



Dock labour and port-related employment in the European seaport system

Key factors to port competitiveness and reform

Report prepared for
European Sea Ports
Organisation (ESPO)

Report prepared by
Theo Notteboom

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Disclaimer

The views and opinions expressed by the writer of this report do not necessarily state or reflect those of the European Sea Ports Organization (ESPO) or any member of ESPO.

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1. Introduction

European ports are important job generators. Ship, cargo and industrial activities and services in port areas generate direct employment effects. The logistics and industrial clusters in the European port system employ a vast labour force linked to ship loading and unloading operations, ship operations and services (agencies, pilotage, towage and bunkering), land transport, logistics activities, cargo services (e.g. freight forwarding and customs broking), industrial production facilities and government agencies. The skills of the port-related employees and the interactions between them contribute to the competitiveness of seaports. Port activities are also responsible for a wide range of indirect employment effects, through the linkages of harbours with other economic sectors and the spatial interactions with large logistics and economic poles outside port areas. Job creation in ports is mirrored on employment levels in the field of education and training, tourism and even in more cultural segments of the economic spectrum such as (maritime) museums. All the above activities provide people with wages, salaries and other earnings and are a major source of tax revenues for governments at different geographical levels.

Cargo handling operations form the core of the *raison d'être* of ports. The efficiency and effectiveness with which loading and discharging activities take place in a port are important cornerstones for the port's competitiveness and its ability to generate wider economic effects in terms of employment and value-added creation. Dock labour systems have an important role to play here.

This report aims at providing a deeper understanding of the dynamics behind port employment and port labour and their relation with port competitiveness and port reform. The report aims for a balanced approach taking into account considerations and developments related to the general employment impact of ports as well as those at the level of dock labour. The findings of the report serve as input for the ongoing discussion on the role of the human factor in the European port system.

The report is structured as follows. In a first part, we analyze the employment effects in European ports. The sources of employment in ports are depicted and we elaborate on the complexity linked to the measurement of port-related employment in European ports. The first part also pays attention to the role of employment in raising the public awareness regarding ports. The second part of the report deals with dock labour in European seaports. We introduce a conceptual framework on dock labour systems and arrangements. After a detailed discussion on each of the components of the framework, the report concludes by analyzing key issues in port labour systems and reform in European ports.

This is the fourth report in a series of port studies realized within the framework of the existing service agreement between the European Sea Ports Organisation and the Institute of Transport and Maritime Management Antwerp (ITMMA), an institute of the University of Antwerp (see a listing of the other reports at the end of this report). The views and opinions expressed in this report do not necessarily state or reflect those of the European Sea Ports Organization (ESPO) or any member of ESPO.

2. Employment effects and issues in European ports

2.1. *Employment effects of ports: an overview*

Transport, storage and transshipment of goods are in principle derived economic activities. If there is no extraction of raw materials, no production of intermediate and finished products or no consumption of these goods, there is no demand for cargo transportation, storage or handling. However, narrowing down the European port system to just a derived activity of the basic economic activities does not give the right picture. The port and maritime industry has evolved into a fully fledged economic sector with its own dynamics. As a result, European ports are increasingly functioning not as individual places that handle ships but as turntables within global supply chains and global production networks. European ports are important generators of employment at the local, regional, national and even European level.

The employment effects of a port activity usually extend beyond the initial round of employment generated by that activity. For example, stevedoring companies purchase a part of their inputs from local suppliers. The production of these inputs generates additional employment in the local economy. The suppliers in turn purchase goods and services from other local firms. There are further rounds of local re-spending which generate additional employment. Similarly, households that receive income from employment in stevedoring and related activities spend some of their income on local goods and services. These purchases result in additional local jobs. Some of the household income from these additional jobs is in turn spent on local goods and services, thereby creating further jobs and income for local households. As a result of these successive rounds of re-spending in the framework of local purchases, the overall impact on the economy exceeds the initial round of output, income and employment generated by stevedoring. In essence, seaports create employment impacts in four ways (Martin Associates, 2007): direct, induced, indirect and related jobs.

First of all, **direct employment** includes the jobs local firms provide to support services to the seaport. Seaports create direct port employment through cargo handling services, ship operations and nautical services and via government agencies. These jobs are dependent upon seaport activity and would disappear if the seaport activity were to cease. Typical direct jobs include dock workers (see the extensive analysis provided in the second part of this report), ship agents, pilots, tug boat operators, freight forwarders, employees of port authorities, ship chandlers, warehouse operators, terminal operators and stevedores, railroad, barging and trucking companies.

Ports also generate **indirect jobs** as the result of local purchases by the port-related companies directly dependent upon seaport activity. Hence, port activities are responsible for a wide range of indirect employment effects, through the linkages of harbours with other economic sectors and the spatial interactions with large logistics and economic poles outside port areas. The indirect jobs include jobs in local office supply firms, equipment and parts suppliers, maintenance and repair services, insurance companies, consulting and other business services.

The employees of port-related companies spend part of their wages and salaries. **Induced jobs** are jobs created locally and throughout the wider national or supranational economy due to purchases of goods and services by those directly employed. Induced employment can include grocery stores, local construction industry (housing), retail stores, health care providers, local transportation services, local and state government agencies providing public services and education to those directly employed, and businesses providing professional and business services in support of those directly employed.

The last group of employment effects consists of **related jobs**. Manufacturing and distribution firms in and outside the port partly rely on efficient cargo handling operations in seaports. For instance, the steel industry requires cost efficient import of iron ore and coal for the blast furnaces and needs the port for exporting finished products such as steel booms and coils. The construction industry moves construction materials via deepwater ports. Manufacturers and retail outlets and distribution centres handling imported containerized cargo rely on efficient port operations. Also firms producing and consuming liquid bulk cargoes such as petrochemical and chemical companies use ports. The dependency of related jobs on the port is a function of the location. When industrial activities or distribution centres are located in the port or in close proximity then a low competitiveness of the seaport could lead to a loss of jobs. In such a case, it is difficult to make a strict distinction between direct and related jobs. When these activities are located in the more distant hinterland then inefficient operations in one port could lead to a shift of the cargo flows to a competing port. A shift of traffic between ports generally preserves the employment levels in the related industrial companies and distribution centres in the more distant hinterland. It is the demand for the final product (e.g. steel products or consumer products) which creates the demand for the employment with these shippers/consignees, not the use of a particular seaport or marine terminal.

The extent of the employment effects of port activity is affected by the boundaries of the economy that is being analysed. The increasingly international nature of port and shipping activities and the characteristics of global production networks and global supply chains make that the employment effects of port activities typically extend more and more from a local port level to a regional or even supranational level. A few examples underline this above tendency. Shipping lines are operational on a global scale. At a local scale they might generate employment via their liner shipping agencies in the ports of call. However, the jobs related to ship management, container fleet management and the investment and the commercial strategies are usually concentrated in global or regional headquarters. The same applies to global container terminal operators such as PSA, Hutchison Port Holding, DP World or APM Terminals. While these companies generate many operational jobs at the local port level, they keep some activities centralized in global or regional headquarters (e.g. equipment purchases, R&D, etc..). Terminal operators might purchase terminal equipment not from local operators, but from foreign suppliers in Europe (e.g. Kalmar, Gottwald) or from overseas (e.g. Shanghai-based ZPMC). For a particular port activity, the flow-on employment effects to the national or international economy will thus generally be larger than the flow-on effects to the regional economy.



London – one of the world's leading maritime cities

The tendency towards the global level is even more visible when looking at advanced producer services (APS, e.g. accountancy, advertising, banking/finance and law) that support international commodity chains that move through ports. Jacobs et al. (2010) show there is a weak relation between commodity flow patterns in ports and the localization of these APS. Specialized APS tend to agglomerate near other APS service providers in global cities such as London, New York, Singapore or Hong Kong. Even non-port cities such as Madrid, Moscow and Paris show a high concentration of APS firms. To a certain degree, a spatial division of labour has taken place between the concentration of port-maritime advanced services and the physical flows of goods and ships. Next to London, New York, Singapore or Hong Kong, only a few port cities such as Rotterdam, Houston and Hamburg have succeeded in combining both physical flows with a considerable scale in APS functions. Along the same lines, the study of Verhetsel and Sel (2009) revealed that Hong Kong, Hamburg, Singapore, Shanghai, Tokyo, New Jersey/New York, Bangkok/Laem Chabang and London are the world's leading maritime cities.

2.2. Sources of employment in ports: vessel operations, cargo handling and port management & development

Vessel operations in ports create a wide range of direct and indirect jobs. The call of a vessel in a port generally requires the involvement of towage companies, pilotage services, mooring/unmooring services, the harbour master's office (part of port authority or government department), lock operators (if any), ship agents, companies involved in signalling and shipping services, waste reception facilities, ship suppliers and chandlers, marine surveyors, bunkering firms, classification societies, safety and security firms, etc.. . Quite a number of ports also offer ship repair facilities.

Infrastructure development and maintenance in ports are responsible for a wide range of direct and indirect jobs. Dredging companies execute most of the capital and maintenance dredging works in European ports. The development of new terminals and port zones offers project work to consultancy firms, contractors and construction firms, engineering firms and all sorts of suppliers of technical equipment and services. In addition, the development of land transport infrastructure goes hand in hand with (temporary) jobs.

Cargo and vessel operations in ports create jobs at the level of government agencies and organizations of all kinds. Semi-public or public managing bodies of ports are important job creators, depending on the tasks the port authority adopts. Government jobs typically linked to port activities include customs officers, veterinary and food inspectors, environmental officers, harbour police, pilots, state-owned tugboat companies, navigation aids and vessel traffic systems (VTS), fire fighters, maritime courts, etc.. . Army activities in port areas also contribute to a port's economic impact. The permanent stationing of naval fleets in a seaport or visits by foreign naval vessels may have effects on a regional economy in the form of the purchase of fuel and provisions, and the expenditure by ships' crews in the local economy.

The branch associations of economic sectors in the port (i.e. freight forwarders, ship agents, industrial firms, etc..) and umbrella associations (e.g. Deltalinqs in Rotterdam, Alfaport in Antwerp) employ people for the study and promotion of their respective port sectors. Numerous jobs are created in training and education, not only at the public level (universities, public schools of higher education, technical schools) but also in private training centres. A wide range of advanced service firms (such as banks, other financial institutions and investment firms, insurance firms, law firms, etc..) realize a part of their turnover in ports.

Cargo handling operations lie at the core of the *raison d'être* of ports. The efficiency and effectiveness, with which loading and discharging activities take place in a port, are important cornerstones for the port's competitiveness and its ability to generate wider economic effects in terms of employment and value added creation. Cargo handling in the first place creates jobs at terminal and stevedoring companies in the form of dock worker and management/administrative positions. While the dock labour force typically represent a modest portion of total direct jobs in quite a number of ports, the dock labour system has an important role to play in this context as will be demonstrated in the second part of this report. The dock labour needs are very dependent on the cargo flows handled in the port. Other cargo service related jobs include cargo survey, land transport and storage, port-related storage, conveyor/pipeline transfer between berths and storage facilities, etc.. .

Although the general cargo market has witnessed an increased container penetration rate in recent years, the volume of break bulk cargo shipped overseas is still very significant. In 2006, some 340 European ports handled about 319 million tons of conventional general cargo (see ESPO/ITMMA market report of 2007). In comparison, container throughput in the same year reached around 700 million tons. Compared to the handling of, say, crude oil or the major dry bulks, conventional general cargo is much more labour-intensive and generates a substantially higher value added per ton. This is confirmed by various studies (textbox 2.1). So, per ton handled conventional general cargo that is normally packed, bundled or unitized but which is not stowed in containers, is the largest generator of dock-related jobs although large difference might exist among commodities. Hence, conventional general cargo encompasses a myriad of different commodities:

- Project cargo: e.g. power generation plants, steel mills, wood pulp factories, gas power plants, road construction equipment, ...
- Power plant equipment: e.g. gas turbines, power generators, transformers, turbines, heavy machinery, industrial equipment, ...
- Iron and steel products: e.g. bars, coils, plates, wires, ...
- Forest products: i.e. all kinds of wood and paper products
- Parcels: e.g. malt, fertilizer, sugar, rice, ...
- Reefer vessel trades: e.g. fruit, meat
- Break-bulk shipments of smaller lots

Generally speaking, the handling of conventional general cargo is confronted with ever-tighter handling space in many seaports in Europe (as more and more square metres are consumed by containers) and, given the strong labour intensity, it is also very sensitive to labour-related issues.

Ports are nodes of goods and information flows. Many service companies involved in the booking, consolidation and tracking of vessels and cargo (e.g. freight forwarders and ship agents) are located in seaport area or in the immediate vicinity. The consolidation of cargo is an important port activity, which not only generates added value and employment, but also contributes to efficiency improvements in terms of loading rates and in terms of the balance between incoming and outgoing goods flows. Ports often act as a consolidation points for partial loads (e.g. LCL cargo and groupage activities). However, disintermediation in the supply chains and the increasing globalization of the maritime and port industry can imply that some ports face a relocation of some of the decision-making power over cargo flows to inland centres or major (maritime) cities. When cargo control centres are set-up outside the port area, the role of the local service providers is narrowed down to specific operational tasks or back-office functions. The role of the port in supply chains is therefore increasingly dependent on factors and actors outside the port area.

Textbox 2.1. Measuring the relative value added per ton

Several studies have attempted to measure intrinsic cargo handling values by presenting the relative value added associated with the handling of one ton of cargo. The methodologies deployed range from bottom-up to top-down approaches. The first of such 'rules' was presented by the port of Hamburg in 1976 (Schultze-Gisevius, 1985) and stated that the value added created by one ton of conventional cargo is five times higher than the value added linked to the handling of one ton of dry bulk and fifteen times higher than one ton of liquid bulk.

The 'Bremen Rule' was presented in 1982 by the port of Bremen. The rule was based on the differences in labour costs for handling cargo and came to the following relative weights: 1 ton of general cargo equals 3 tons of dry bulk equals 12 tons of liquid bulk.

The Rotterdam Port Authority introduced the 'Rotterdam Rule' in 1985 and refined the method further in 1991. The rule states that the total value added created by 1 ton of conventional cargo in the port = 2.5 tons of oil products = 3 tons of containers = 4 tons of cereals = 7.5 tons of other bulk = 8 tons of roro traffic = 10 tons of coal = 12.7 tons of iron ore = 15 tons of crude oil.

In 1986, the 'Dupuydauby Rule' came to the following relative weights in cargo handling value per ton: 1 ton conventional cargo = 3 tons of containers and roro traffic = 6 tons of dry bulk = 9 tons of liquid bulk = 12 tons of crude oil.

The 'Antwerp Rule' is based on data of the Antwerp port for the reference year 1995 and distinguishes thirteen traffic categories. Based on these figures, the highest value added per ton in the port of Antwerp is created by the handling of fruit. The weights proposed by the 'Antwerp Rule' are 1 ton of fruit = 1.5 tons of cars and vehicles = 1.6 tons of other conventional cargo = 3 tons of forest products = 3 tons of other roro = 3.5 tons of coils and ferro = 5 tons of other liquid bulk = 7 tons of containers = 8 tons of fertilizers = 10 tons of other dry bulk = 11 tons of ores and coal = 12 tons of cereal = 47 tons of crude oil.

As the 'Antwerp Rule' is only based on Antwerp data, the University of Antwerp also developed a 'Range rule' based on data for ports in the Hamburg-Le Havre range. The weights obtained are the following: 1 ton of roro = 1 ton of conventional cargo = 2 tons of other liquid bulk = 3 tons of containers = 5 tons of dry bulk = 18 tons of crude oil.

Source: based on Huybrechts et al. (2002)

The employment and value added per ton increases in case the goods undergo logistics or industrial transformations in the port area. For example, the stuffing and stripping of containers is up to five times more labour intensive than the loading or discharging from the vessel. Storage, distribution and other logistics activities in the framework of industrial subcontracting or postponed manufacturing in the port area also boost employment levels for a given cargo throughput level in a port. The gateway position of major seaports offers opportunities for the development of value-added logistics (VAL). Many European seaports have evolved from pure transshipment centres to complexes of key functions within a logistics system. A mix of pure stevedoring activities and logistics activities occurs. A non-exhaustive list of logistics activities that typically opt for a location in a port includes:

- Logistics activities involving big volumes of bulk cargoes, suitable for inland navigation and rail;
- Logistics activities directly related to companies which have a (production) site in the port area;
- Logistics activities related to cargo that needs flexible storage to create a buffer (products subject to season dependent fluctuations or irregular supply);
- Logistics activities with a high dependency on short sea shipping.

Moreover, port areas typically possess a strong competitiveness for distribution centres in a multiple import structure and as a consolidation centre for export cargo. Many seaports have responded by creating logistics parks inside the port area or in the immediate vicinity of the port. Three basic types of port-based logistics parks in seaport areas can be distinguished (Buck Consultants International, 1996, Kuipers 1999):

- *Traditional seaport-based logistics park*: this type of logistics park is associated with the pre-container area in seaports.
- *Container oriented logistics parks*. This is the dominant type with a number of large warehouses close to the container terminal locations and intermodal terminal facilities.
- *Specialised seaport-based logistics parks*. This type of park specializes on different functions, often closely related to the characteristics of the seaport. The park may focus on the storage of liquid bulk (chemicals), on trade in which a combination of warehousing and office space is offered to a number of import-export companies or on high-value office related employment in which Fourth Party Logistics Service Providers, logistics software firms, financial service providers to the maritime industry and consultants are located in the park.

The rise of port-based activities in the hinterland (also called demaritimisation or sub-harborisation) can put pressure on the logistics activities in ports and can spread logistics job creation from the port to the wider hinterland. The development of logistics poles in the hinterland will be discussed in the 'market developments' section of the part on dock labour in this report.

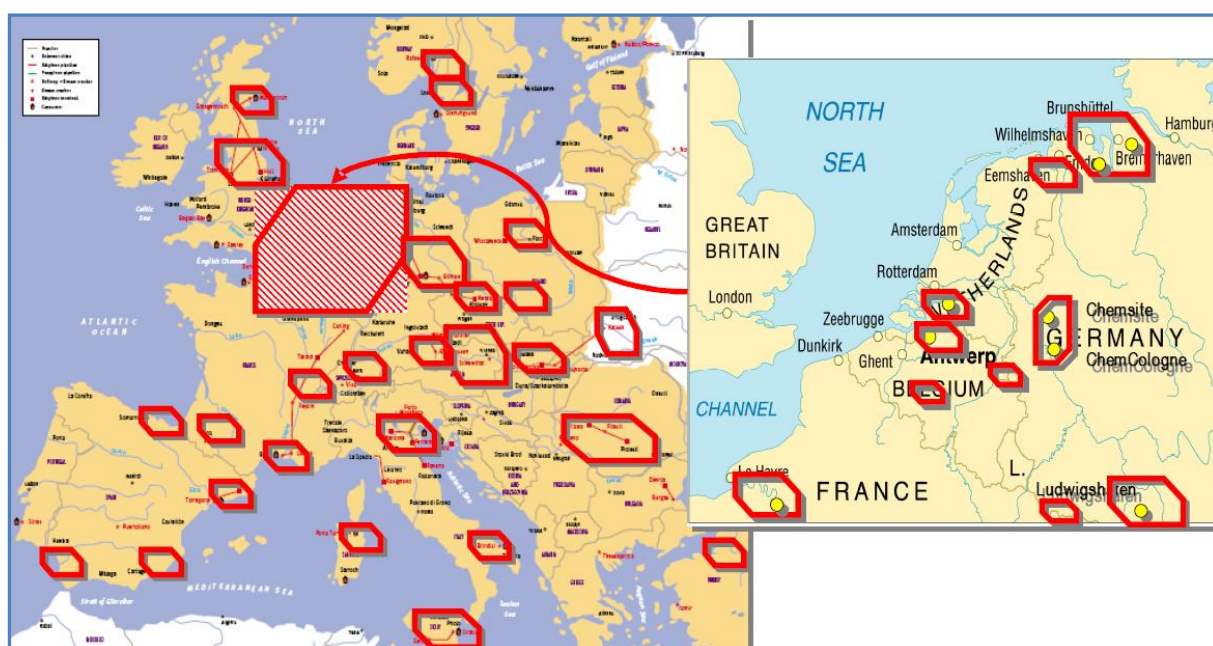
2.3. Sources of employment in ports: industrial activities

2.3.1. The (petro)chemical industry

Europe has over 300 chemical production sites, the majority of which are located in clusters. In the EU, some 29,000 chemical and pharmaceutical companies employ a total staff of about 1.84 million, or 6% of the overall workforce in the manufacturing industry. Chemicals alone account for 1.26 million employees. Employment in the EU chemical industry has decreased by 2% over the last 10 years. The chemical industry is the second leading manufacturing sector (after pharmaceuticals) in terms of value added per employee (figures CEFIC). Most of the chemical clusters have evolved historically around either a raw material source, or as a supplier to the downstream industry. As the raw material supply and the downstream industries have evolved, these clusters have adapted to these changes. In general Europe's chemical industry clusters are highly integrated along the product value chains and benefit from competitive infrastructure, utilities and services.

In the 1950s and 1960s port areas started to play a prominent role in attracting petrochemical and chemical industries. Today, the MIDAs (Maritime Industrial Development Area) or large integrated centres of industrial activities in seaports constitute an essential part of the economic activity in ports as exemplified by the large petrochemical and chemical clusters in Marseille, Rotterdam, Antwerp, Wilhelmshaven, Tarragona and Taranto to name but a few. These clusters are integrated upstream into primary raw materials, feedstock, commodities or intermediates and downstream into other chemical industry sectors or into key customer industries (e.g. automotive, packaging, construction).

Figure 2.1. The main chemical clusters in Europe



Source: based on European Chemical Site Promotion Platform (ECSPP)

The petrochemical industry is strongly based on **oil refinery** activities. There are around 116 refineries in the European Union (figures 2007 of European Petroleum Industry Association), many of which are located in seaports. Together they account for around 767 million tons of refining capacity per year, 18% of total global refining capacity.

The chemical industry can be divided in four main categories. First, there are the **basic chemicals** which includes polymers (e.g. polyethylene (PE), polyvinyl chloride (PVC), polypropylene (PP), polystyrene (PS) and man-made fibres such as polyester, nylon, polypropylene and acrylics), bulk petrochemicals and intermediates (i.e. primarily made from liquefied petroleum gas (LPG), natural gas and crude oil and used for the production of ethylene, propylene, benzene, toluene, methanol, styrene, etc.), other derivatives and basic industrials (e.g. synthetic rubber, surfactants, dyes and pigments, resins, carbon black, explosives), inorganic chemicals (e.g. salt, chlorine, caustic soda, soda ash, acids) and fertilizers (phosphates, ammonia and potash chemicals). Second, there are the **life sciences** which include differentiated chemical and biological substances, pharmaceuticals, diagnostics, animal health products, vitamins and crop protection (herbicides, insecticides and fungicides). These products tend to have very high prices and require a lot of investment in research and development. The third group concerns the **specialty chemicals** such electronic chemicals, industrial gases, adhesives, sealants, coatings, cleaning products and catalysts. The fourth group consists of the **consumer products** that are directly sold to the consumer such as soaps, detergents and cosmetics.



Partly as a result of the presence of large petrochemical and chemical sites in seaports, the liquid bulk market is the largest cargo handling segment in the European port system, at least when expressed in metric tons handled. The total handling of liquid bulk in European ports is estimated at more than 1.5 billion tons in 2007 (see also statistics section of ESPO Annual Report 2008-2009).

The successful development of the chemical clusters in seaports depends on various factors such as (a) the availability of skilled labour at competitive prices, (b) good training and educational facilities (c) the role and support of port authorities and government agencies in providing incentives and support in the development of infrastructure, (d) the availability of land, (e) the availability of raw material supplies at competitive prices, (f) competitive prices for energy and utilities, (g) a low-risk and stable business climate and stable regulatory environment, (h) co-siting and partnering opportunities (industrial cascades), (i) the relative proximity and easy access to most important customers and (j) the availability of efficient services (logistics, finance, IT, packaging, security, marketing, promotion etc).

A competitive cluster also requires good inter-company infrastructure (e.g. pipelines), product diversity, the sharing of utility services and infrastructure and a strong cluster governance. Chemical clusters are increasingly overcoming regional boundaries by developing pipeline systems and other mass transport infrastructure that link chemical clusters in several ports (cf. linkages between Rotterdam, Antwerp and Terneuzen) and the ports to major chemical clusters in the hinterland (cf. links between Rhine-Scheldt Delta, the chemical axis along the Albert Canal to Liège and the German Ruhr area).

2.3.2. The steel industry

The steel industry employs directly 280,000 people in the EU and produces about 160 million tons of crude steel per year or about 20% of the world production (figures of Eurofer – European Confederation of Iron and Steel Industries). The steel industry operates in a highly competitive environment on a global market, where rigorous cost management is imperative for maintaining and strengthening the industry's competitiveness. Therefore, steelmaking processes have been developed and refined over the years. Steelmaking is capital intensive and the average plant life is very long, which makes changes to new technologies possible only in a timeframe of several decades.

Figure 2.2: Location of European flat carbon steel mills of ArcelorMittal



Many of Europe's steel plants are located in seaport areas. A good example is ArcelorMittal, the world's largest steel group. ArcelorMittal operates several 'maritime' flat carbon steel mills (e.g. Dunkirk, Ghent, Fos, Gijon, Bremen). Most other mills are located less than 100km from major import ports (figure 2.2). On the import side, steel plants generate large flows of iron ore, pellets, cokes coal, metal scrap and steel slabs. The outgoing cargo flows typically include steel coils, steel booms, steel wires and related products.

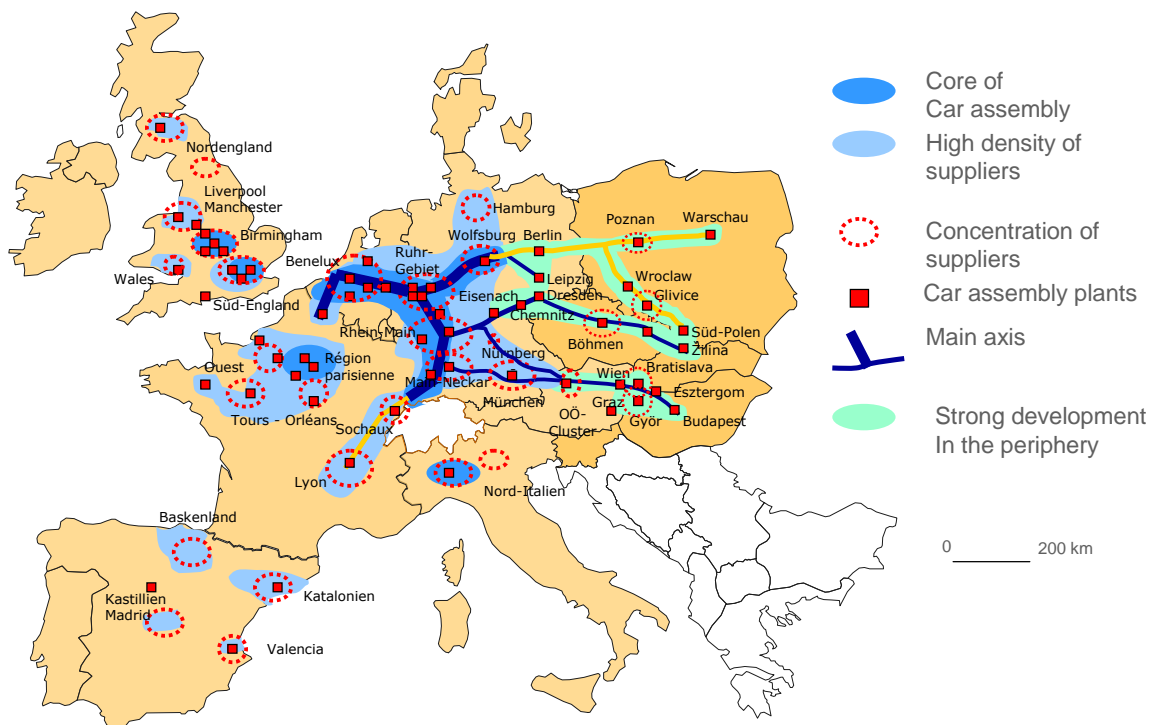


2.3.3. The automotive industry

The automotive industry in the European Union generates significant activity throughout the economy – from materials and parts supply, to R&D and manufacturing, to sales and after-sales services. Vehicle manufacturing in the EU supports over 2.2 million direct jobs with an additional 9.8 million people employed in associated industries such as metals, plastics, chemicals, textiles and electric and electronic systems. Exports are valued at over 70 billion euro annually (figures of European Automobile Manufacturers' Association – EAMA). Total vehicle production in Europe (cars, trucks, buses) decreased by 17.3% compared to 2008 and by 23% compared to the pre-crisis level of 2007. Passenger car production dropped by 13% to reach 13.4 million units. Germany is by far the largest vehicle producer (5.2 million units) in the EU. In 2009, some 14.1 million new cars were registered in the EU. There are fourteen international players active in Europe (BMW Group, DAF Trucks, Daimler, FIAT Group, Ford of Europe, General Motors Europe, Jaguar Land Rover, MAN Nutzfahrzeuge, Porsche, PSA Peugeot Citroën, Renault, Scania, Toyota Motor Europe, Volkswagen and Volvo Group) and together these groups operate over 250 plants in 18 EU countries. The number of assembly plants in the EU is estimated at around 150.

The European automotive network, as depicted in figure 2.3, demonstrates how the main axes of car assembly and supplier activities are increasingly being complemented by strong developments in the periphery. The figure does not include the Scandinavia/Baltic region. This region, however, is also of major importance to the European automotive industry, with large assembly factories (e.g. Volvo and Saab in Sweden). Table 2.1 provides an overview of the car manufacturing sites located in or near seaport areas. While assembly plants mostly do not locate in seaport areas (only about 10 of the 150 European assembly plants are located in seaport areas), they often establish quite close to seaports for reasons of ingoing and outgoing flows of parts and finished cars.

Figure 2.3. The European automotive network



Source: Podvin; to-Consulting

Table 2.1. Car assembly sites in or in close proximity (< 25 km) of seaport areas

	Location of production site	Close to seaport (<25 km)	Brands produced
Belgium	Ghent	Ghent	Volvo
Belgium	Antwerp	Antwerp (in port area)	Opel
Finland	Uusikaupunki	Uusikaupunki	Fisker, Porsche
France	Dieppe	Dieppe	Renault
France	Sandouville	Le Havre	Renault
Germany	Bremen	Bremen/Bremerhaven	Mercedes
Germany	Emden	Emden	Volkswagen
Italy	Pomigliano d'Arco	Naples	Alfa Romeo
Italy	Termini Imerese	Palermo	Lancia
Portugal	Setubal	Setubal	Volkswagen, Seat
Portugal	Ovar	Porto	Toyota
Spain	Vigo	Vigo	Citroen, Peugeot
Spain	Valencia	Valencia	Ford
Spain	Martorell	Barcelona	Seat
Spain	Barcelona	Barcelona	Nissan, Opel, Renault (vans)
Sweden	Gothenborg	Gothenborg	Volvo
Sweden	Uddevella	Uddevella	Volvo
UK	Good Wood	Portsmouth	Rolls Royce
UK	Dartford	Tilbury	Caterham
UK	Norwich	Great Yarmouth	Lotus, Tesla
UK	Sunderland	Newcastle	Nissan
UK	Ellesmere Port	Liverpool	Opel/Vauxhall
UK	Southampton	Southampton	Ford (vans)

Based: own compilation based on data 'Guide to assembly plants in Europe', www.autonewseurope.com

2.3.4. Energy production and distribution

Electricity is produced in conventional steam-electric plants (coal and lignite), conventional steam-electric plants (other fuels), combined-cycle and gas turbine plants, conventional hydroelectric plants, pumped-storage hydroelectric plants, nuclear power plants, waste-to-energy plants, biomass power plants, diesel and gas-engine power plants, wind energy plants, geothermal power plants and solar power plants. The availability of land and cooling water and the presence of large industrial customers are some of the reasons for energy producing firms to set-up business in seaport areas. Depending on the set-up, conventional steam-electric plants are massive consumers of coal.

In March 2010, there were a total of 195 nuclear power plant units in operation in Europe and 16 new units were under construction in six countries (figures of the European Nuclear Society). A number of these are located in seaport areas as illustrated in the pictures below.

Growing trends in electricity production include plants that produce electricity based on gas, pellets, waste or biomass. Stations powered by these fuels present economic advantages, are often faster to build and are more environmentally friendly, when compared to electricity production from other (fossil) fuels. There is also an increased interest in wind energy. While most wind farms are installed offshore (mostly on sand banks) or in open plots in the hinterland, a number of seaports are also home to wind farms. These wind farms are typically installed on breakwaters or on narrow stretches of land close to the sea thereby benefiting from favourable winds in coastal areas.



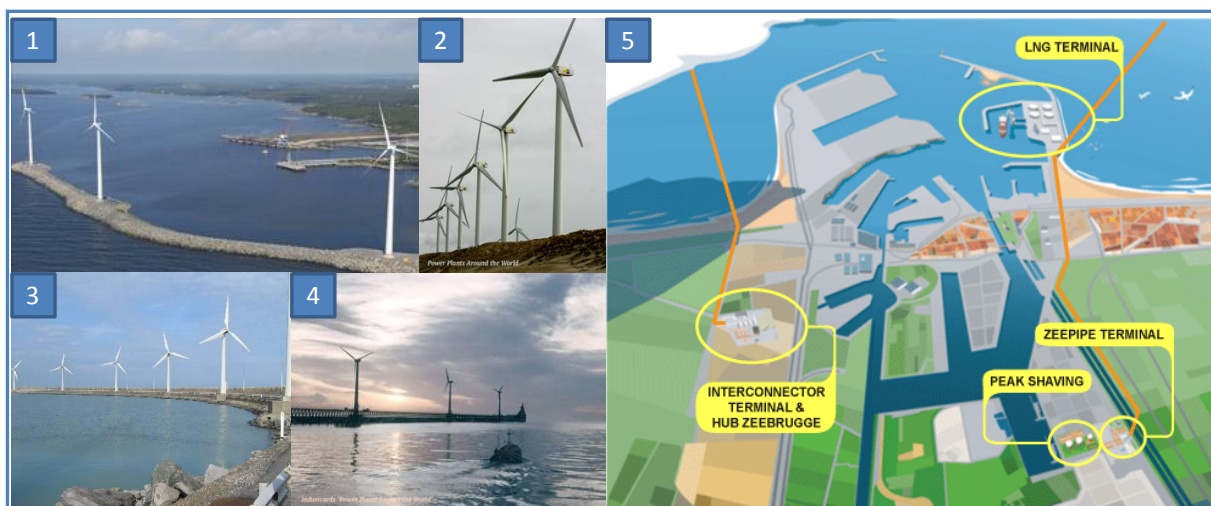
Examples of coal-fired and gas and oil fired plants in or near seaport areas

- 1 – Sines, Portugal (hard coal), 2 – Varna, Bulgaria (bituminous coal and natural gas), 3 – Esbjerg, Denmark (hard coal, oil),
4 – Hanasaari, Finland (hard coal, oil), 5 – Rotterdam/Maasvlakte, the Netherlands (hard coal, natural gas, biomass),
6 – Le Havre, France (hard coal, heavy fuel oil).



Examples of nuclear power plants in or near seaport areas

- 1 – Doel (Antwerp), Belgium, 2 – Borssele (Flushing), the Netherlands, 3 – Vandelló II (Tarragona), Spain



1 to 4 - Examples of wind farms in seaport areas

- 1 – Karuhsaari, Finland, 2 – IJmuiden in Rotterdam, the Netherlands, 3 – Zeebrugge, Belgium, 4 – Blyth Harbour, UK
5 – Gas terminals in the port of Zeebrugge, Belgium (source Fluxys)

LNG terminal in outer harbour for LNG ships, terminals for pipelines Zeebrugge (from Norway's Troll and Sleipner gas fields) and Interconnector (to/from Bacton, UK) and peak shaving installation

Many seaports also play an essential role in the distribution of natural gas. The gas comes in either via vessels (LNG carrier) on specialized deep sea terminals or via pipelines which land in the seaport area. The largest reserves of natural gas are found in Russia, Iran and Qatar. A major pipeline project in the Trans-European Network for Energy (TEN-E) is the Nord Stream, a gas pipeline to link Russia and the European Union via the Baltic Sea (capacity of up to 55 billion cubic metres). Large new LNG terminals are being planned and or constructed all over Europe in an effort to reduce Western Europe's reliance on the Russian Federation's Gazprom. Currently, there are existing LNG regasification terminals or new terminals under construction in ports of Portugal (Sines), Spain (Bilbao, Gijon, Huelva, Cartagena, Sagunto and Barcelona), France (Fos and Montoir), Belgium (Zeebrugge), the Netherlands (Rotterdam), UK (Teesside, Milford Haven and Isle of Grain), Italy (Brindisi, La Spezia, Rovigo and Livorno), Sweden (Brunnsviksholme) and Greece (Revythoussa). A dozen additional LNG terminal projects are under consideration in countries such as Croatia, Cyprus, Germany, Ireland, Poland, Lithuania, Estonia, Finland, France and Romania.

The presence of power plants and power distribution infrastructure not only generates direct jobs in power plants, energy distribution platforms and the terminal operating business (i.e. handling of coal, gas and other fuels), but is also a major creator of jobs in other industries and services such as engineering firms, construction companies, maintenance and repair companies, survey and inspection firms, security services, etc... .

Figure 2.4. The projected Nord Stream pipeline and major gas pipelines in north Europe



Source: www.nord-stream.com

2.3.5. Other industries

There exists a wide range of other industrial activities that typically locate in port areas. Industries that are part of maritime clusters include shipyards (ship repair and shipbuilding), marine equipment companies, crane and terminal equipment producers, salvage companies, offshore companies (offshore survey, exploration, production, installation, supply, pipe laying, etc.), marine construction firms, dredging firms, naval bases, the fish processing industry, etc.. . Non-maritime cluster industries that are often found in ports and were not discussed earlier include paper mills, food production companies (e.g. fruit juice), firms producing building materials (e.g. cement, bricks, tiles), etc.. .

2.4. Port-related employment and the public image of ports

Nowadays, ports are viewed as independent commercial undertakings aiming at full cost recovery and a rapid response to the customer. The economic effects of seaport activities are no longer limited to the local environment, but are spread over a much wider geographical area and among a large number of international players (cf. the impact of horizontal and vertical integration among market players, see Notteboom and Winkelmans, 2001). In other words, the economic benefits of port activities are expanding from the local port system towards a much larger economic system (Benacchio and Musso, 2001).

A large part of the population takes seaports for granted and is ignorant of how the port is organized and operated and to what extent the port contributes to the local economy. More attention is given to the fact that the growth of a port in many cases goes hand in hand with negative effects for the local community, such as road congestion, intrusion of the landscape, noise and air pollution and the use of scarce land. Port areas are often considered by the general public as desolate, dangerous, dirty and unattractive areas characterized by ugly buildings and large machinery. Many people feel disconnected from ports, particularly in those areas where the port has moved away from the city. The erosion of public support for seaports is a major issue in port management.

Some community groups argue that there is a clear imbalance between the benefits and costs for the local community of having larger and larger ports. This viewpoint is a breeding ground for major socio-economic confrontations related to port development. As such, port managers and government bodies nowadays (have to) spend a lot of time in trying to make sure that new port developments are socially broadly based. Ports cannot take broad public support for development plans for granted. This aspect of port competitiveness will undoubtedly become more important in the near future as resources such as land are becoming scarcer and as broader social and environmental functions are challenging the economic function of seaports. The more international the maritime and port industry becomes, the more energy will have to be put in embedding the port in the local community.

In line with the 'soft values' approach introduced by Van Hooydonk (2006, 2007), ports are challenged to improve the public image of seaports. This can be done by combining several approaches: (a) external communications policies and public events and festivities in and around port areas – such as Port Days; (b) convince the general public of the importance of ports by presenting figures on employment effects and added value; (c) adopt a green port management strategy; (d) stakeholder relations management, i.e. the development of good relations with all parties concerned, particularly with respect to port expansion plans or redevelopment/regeneration plans focusing on older port areas (i.e. waterfront redevelopment).



Some European examples of dockland and riverfront redevelopment

1 - Genoa (Porto Antico), 2 - Hamburg (HafenCity), 3 - London (Docklands), 4 - Lisbon (Parque das Nações), 5 – Valencia, 6 - Marseilles (Euroméditerranée), 7 - Rotterdam (Kop van Zuid), 8 - Antwerp ('t Eilandje)

A waterfront redevelopment program which respects the maritime heritage of the port and re-establishes the link between the city and the port can revive the public acceptance of ports. It can also bring new jobs to derelict port areas. In many European ports, public and private investments have been channelled to revitalize older port areas encompassing housing, hotels, maritime heritage projects, sports, recreation, tourism and local commerce. Residential, recreational, commercial, retail, service and tourist facilities are mixed to create multifunctional areas with a broad range of employment opportunities. At first glance, redeveloped docklands all over the world look very much the same. However, the objectives, approach and focus of waterfront projects can differ considerably. In the pioneering London Docklands scheme in London, the focus was on the provision of office accommodation, while in Barcelona, where the waterfront conversion project contributed to an unprecedented investment, tourism, employment and population boom, the emphasis was on the creation of leisure and shopping facilities and the rearrangement of traffic flows. Similar redevelopment initiatives have been taken in other port cities as well, turning port areas into very attractive places for living, working and recreation.

Many waterfront projects bring in a clear cultural component through museums (e.g. Guggenheim Museum in Bilbao, 'Museum aan de Stroom' (MAS) in Antwerp), opera houses and concert halls (e.g. Elbphilharmonie in Hamburg). The link with the maritime heritage is often enhanced by the establishment of port museums. The new urban waterfront also provides many service jobs linked to bars, restaurants, convenience shops, etc. and jobs linked to the usual range of neighbourhood services expected by the new residents of the waterfront. Hotels have become a prominent feature of urban waterfronts all over the world. These hotels are usually accompanied by a cluster of

restaurants that look out over the water, and often specialize in seafood. Increased visitor expenditure through the multiplier can create new investment and employment opportunities.

Waterfronts are also places for recreation. The European yachting sector is prominent in the world. Many European ports provide jobs to people working in marinas, sailing schools, yacht and boat repair and maintenance yards, and similar waterfront operations.



A number of European ports have become turntables in the cruise industry, with most cruise terminals located close to the city centre. Cruise vessels near the city reinforce the maritime link between cities and ports and are visible signs of the touristic attractiveness of the city. In 2008, the European Cruise Council (ECC), MedCruise and their partners announced that the cruise industry accounts for 225,586 jobs in Europe, over 10 billion euro of direct expenditure by cruise companies, shipbuilding yards and cruise passengers, and 15 million visits to European ports. Every million of euro spent by the cruise industry creates 2.2 million euro in business output and 21 jobs.

The most popular countries for cruise ports of call in Europe are Italy, Spain and Greece (see also table 2.2). Expenditure by passengers from visiting cruise ships may have a significant impact on the regional economy. This is most likely to occur where the port has relatively frequent visits by cruise ships or the region is small. Cruise passengers may also spend time in the metropolitan area before or after their voyages, generating additional economic impacts through their visitor expenditures. Cruise vessels calling a port also generate jobs at the level of pilotage, tugs, provisions, fuel, crew shore leave, passenger services, inspections, immigration, hotels, restaurants, local attractions and other visitor activities in the port area. Further employment is provided by inland transportation involving cruise passengers including air, private car, bus, transit and taxi. Rotterdam, Amsterdam and Antwerp are regular ports of call for river cruises to/from the Rhine.

*Table 2.2. Number of cruise passengers (in/out and transit)
in 120 European seaports –ranking based on 2008 figures*

▲	2008	2009	Area	▲	2008	2009	Area
1	Barcelona	2074554	Mediterranean	61	Trieste (est.)	50000	Mediterranean
2	Civitavecchia	1790000	Mediterranean	62	La Spezia	49656	Mediterranean
3	Baleares	1314074	Mediterranean	63	Invergoron	48098	United Kingdom & Ireland
4	Piraeus	1289882	Mediterranean	64	Trondheim	47938	Iceland, Norway & Faroes
5	Naples	1237075	Mediterranean	65	Tyne	43047	United Kingdom & Ireland
6	Venice	1215088	Mediterranean	66	Akureyri	41705	Iceland, Norway & Faroes
7	Southampton	971258	United Kingdom & Ireland	67	Liverpool	40971	United Kingdom & Ireland
8	Dubrovnik	851961	Mediterranean	68	Bilbao	37126	Europe West Coast
9	Livorno	848861	Mediterranean	69	Eidfjord	36182	Iceland, Norway & Faroes
10	French Riviera (Cannes, Nice)	762092	Mediterranean	70	Volos	35655	Mediterranean
11	Las Palmas	567412	Gran Canaria	71	Cartagena	35375	Mediterranean
12	Copenhagen	560119	The Baltic	72	Klaipeda	32461	The Baltic
13	Santa Cruz de Tenerife	557371	Gran Canaria	73	Cherbourg	31043	Europe West Coast
14	Genoa	547905	Mediterranean	74	Greenock Glasgow	30776	United Kingdom & Ireland
15	Palermo	538721	Mediterranean	75	Molde Andalsnes	28185	Iceland, Norway & Faroes
16	Lisbon	407508	Europe West Coast	76	Torshavn	28154	Iceland, Norway & Faroes
17	Madeira	405306	Mediterranean	77	Rotterdam	27000	Europe West Coast
18	St. Petersburg	394644	The Baltic	78	Rouen	26261	Europe West Coast
19	Cyprus	376706	Mediterranean	79	Aarhus	25536	The Baltic
20	Tallinn	375578	The Baltic	80	Leixões	25500	Europe West Coast
21	Stockholm	363276	The Baltic	81	Zadar	24231	Mediterranean
22	Helsinki	360000	The Baltic	82	Constanza	24207	Black Sea
23	Malaga	352993	Mediterranean	83	Kristiansand	22000	Iceland, Norway & Faroes
24	Gibraltar	308989	Mediterranean	84	Portoferraio	21502	Mediterranean
25	Messina (est.)	300000	Mediterranean	85	Santander	21291	Europe West Coast
26	Dover	273187	United Kingdom & Ireland	86	Falmouth	20007	United Kingdom & Ireland
27	Oslo	239991	The Baltic	87	Sevilla	18089	Mediterranean
28	Bergen	232210	Iceland, Norway & Faroes	88	Brest	17600	Europe West Coast
29	Monaco	231639	Mediterranean	89	Lerwick	17148	United Kingdom & Ireland
30	Amsterdam	226079	Europe West Coast	90	Rønne	16916	The Baltic
31	Cadiz	224905	Europe West Coast	91	Bordeaux	16805	Europe West Coast
32	Bari	222000	Mediterranean	92	Koper	15246	Mediterranean
33	Vigo	216333	Europe West Coast	93	Rijeka	14676	Mediterranean
34	Vigo	216118	Europe West Coast	94	Hammerfest	14305	Iceland, Norway & Faroes
35	Valencia	199335	Mediterranean	95	Tilbury	13546	United Kingdom & Ireland
36	Rostock	171500	The Baltic	96	Gdansk	13276	The Baltic
37	Geiranger	163695	Iceland, Norway & Faroes	97	Göteborg	12445	The Baltic
38	Harwich	133660	United Kingdom & Ireland	98	Isafjordur	11080	Iceland, Norway & Faroes
39	Stavanger	125603	Iceland, Norway & Faroes	99	Sibenik	10516	Mediterranean
40	Split	124525	Mediterranean	100	Kalundborg	10500	The Baltic
41	Gdynia	123521	The Baltic	101	Ravenna	8867	Mediterranean
42	Flåm	119684	Iceland, Norway & Faroes	102	Sète	7926	Mediterranean
43	Toulon	117612	Mediterranean	103	St. Malo	7441	Europe West Coast
44	Hamburg	89791	Europe West Coast	104	Stomoway	7135	United Kingdom & Ireland
45	Alicante	82487	Mediterranean	105	London	6128	United Kingdom & Ireland
46	Nordkapp	80844	Iceland, Norway & Faroes	106	Gijón	6123	Europe West Coast
47	Le Havre	78250	Europe West Coast	107	Ulmuiden	5991	Europe West Coast
48	Tromsø	77874	Iceland, Norway & Faroes	108	Kaatskrona	5778	The Baltic
49	Zeebrugge	74800	Europe West Coast	109	Portree	4635	United Kingdom & Ireland
50	Alesund	66291	Iceland, Norway & Faroes	110	La Rochelle	4593	Europe West Coast
51	Dublin	65101	United Kingdom & Ireland	111	Antwerp	4581	Europe West Coast
52	Cagliari	63638	Mediterranean	112	Cuxhaven	4000	Europe West Coast
53	Cork	60909	United Kingdom & Ireland	113	Helsingborg	3888	The Baltic
54	Almeria	60695	Mediterranean	114	Millford Haven	3798	United Kingdom & Ireland
55	Reykjavik	59308	Iceland, Norway & Faroes	115	Ullapool	3589	United Kingdom & Ireland
56	Olden-Nordfjord	58111	Iceland, Norway & Faroes	116	Isle of Man	3285	United Kingdom & Ireland
57	A Coruña	57508	Europe West Coast	117	Nantes	3203	Europe West Coast
58	Guernsey	54518	United Kingdom & Ireland	118	Turku	2996	The Baltic
59	Edinburgh	53000	United Kingdom & Ireland	119	Oostende	2947	Europe West Coast
60	Riga	50126	The Baltic	120	Seydisfjörður	2563	Iceland, Norway & Faroes

*Source: own compilation based on data of CruiseEurope, MedCruise,
Puertos del Estado and various port authorities*

Reinforcing the public image of ports is also a matter of attracting young people to work in the port. The future of seaports lies with the young generation. More and more young people must be prepared to take on job positions in the port industry. Ports have to offer attractive careers for young people by offering good working conditions and stimulating a sense of pride about the port. In promoting the port as a workplace, it is important to underline the international nature of port activities. The port business is an international one, so multi-cultural and international thinking should also be part of training and educational programs in port management, maritime transport or logistics. Tomorrow's port workers have an international perspective.

2.5. Measuring employment effects of ports

2.5.1. Methodologies

The appropriate technique for analyzing the economic impact of a particular port activity is determined by the characteristics of the activity and the region being analyzed, and by the purpose of the analysis. The availability of data is also an important factor. Measuring the employment impacts of ports is not an easy task. There are several methodological problems when evaluating port impacts (Accario, 2008; Musso et al., 2000):

- The identification of activities that are dependent on the port and the evaluation of their degree of dependency (e.g. how much of the employment in a local bank is linked exclusively to the port). The measurement of the degree of dependency is potentially exposed to the risk of subjectivity. A lack of exact data can lead to an overestimation of the degree of dependency and thus an overestimation of the employment effects;
- The intensity of the employment impact of the port, i.e. how much of the consumption activities and multiplier effects can be attributed to the existence of the port. Also here an estimation bias can occur when no exact figures are available.

Many of the above problems are structured by making a difference between direct, indirect, induced and related jobs. There exists however no unique standard methodology in Europe on the definition of the types of impacts, which makes port comparisons difficult. Benchmarking employment impacts of European ports is further complicated by the large variety in methodologies applied (mostly bottom-up approaches) and a general lack of recent and port-relevant economic input-output data at the macro-economic scale. Still, the fragmented results in European ports underline the significant direct and indirect employment impacts of ports as will be demonstrated in the next section.

Various analytical techniques can be used to calculate the economic and employment effects of port activity. The most commonly used technique is the [multiplier analysis](#). In broad terms, a multiplier is an index (ratio) that indicates the overall change in the level of activity that results from an initial change in activity. It effectively adds up all of the successive rounds of re-spending, assuming that major factors such as input prices are unchanged and that there are no resource limitations. The basic ideas of multiplier analysis can be found back in several distinctive methods: input-output analysis, economic base method and Keynesian multiplier analysis (see e.g. Bureau of Transport Economics, 2000; Accario, 2008).

The most popular technique of the list is the [input-output analysis](#) as it provides a good combination of analytical rigour and cost. Input-output analysis is a detailed method for the estimation of multipliers. I-O analysis is based on a set of tables that quantify the linkages and transactions between different sectors of the economy. The quantities of inputs and outputs for a given period are entered in an input-output matrix/ table in order to analyze what happens across various sectors of an economy. All sector-based multipliers (including direct, indirect and induced effects) can be calculated when the matrix is complete and includes private consumption figures. The I-O technique can be used to prepare multipliers for a variety of impact measures (e.g. output, employment, income). Multipliers can also be estimated for major components (e.g. by cargo type for a port). The technique and results of an I-O analysis are relatively easy to understand and the expertise required is readily available from a large number of consultants and academics. However, the technique can be quite costly if the required input-output base tables are not available at national/regional level or are outdated. As the structure of a regional economy may change over time, the use of older I-O tables might lead to wrong results. In many cases new regional tables are generated by using survey methods or existing tables are updated by incorporating more recent data on production and

employment in the region. Another problem of I-O analysis is that it does not incorporate any constraints at the supply side. For example, port development in a tight labour market can lead to crowding effects or the shift of employees from one industry (e.g. chemical industry) to the port sector. In such a case the net employment effect for the regional economy stays the same (no net gain in total number of jobs).

There are also integrated modelling techniques available to measure the economic impact of ports. These approaches combine input-output analysis and econometric techniques to analyze the economy's response over time to external shocks. A very advanced technique is the computable general equilibrium (CGE) modelling, which estimates the optimal mix of economic variables (e.g. consumption) in response to an external shock. Integrated modelling and CGE modelling are more sophisticated than multiplier analysis, but the data requirements of these methods are very high, so are the costs to perform the analysis.

Several scholars have introduced methods to overcome existing methodological problems or difficulties. Two examples are discussed. Musso et al. (2000) presented an approach based on estimating the probability of the extent to which an industry is related to a port. A preliminary phase, using location quotients and control region techniques, compares the employment structure of port economies to that of a standard 'non-port' economy. After estimating the probability of an industry being port-related, employment data are added in a second phase providing thereby individual ports with an actual assessment of employment impact. The technique was tested using a survey on Italian ports and a specific employment assessment for Genoa. Coppens et al. (2007) developed a bottom-up methodology to assess the economic impact of a port at a disaggregate level by identifying and quantifying the mutual relationships between the various port players themselves and between them and other industries. The approach made it possible to calculate the direct and indirect impact of modifications in the port activity more precisely and in greater detail: (a) the economic relationships among port actors are derived from a regional input-output table which is constructed using a bottom-up approach; (b) the method aims to measure the links with the hinterland, by means of a disaggregate geographical analysis; (c) the port actors and other sectors are brought into connection. The methodology was applied to the port of Antwerp, with both functional and geographical details on the economic interactions.

To our knowledge, there is no European-wide methodology to measure employment impacts of seaports. The European Commission has worked on uniform measurement techniques in other fields such as the measurement of Structural Fund employment effects using a 'bottom-up' methodology (Centre for Strategy and Evaluation Services, 2006). The next section will provide examples of the methodologies used in several European countries and ports in view of analyzing job creation by port activity. The results of these studies are also presented.

2.5.2. Some examples on the employment impact of European ports

Socio-economic impact indicators such as employment and value added are often used in the framework of evaluation of infrastructure projects in European seaports. Employment figures can serve as criteria for budget allocation of public infrastructure funds, as a criterion in the awarding of terminals to private terminal operators or as public relations tool in dealing with stakeholders and the general public. To our knowledge, there is no European-wide study showing the employment effects in the European port system. Employment figures for US ports are available on a nation-wide scale as reported by the Association of American port authorities (see textbox 2.2 for more details). Despite a lack of a European-wide approach on the issue, many port authorities and (national) government agencies in Europe produce figures on the economic impact of their respective port(s), including the employment effects. Examples include:

- Every year the National Bank of Belgium publishes figures on the economic impact of the ports of Antwerp, Ghent, Zeebrugge, Ostend and more recently also for the ports of Brussels and Liège. The studies are part of the Working Papers series of the National Bank (see textbox 2.3);
- The Ministry of Transport, Public works and Water Management of the Netherlands regularly commissions a 'Havenmonitor' report (Port Monitor). The last available report in the series was published in 2008 and contains economic impact figures for 2006 (see textbox 2.4);
- In the autumn of 2008, Oxford Economics was commissioned by the Chamber of Shipping, British Ports Association (BPA) and United Kingdom Major Ports Group (UKMPG) to prepare two economic impacts studies on aspects of the UK maritime industry. One focuses on ports and the other on the UK shipping industry. These studies are entitled "The economic contribution of ports to the UK economy" and "The economic contribution of the UK shipping industry" (see textbox 2.5);
- The remaining textboxes provide examples for ports from Scandinavia to the Mediterranean.

Textbox 2.2. Employment impact of the US port system

A study by Martin Associates (2007) analyzed the economic impact of US seaports and seaport-related businesses. In 2006, nearly 8.4 million Americans worked for ports and port-related industries. About 7 million of them were employed by firms involved in handling imports and exports, such as retailers, wholesalers, manufacturers, distributors and logistics companies. These jobs are not only found in port cities but spread throughout the US. The number of direct, induced and indirect jobs from business activities at US ports reached 1.4 million.

Slightly more than half a million Americans held jobs in seaports, more particularly as terminal operators, longshoremen, freight forwarders, ship agents, ship pilots, tug operators, chandlers, warehousemen, as well as jobs in the dredging, marine construction, ship repair, trucking and railroad industries. These direct port-sector jobs supported around 631,000 induced jobs due to purchases of food, housing, transportation, apparel, medical and entertainment services. Also included as induced jobs were those with local, state and federal agencies providing support functions such as education and municipal services.

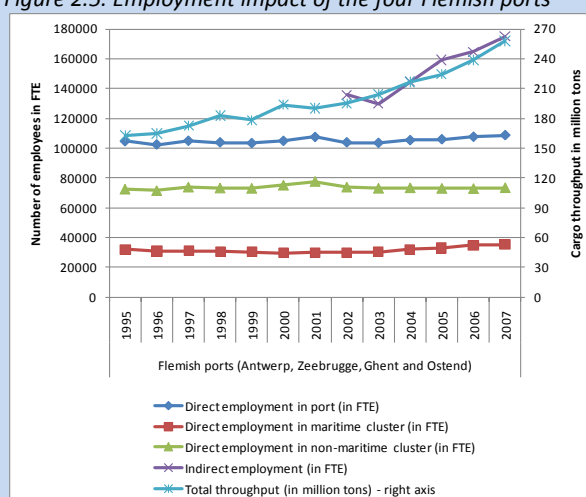
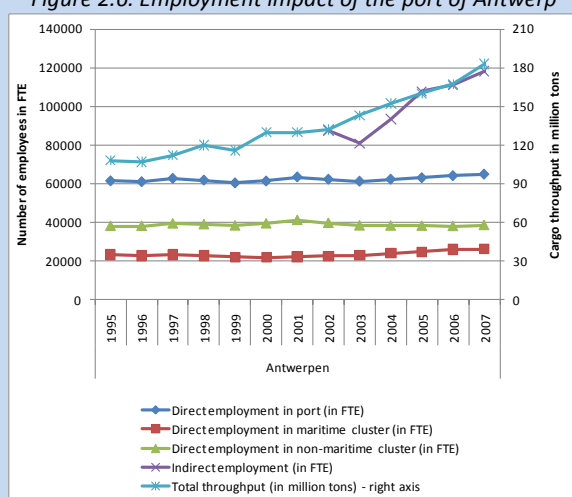
The port-sector firms providing direct services to the cargo and vessel activity at the nation's seaports, supporting another 306,289 indirect jobs. These include, for example: jobs with suppliers of parts and equipment, firms providing maintenance and repair services to the businesses dependent on port operations, utilities providing services to marine terminals and office supply firms.

The study also revealed that port-sector workers earn on average about \$50,000 a year, which is \$13,000 more per year than the National Average Wage Index, as computed by the Social Security Administration.

Source: based on Martin Associates (2007)

Textbox 2.3. The economic importance of the Belgian ports

Every year, the National Bank of Belgium publishes an annual update of the study on the economic importance of the Flemish maritime ports - Antwerp, Ghent, Ostend and Zeebrugge - and more recently also the Liège port complex and the port of Brussels. Each port's contribution to the national economy is estimated on the basis of an analysis of its economic, social and financial situation. The three variables involved in the main developments are valued added, employment and investment. The studies also highlights indirect impact in terms of valued added and employment. A division is made between a maritime and non-maritime cluster. The non-maritime cluster is further subdivided in trade, industry, land transport and other logistics services. In this way, one gets a rather complete picture of the economic impact of the Belgian port sector.

Figure 2.5. Employment impact of the four Flemish ports**Figure 2.6. Employment impact of the port of Antwerp**

Direct employment in the four Flemish ports reached 108,818 FTE in 2007, a 5% increase compared to 2002 (figure 2.5). Employment expanded more rapidly in the maritime cluster (+18%) than in the non-maritime cluster (-1%). Employment is rising in the port's maritime cluster largely as a result of cargo handling activity. The indirect employment in the Flemish ports reached 175,084 jobs in 2007, 29% more than in 2002. Total cargo throughput in the Flemish ports increased by 32% in the period 2002-2007.

The port of Antwerp represents about 60% of total direct employment, 67% of the indirect employment and 70.8% of the total cargo throughput in the Flemish ports (2007 figures). Most of the direct jobs in the maritime cluster in Antwerp are found in cargo handling (14,934 jobs), ship agents and forwarders (7,133), the Antwerp Port Authority (1,640), shipping lines (1,033) and dredging and port construction (956). The Antwerp port industry is the main segment in the non-maritime cluster with 25,758 jobs in 2007 (of which 10,788 jobs in the chemical industry). Other important segments in the non-maritime cluster include land transportation (3,652) and the public sector (2,032).

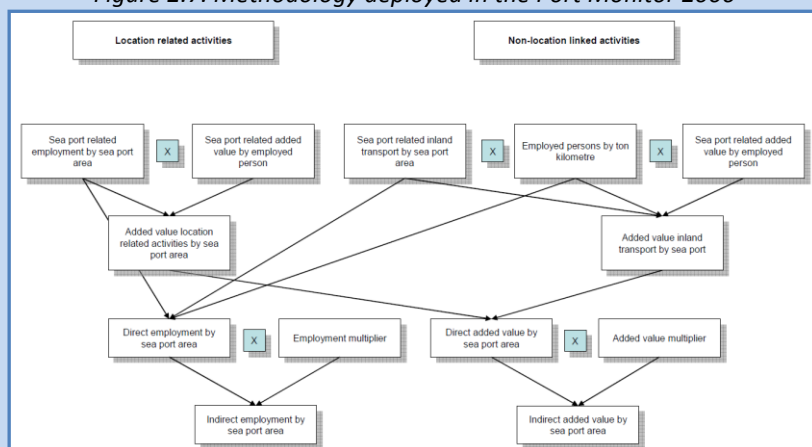
An elevated 92% of the total direct employment in the port of Ghent (or 25,968 of the 28,169 jobs in 2007) is linked to the non-maritime cluster with as main segments the steel industry (6,446 jobs, impact of ArcelorMittal), the automotive industry (8,552 mainly in Volvo trucks and Volvo Cars) and the chemical industry (1,737). In contrast, the port of Zeebrugge relies much more on the maritime cluster with 5,361 of the 10,940 direct jobs in 2010 (of which 2,254 FTE in cargo handling).

Source: own elaboration and calculations based on National Bank of Belgium (2009)

Textbox 2.4. The economic importance of the Dutch ports

Every year, the Ministry of Transport, Public Works and Water Management carries out a study concerning the economic significance of seaport related activities in the four Dutch port areas: the sea ports in the North (Delfszijl, Eemsmond, Harlingen, Den Helder), the North sea canal area (Amsterdam, Velsen/IJmuiden), the Rhine and Maas estuary area (with specific attention to Rotterdam-Rijnmond) and the Scheldt basin (Flushing, Terneuzen, Borssele). The economic significance is defined in terms of added value, employment, business establishments and business dynamics and private investments. The Port Monitor studies follow a ‘top-down’ approach following several steps as depicted in the figure below.

Figure 2.7. Methodology deployed in the Port Monitor 2006



The employment figures are based on data of LISA (Landelijk Informatiesysteem van Arbeidsplaatsen en Vestigingen) at business establishment level. The basis for the definition of the employment of non-location related activities for a seaport municipality is formed by the transport services allocated to a seaport municipality. The main conclusions of the latest report are (see table 2.3):

- In 2007, the Dutch sea ports employed 167,333 directly seaport related persons which corresponds with 1.9% of the total Dutch employment. This figure remained fairly constant in the period 2002-2007, while total throughput in Dutch ports increased by 24.2% (figures Nationale Havenraad). About 35% of seaport employment is linked to the presence of industries.
- When the indirect effects of intermediate purchases of goods and services at Dutch subcontractors are added to the direct effects, the employment effects increase to 286,360 (multiplier of 1.7). The direct and indirect employment represents 3.3% of the total Dutch employment. The indirect employment increased by 12.8% between 2002 and 2007.
- The Rhine and Maas estuary area (which includes Rotterdam) generates more than 60% of the total.

Table 2.3. Summary of the employment impact of Dutch ports

	2002	2003	2004	2005	2006	2007	Growth 2007/2002
Direct employment Northern Seaports	8832	8658	8453	8337	8678	7677	-13.1%
Direct employment North Sea Canal Area	34737	33525	32363	32546	33293	35430	2.0%
Direct employment Rhine- and Maasmond	107066	105458	103406	103765	105518	108313	1.2%
Direct employment Scheldt Basin	15734	15386	14993	15066	15377	15913	1.1%
Total direct employment Dutch ports	166369	163027	159215	159714	162866	167333	0.6%
Total indirect employment Dutch ports	105490	103464	104229	105401	111403	119027	12.8%
Cargo throughput (in million tons)	435.2	437.2	471.7	492.6	513.3	540.3	24.2%
Direct employment per sector	2002	2003	2004	2005	2006	2007	Growth 2007/2002
Transport	45951	47370	44133	45798	46771	51796	12.7%
Services for transport	16139	14658	15065	14886	15514	15698	-2.7%
Handling and storage	14688	14205	14079	14799	14805	14865	1.2%
Industry	65259	62592	61406	59564	60136	58390	-10.5%
Wholesale	14242	13689	13982	14219	14562	14818	4.0%
Public and private services	10090	10513	10550	10448	11078	11765	16.6%
Total direct employment Dutch ports	166369	163027	159215	159714	162866	167332	0.6%

Source: based on Rebelgroup and Buck Consultants (2008; 2009)

Textbox 2.5. The economic importance of UK ports

A study by Oxford Economics (2009) shows that the **UK ports sector** is the largest in Europe by tons of cargo. In 2007, 24.8 million international sea passengers went through UK ports. Another 24.2 million domestic sea passengers travelled between UK ports. In 2007, UK ports are estimated to have directly employed 132,000 people, representing 0.5% of the total UK workforce (in 2003 total direct employment amounted to about 120,000). Of these 132,000, almost half (65,000) work in transport or transport related services and 11,000 work in cargo handling and storage. The indirect impacts of the UK port sector are the effects it has on its supply chain. The study estimates the ports indirectly support 150,000 jobs. The induced effects of the ports sector, measuring the impact of consumer spending by those employed in ports or directly in their supply chain, were estimated to support 80,000 jobs in 2007. Adding together the direct, indirect and induced impacts, ports were estimated to have supported 362,000 jobs in 2007 or 1.2% of all employment in the UK. The authors of the study indicate that the impacts of ports extend well beyond these narrow estimates with a large number of industries highly dependent on ports for their existence (for example fishing, marine dredging and sectors that rely on imports of bulk raw materials or export finished goods).

A lot of separate studies focusing on specific port regions have been presented as well. One example is the economic assessment of the **port of Bristol** by Roger Tym and Partners (2004) and commissioned by the South West of England Regional Development Agency. Data was collected via surveys and supplemented by desk research and reviews of official statistics. The consultants used a ratio of 0.22 to 1 for “indirect” to “direct” jobs for port, transport and port dependent employment. The total direct port-related employment was estimated at 5,938 jobs and another 1,722 jobs caused by the multiplier effects. Direct and indirect non-port related employment located with the port estate totalled 1,765 jobs.

Another example is the economic impact survey undertaken by the **Port of London**. The update in 2004 concluded that Port of London terminals and related shipping activities and services provide direct employment for 30,306 people and a further 5,000 jobs are created indirectly. The London study reduced the risk of double-counting effects by excluding all impact of expenditure on bought-in goods and services from riverside boroughs where port activities are clustered. The study found that bought-in goods and services on average accounted for 62% of turnover of firms in the Port of London, with a range from port and ship suppliers (67%) to port operators and processors (61%). Sourcing patterns also showed that over 55% came from abroad.

A last example is the report on the contribution of the maritime sector to the **Merseyside** economy (Fisher Associates, 2007). The methodology deployed included direct, indirect and induced economic impacts and looked at all activities in the maritime sector (i.e. building, repair and maintenance of ships; cargo handling; education, training and skills; engineering and fabrication services; other specialist sectors; port operations; professional services; royal navy; shipping, freight and forwarding agents and brokers; storage and warehousing; transport by land and air; transport by sea; wholesale distribution). Total direct employment was estimated at 20,543 jobs and indirect/induced jobs reached 5,898. The most important segments in the maritime sector include shipping, freight and forwarding (5,004 direct jobs, 1,451 indirect/induced jobs), transport by sea (3,722 and 1,079), port operations (2,052 and 595), transport by land and air (2,013 and 584), cargo handling (1,645 and 477) and building, repair and maintenance of ships (1,085 and 315).

Textbox 2.6. Some examples on port employment in Scandinavian ports

In the period 2007-2009, 25 Danish ports made an analysis of the economic importance to their respective local communities. The outcome of this exercise is summarized in the paper 'Havnens rolle i den lokale erhvervsudvikling' published by Danske Havne (Danish Ports), the national association of commercial ports in Denmark. The results revealed that the port industry in many parts of the country plays an important role in earnings and employment (table 2.4). There are large differences among Danish ports caused by factors such as the port's functions and the scale of the port compared to the surrounding communities. In some places of the country more than 10% of local jobs in private enterprises are linked to the port. An analysis of the business activities in ports showed that port activity has particularly secondary effects in other industries. Frederikshavn is probably the municipality with the greatest economic importance to the local community. Activities related to Skagen Port, the commercial port and the naval base in Frederikshavn create respectively 2,342, 2,501 and 2,076 jobs. In addition, there are secondary effects from ferries to Gothenburg, which were not counted in the analysis. The industry cluster around Frederikshavn includes a broad spectrum of businesses and activities, mainly fishing, tourism and maritime services. In addition, there are several maritime training institutes in the municipality. The function of Danish ports is expanding to include a large array of service-oriented and industrial companies. It is expected that there will be an increased demand for locating new businesses in the ports, e.g. for the production and distribution of biofuels, recycling services, etc.. Also the handling of offshore energy products is becoming an important port activity (Danske Havne, 2009).

Table 2.4. Employment in 25 Danish ports

Port	Jobs	Port	Jobs
Hundested	368	Aabenraa	1281
Rønne	1852	Kolding	3450
Nexø	338	Vejle	2534
Køge	1318	Horsens	1800
Kalundborg	1732	Grenå	1717
Korsør	2124	Bønnerup	117
Nakskov	1770	Randers	1179
Næstved	792	Hanstholm	2269
Guldborgsund	621	Hirtshals	2723
Vordingborg	158	Aalborg	6331
Odense	2321	Skagen	2342
Nyborg	740	Frederikshavn - commercial port	2501
Fredericia	2392	Frederikshavn - naval port	2076
Total 25 ports		46846	

A study for the European Commission DG fisheries and Maritime affairs conducted by ECOTEC Research & Consulting (2006) looked at the employment generated by seaport and stevedoring companies in Swedish ports. The narrow focused study did not analyze any other economic activities in seaports. The number of permanent blue-collar employees in Swedish ports in 2004 was estimated at around 4,000 and the number of blue-collar workers temporarily employed was approximately 2,000. In addition to these there are about 500 white collar workers at various levels, bringing the total number of employees in seaport and stevedoring companies to some 6,500 workers. In 2008, all Swedish ports together handled a total of 188 million tons (figures of Sveriges Hamnar). The Finnish Ports Association (FPA) publishes annual figures on the number of people directly employed by the Port Authority or other port offices: 799 people for all Finnish seaports in 2009 compared to 1,055 in 2000.

Textbox 2.7. Some examples of port employment studies related to Spanish ports

The first studies on the economic impact of port activities date back to 1992 (Santander, Galicia, Sta. Cruz de Tenerife, Las Palmas). An interesting methodology for assessing impacts of port activities on the economy in Spain was applied to four ports: Vigo, Marin, Vilagarcia and Pasajes. A distinction was made between the port sector and the economies dependent on the ports. For example, the obtained employment effects for the port sector in Vigo amounted to 2,049 direct jobs, 757 indirect and 473 induced employment (Perea Sardón, 2007).

Acosta Seró et al. (2009) made a study on the economic impact of container activities at the port of Algeciras, one of the main transshipment hubs in the Mediterranean. The economic impact of the Port of Algeciras Bay and its economic relevance were derived from the application of an economic input-output methodology. Total direct employment was estimated at 2,294 persons, indirect employment at 1,043 and induced jobs totalled 1,515. The results are summarized in the table below. The study is interesting in the sense that it makes a distinction between the economic impacts related to transhipped containers (which represent about 85% of total container traffic in Algeciras) and import/export containers.

Table 2.5. Employment impact of container traffic at the Port of Algeciras Bay – in number of jobs

Jobs	Transshipment	Import/export	Total
Terminals	633	47	680
Port operators	948	94	1042
Intermediaries	37	74	111
Transport operators	0	265	265
Port authority	112	7	119
Other official organisations	62	15	77
Total direct employment	1792	502	2294
Total indirect employment	808	235	1043
Total induced employment	1282	233	1515

Textbox 2.8. Some examples of port employment studies related to French ports

The research firm 'Entreprises et Territoires' analyzed the employment impact of the Port of Marseille-Fos on the local economy (i.e. the Bouches-du-Rhône region). About 41,300 jobs and 2,741 companies are directly involved in port activity of Marseille-Fos. The distribution of the 41,300 jobs is as follows: 14,302 (35%) in large professional port-related services, 10,266 (25%) in port-related land logistics and 16,700 (40%) in the port industry. Some 23% of industrial jobs in the region are related to port activity. The figure for land logistics includes road transport, rail, barge, pipeline, storage and handling in non-port locations and trading. Shipping companies are responsible for 5,110 jobs, shipping agencies and consignees: 940, freight forwarders (including NVOCC): 2330, cargo handling (including dockers): 1064, etc.. The jobs related to construction works (port basins, infrastructure, CMA-CGM Tower, etc..), those generated from spending by passengers and cruise lines, or those related to the outsourcing of ship repair were not included in these figures. In 2007, the port of Marseille welcomed about 436,000 cruise passengers, each spending an average of 50 euro per day.

Figures on employment impact of the port of Le Havre are included in a study produced jointly by INSEE (Institut national de la statistique et des études économiques), AURH (l'Agence d'Urbanisme de la Région du Havre et de l'Estuaire de la Seine) and the port authority of Le Havre. The study measures the jobs directly related to port activity for the period 2000-2006. It also analyzes the structure of the labour force in terms of age, gender distribution, socio-professional categories and place of residence. Over the period 2000-2006, direct employment in the port of Le Havre Basin has increased by 11.6%, from 14,672 to 16,374 employees. This trend is noteworthy because it contrasts particularly with employment growth for all activities in the Le Havre area (+4.5%) and in the region of Haute-Normandie (+1.7%). Port and maritime activities represent 12% of the total employment in the region. If we add industrial and services located in the port area, the share rises to almost one quarter of all local jobs or 32,600 employees.

Table 2.6. Direct employment (port and maritime) in the port of Le Havre, 2000-2006

	2000	2001	2002	2003	2004	2005	2006
Shipping lines, ship-related companies, ship agents	1932	1 962	1 972	2 050	1 997	2 028	1 998
Stevedoring	1779	1 889	1 923	2 059	2 045	2 112	2 319
Pilots, towage, linesmen, mooring and boatage	519	470	485	486	492	507	510
Insurance, surveys, inspection and technical surveying	442	454	487	481	510	527	555
Ship repairs	444	329	314	307	283	179	177
Warehousing, logistics	2601	2 925	2 980	2 963	3 188	2 983	3 091
Freight forwarders and trading	1186	1 276	1 307	1 403	1 366	1 411	1 454
Repair, storage, trading of containers	453	463	480	456	445	452	450
Port of Le Havre Authority	1437	1 466	1 510	1 538	1 540	1 510	1 493
Customs	434	444	450	477	435	449	470
Miscellaneous port services	775	795	798	788	798	839	795
Road transport	1971	2 021	2 172	2 146	2 244	2 347	2 420
Rail transport	462	450	431	399	318	297	260
Waterway transport	237	247	258	276	283	319	382
Port shipping trades (all together)	14672	15292	15668	15928	16041	15960	16374
Le Havre employment area (except port jobs)	129655	131 146	132 646	132 645	133 528	133 606	134 940

Source: Le Havre port authority, INSEE and AURH

Another study of INSEE entitled 'L'impact socio-économique du Port de Nantes Saint-Nazaire' (Dossier n°31 - November 2008) looks at the economic impact of the port of Nantes Saint-Nazaire. In 2006, the port was responsible for 15,943 jobs. In Saint-Nazaire, 15% of all jobs are linked to the port. Direct jobs account for 1,784 of the total, while indirect and induced jobs amount to 6,787 and 4,160 respectively. The remaining jobs are attributable to subcontracting (1,174), road transport (1,600), rail transport (180) and administration (258).

As demonstrated in the case studies the employment effects are mainly expressed in full-time equivalent (FTE) and a distinction is generally made between direct and indirect/induced effects. Employment impacts are often disaggregated to the level of individual ports or port regions and to the level of specific economic activities (cargo handling, industry, etc.). Some best practices exist in the European port sector such as the annual studies from the National Bank of Belgium and outputs developed during the IMPACTE Interreg project. However, the results are often not comparable among countries or even ports within the same country. The above textboxes and recent research (e.g. the study of Dooms, Haezendonck and Verbeke, 2010 with cases of Belgium, France and the UK) demonstrate a great diversity in measurement methods between countries/ports. There are methodological differences, particularly in terms of the definition of the port area and the economic sectors, the terminology used, the level of aggregation of the data, the followed approach (i.e. top-down via input-output table with sector data or bottom-up on the basis of firm-level data) and the definitions and methods deployed to analyze indirect/induced employment effects. The observed methodological differences can result in non-transparency and wrong benchmarking exercises. Stakeholders might show some mistrust on the results obtained, even if the methodology is made very transparent. The fact that methodologies differ further fuels criticism on employment studies for being overoptimistic regarding the real job creation.

One of the aims of the PPRISM-project is to achieve a more standardized, widely accepted approach to measure the economic impact of ports for benchmarking purposes and in order to gain credibility towards the general public and stakeholders. The PPRISM-project (Port Performance Indicators Selection and Measurement) is an EC-funded project that started-up in early 2010 and is executed by a consortium led by ESPO (consortium members include ITMMA-University of Antwerp, University of the Aegean, Eindhoven University of Technology, University of Brussels and Cardiff University). One of the objectives should be to offer a standard toolkit of potential measurement methods, in order to make economic impact studies and the employment component in these studies more transparent and credible in an European context.

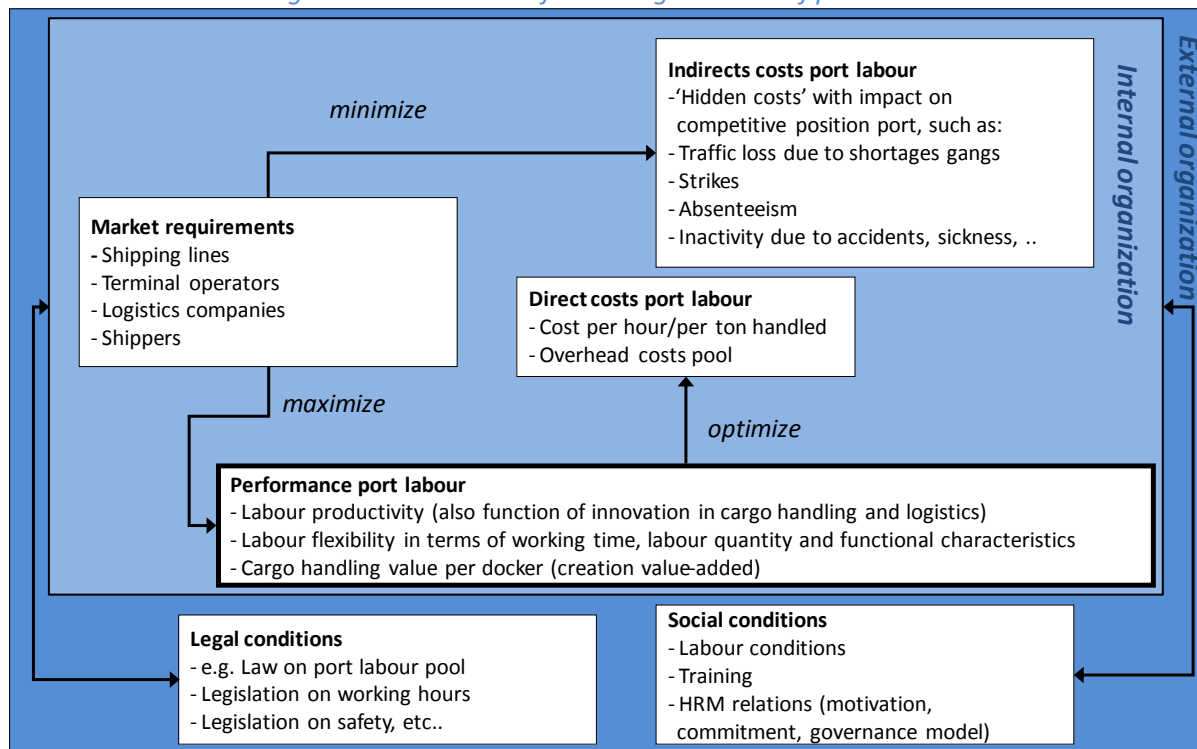
Despite the lack of a standardized methodology, the cases discussed in this report point to some common conclusions. The total employment effects of ports (direct and indirect/induced) are significant and typically represent between 1 and 5% of the total employment in a country. However, in many ports around Europe local direct employments effects of port activity are stagnating or decreasing due to a combination of deindustrialization, containerisation and the increasing use of automated port handling systems and technology. As a result the growth in direct FTE's in many (but not all) port areas is either negative or close to zero while throughput volumes increase. There is also good news though. More and more jobs are created outside the port area due to demaritimisation, subharborisation and port regionalization processes (see Notteboom and Rodrigue, 2005 on the issue of port regionalization). The growth rate of these indirect/induced jobs is typically more in line with observed traffic growth (see e.g. the Belgian and Dutch examples). It should be kept in mind that a large variety can be observed in how these processes are materializing in specific individual ports. At one extreme there are the ports which have succeeded in attracting more businesses and thus more jobs in the port area in recent years. At the other extreme, you have seaports which have become merely transit centres servicing economic and logistics centres in the immediate or more distant hinterland. For example, Gripaios and Gripaios (1995) in their study on the impact of the port of Plymouth on the local economy concluded that the Plymouth evidence suggests that the port is not a big employer of labour and is no longer the inter-related industrial complex that it once was. A decline or stagnation of direct employment levels in a port can have many reasons and does not imply that the total (direct plus indirect plus induced) effects decline. When employment effects increasingly extend beyond the local port level, ports might be confronted with a lower direct employment level, but higher indirect and related jobs. Potential reasons for less direct jobs include productivity gains, the outsourcing of activities to companies outside the port or the delocalization of activities to the hinterland (i.e. demaritimisation or subharborisation, see later).

3. Dock labour in European ports

3.1. Conceptual framework on dock labour

Up to now, the report focused on overall employment effects of ports. In the remaining sections, we discuss one segment of direct employment in ports, i.e. dock labour. While the dock labour force typically represents a modest portion of total direct jobs in quite a number of ports¹, it is a key production factors of port terminals. The flexibility, productivity, quality and cost efficiency of dock workers contribute to the competitiveness of port-related and logistics companies and the wider economy.

Figure 3.1. Framework for the organisation of port labour



Source: own compilation

Figure 3.1 presents a conceptual framework on dock labour. This theoretical framework is based on a market-driven approach. Shipping companies, cargo handling and logistics companies, transport operators and shippers impose certain logistics requirements on ports and terminals based on the characteristics and the needs of the supply chains. Port terminals have to meet these market requirements if they want to bind cargo in a sustainable way and stimulate economic growth within the port and the immediate hinterland. Broadly speaking the requirements of the market players come down to a maximization of the performance of dock workers (with an optimization of the direct costs of port work as a prerequisite) and a minimization of the indirect costs of port labour. This internal organization of dock work takes place within a wider setting of legal and social conditions.

¹ For example, in 2008 there were 8,836 registered dock workers in the Flemish ports (Antwerp, Ghent, Zeebrugge and Ostend) on a total direct port employment of 108,818 FTE (figures Flemish Ports Commission and National Bank of Belgium). Dock workers thus represent a modest 8.1% of total direct employment in the Flemish ports. For the individual ports the shares were 10.5% in Antwerp, 1.6% in Ghent, 13.6% in Zeebrugge and 1.4% in Ostend.

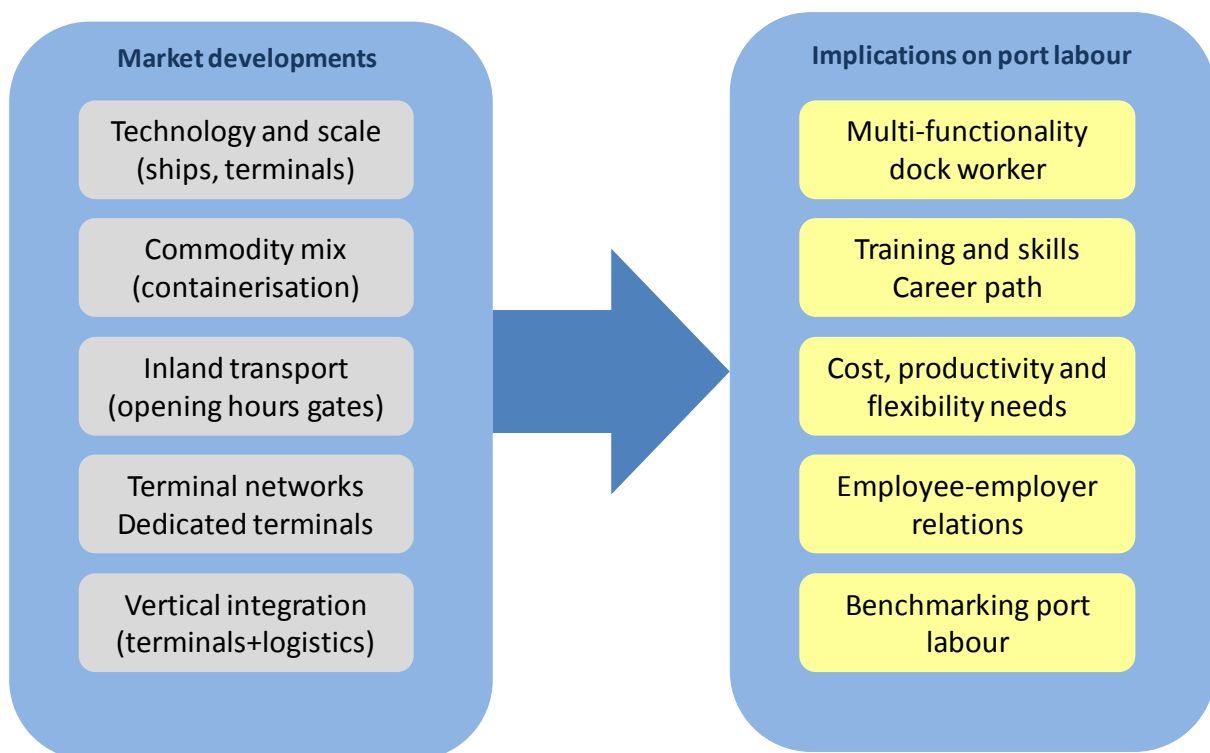
Competition in the European port industry and the technical conditions of cargo handling bring about resemblances among ports. The general nature of the dock work and of labour relations are similar and port labour is crucial to the competitiveness of seaports. But, the organization of port labour and the associated dock labour systems vary considerably throughout Europe as will be discussed later in this report. In other words, ports across Europe are different in the way the elements in the conceptual framework are combined in a comprehensive port labour system. The following sections zoom in on each of the elements of the conceptual framework.

3.2. Market developments and its implication on dock labour

3.2.1. General discussion

This section of the report deals with market developments in seaports and the associated requirements on dock labour. Figure 3.2 provides an overview of the main market developments and the associated implications on port labour requirements. In the first part of this section, we discuss general market developments. We will continue by highlighting some of the specific market developments in roll on roll off, conventional general cargo, containers and dry bulk.

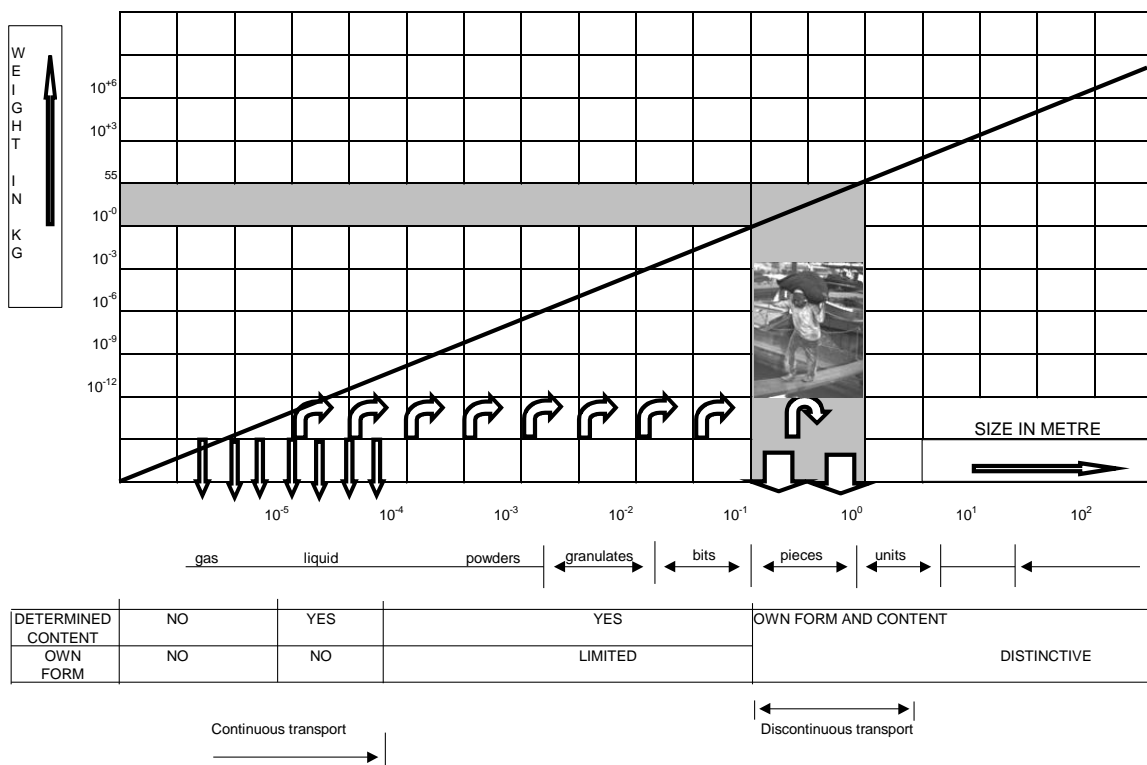
Figure 3.2. Market developments and its impact on port labour



3.2.2. Technological advances in ship types and cargo handling facilities

The mechanisation of handling certain goods in bulk (grain, ore, coal, petroleum products) dates back almost a century. Until the Second World War cargoes were mostly bundled together in pieces or units that dock workers could manipulate, i.e. the so-called 'man load'. Examples are bags of sugar, cotton bales and drums of liquids (figure 3.3). Dock workers carried loads of 30 to 50 kg in and out the vessels. In some cases the single weight to be carried could reach up to 80 kg. The multi-deck 'victory' and 'liberty' vessels are textbook examples of the application of the 'man load' concept to vessels. As a result the dock labour market was characterized by discontinuity and a casual configuration (see later in this report). A slow development in cargo handling technologies, a large offer of work and relatively low salary levels were present at this stage. A large daily hired manpower was required given the low level of mechanisation in the vessel loading and discharging process.

Figure 3.3. The man load concept



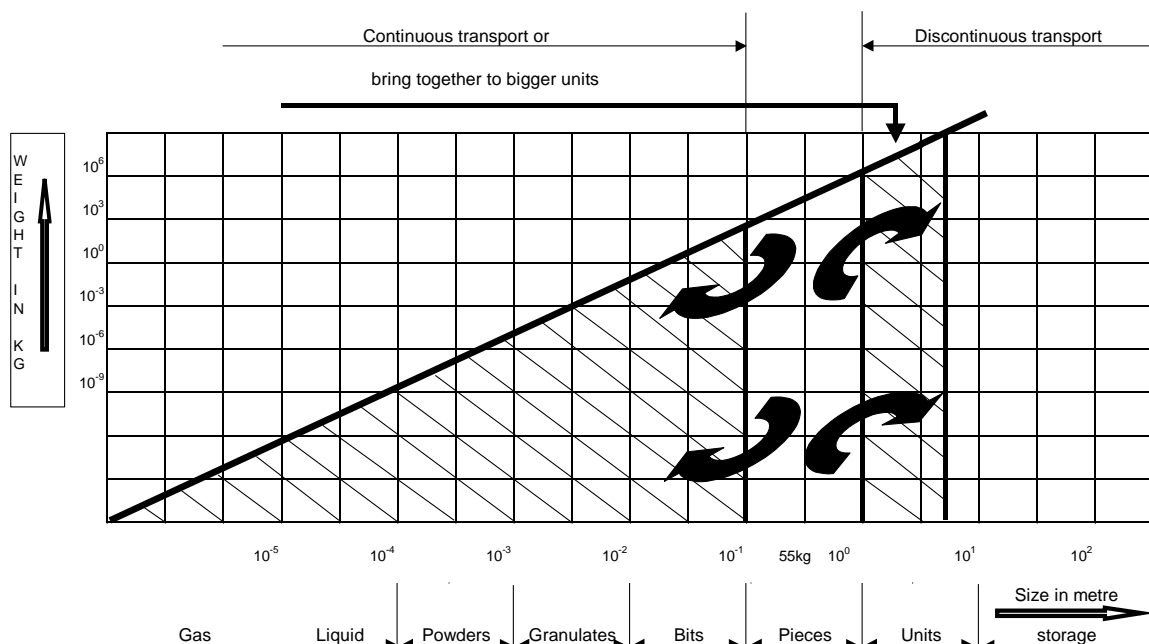
Source: own elaboration based on Meeuse (1977)



The 'man load' concept

Since the 1950s ports have been facing a 'goods explosion model' characterized by a shift from 'man load' to 'unit load' and bulk cargoes (figure 3.4). At one side of the spectrum, bulk commodities (powders, grains, etc..) were increasingly carried by specialized bulk vessels and handled on specialized bulk terminals equipped with grab cranes, stackers and reclaimers, conveyor belts and bulldozers. At the other side of the spectrum, there was a clear trend for general cargo to merge into unit loads such as pallets and containers. The unitization of cargoes went hand in hand with the development of specialized terminal equipment (e.g. specialized quay cranes, forklifts, terminal tractors, straddle carriers, reach stackers, RMGs, RTGs, etc..) and specialized ships (e.g. container ships and ro-ro ships). Forklifts, tractors and other mechanical equipment have been around for more than seventy years.

Figure 3.4. Goods explosion model



Source: own elaboration based on Meeuse (1977)

Large dry bulk carriers, needing specialized berths with deep water and fast discharging facilities, were concentrated on fewer ports. General cargo was increasingly handled in container ships or ro-ro ships. These developments resulted in a spectacular rise in the productivity of labour and port facilities. The vessel turnaround time for a given cargo capacity decreased significantly while far fewer workers were needed. The substitution of cranes and containers for manual labour has changed the nature of the work as well as reduced the number of men required to handle a given volume of cargo. Most ports in Europe got confronted with large-scale redundancies of port labour. Most European ports therefore saw a steep decline in dock workers' numbers, particularly between the 1950s and the late 1970s.

Technology also brought new requirements in terms of the skills of the workforce. Up to the late 1950s, dock work basically involved unskilled work requiring no or little previous training, except for the operation of the mechanical devices which at that time accounted for something like 10% of the work (Jensen, 1964). Dock workers were mainly used to manually handle various bags and other man load. The multi-skilled nature of dock workers was limited to the handling of a broad variety of man loads: bags, bales, crates, drums etc..

The 'goods explosion model' increased the need for skilled dock workers who have the qualifications and experience to operate more specialized handling superstructure. The new technologies made it increasingly difficult to maintain a system of gangs of a dozen or so. A whole new range of crane drivers, straddle carriers drivers and drivers of other equipment emerged. At the same time, wage systems were adjusted to face the new realities by combining wages and bonuses instead of only opting for time-rates or piece-rates. The dock labour force now faced increasing requirements in the field of specialized cargo knowledge and technical knowledge of dedicated and expensive handling equipment. For example, operating a heavy forklift at a forest products terminal requires different skills than the use of a forklift at a fruit terminal. The need for skilled dock workers was further reinforced by the increased focus of port customers on precision, damage prevention and overall quality of service.

The above developments encouraged some degree of permanent employment or at least the assignment of individual workers to always the same port terminals. For instance, some crane drivers became so specialized and highly skilled that many terminal operators started to opt for a system of permanent employment whereby the dock workers concerned only work shifts on the highly-specialized cranes they have been trained for.

The increasing specialization trend implies that the deployment of multi-skilled dock workers on different types of terminals is only possible when extra efforts are made in the field of training. The willingness of employers to invest in the formation of multi-skilled dock workers may in some cases be low, particularly when one already knows in advance that the longshoreman in fact will work his whole life at the same type of terminal. Technological development in ports thus has altered the balance between the specialization degree and the multi-skilled nature of dock workers.

Terminal modernization schemes often only pay off in case the increased capital investments lead to a higher terminal productivity combined with a lower cost per cargo ton handled. Any attempt to improve ship-cargo handling might face resistance from the labour side, since any adjustment in the manning requirements (e.g. composition of the gang) may serve at the same time to eliminate some of the existing workforce. If new technology is introduced, the terminal operator will typically try to compensate a part of the capital investments by lowering the number of dock workers in a gang or the number of gangs per vessel. The introduction of new technologies thus requires appropriate changes in manpower planning.

3.2.3. Scale increases in vessel size

Given the relentless search for cost savings at sea, many shipping lines' expansion plans are heavily focused towards larger vessels. This trend is particularly visible in the container market but also some other market segments are witnessing ever larger vessel sizes. Some examples:

- *Container*: since the 1990s a great deal of attention is devoted to larger, more fuel-efficient vessels. The average vessel size increased from 1,155 TEU in 1987 to 1,581 TEU ten years later, 2,417 TEU in 2007 and 2,618 TEU in 2009 (UNCTAD, 2009). Shipping lines are focusing on large post-panamax (i.e. 5000+ TEU) containerships to be deployed on the main shipping routes. Whereas 78 of such ships provided a total slot capacity of just 464,000 TEU at the beginning of 2000, these numbers already amounted to 504 units and 3.3 million TEU at the beginning of 2007 and 669 units and nearly 4.9 million TEU at the end of 2009 (table 3.1). Whereas 5000+ TEU ships provided just 10% of the total cellular fleet capacity at the beginning of 2000, their share increased to 37.5% at the end of 2009. The total fleet in late 2009 counted 39 vessels in the range of 10,000-15,500 TEU and another 168 vessels of above 10,000 TEU unit capacity were on order. The massive influx of new tonnage and the cascading-down effect triggered by the introduction of large post-panamax ships on the arterial trade routes invoked a significant increase in average vessel sizes on the main trade routes. For example, the size of a typical container vessel deployed on the Far East - Europe trade increased from 4,500-5,500 TEU in 2000 to about 7,500 TEU in 2010.
- *Roro*: New and second-hand cars are transported mostly by Pure Car and Truck Carriers or PCTCs, the first of which entered service in 1977 (some ten years later than the first Pure Car Carrier or PCC). Whereas the average PCTC had a capacity of just 4035 CEU in the mid 1990s, this figure had increased to 4552 CEU by mid-February 2007. The largest vessel reaches a unit capacity of 8000 CEU. From a technical point of view the PCTC with 10-14 cargo decks is nowadays the true workhorse in the industry.

Table 3.1. Composition of the cellular containership fleet for selected dates

size range	Orderbook 10/2009		01/10/2009		01/01/2007		01/01/2000		01/01/1995	
	no.	TEU	no.	TEU	no.	TEU	no.	TEU	no.	TEU
> 7500 teu	258	2,914,640	267	2,418,951	147	1,250,003	10	80,822	0	0
5000 / 7499 teu	116	760,150	402	2,439,772	357	2,070,373	68	383,415	0	0
4000 / 4999 teu	194	869,607	588	2,656,079	346	1,529,854	156	682,428	79	345,351
3000 / 3999 teu	45	156,020	325	1,106,690	282	956,165	227	770,410	164	541,516
2000 / 2999 teu	60	156,166	717	1,819,329	648	1,630,850	389	960,443	255	637,502
1500 / 1999 teu	56	98,357	568	962,082	466	786,591	327	552,003	198	339,511
1000 / 1499 teu	71	84,439	698	824,213	595	705,600	484	565,073	367	433,533
500 / 999 teu	65	52,511	837	616,408	722	525,853	539	381,630	336	239,439
100 / 499 teu	0	0	313	101,472	387	122,944	422	132,484	343	107,046
TOTAL	865	5,091,890	4,715	12,944,996	3,950	9,578,233	2,622	4,508,708	1,742	2,643,898
Average vessel size		5,887 teu		2,745 teu		2,425 teu		1,720 teu		1,518 teu

Source: based on data Alphaliner

Shipping lines are faced with increasing operating costs. The high time costs of these large ships make that shipping companies exert strong pressure on terminals in terms of quay productivity. A ship has to turn around as quickly as possible. Fast cargo handling operations not only have a positive influence on the vessel turnaround time in the port, it also increases the number of trips that can be made. The faster the vessel turnaround time the sooner the quay becomes available for the next vessel, which reduces the fixed costs per vessel handled. A low discharging/loading speed and unproductive hours at the quay are to be avoided. The high time costs of vessels also make 24h/7d operations indispensable. Shipping companies are willing to accept higher terminals costs during weekends and at nights if these additional costs are compensated by savings in time costs of the

vessel. In other words, not all shipping lines are interested in saving labour costs: they would rather like the terminal operator to deploy additional cranes and hire extra men and work them overtime, if the ship has to sail on time. The cost of docking ships can exceed the total money paid in wages to extra labour and for overtime work.



*M/S Faust, a PCTC operated by Wallenius Wilhelmsen
(capacity: 8000 CEU, LOA: 228m, beam: 33m, draft: 11.5m)*

A fast handling of the vessel is one of the key factors, but not the only factor, in minimizing the total vessel turnaround time in port. Hence, the advantages of having a high terminal productivity can be undermined when other activities related to the vessel call are not efficient (e.g. tug operations or pilotage services).



*The Evelyn Maersk in Algeciras during the ESPO Annual conference in 2007
(capacity: 14.700 TEU, LOA: 397m, beam: 56m)*

The improvements in handling technologies in recent decades made it possible to increase quay productivity significantly. Moreover, terminal operators assign more quay cranes and more yard equipment per vessel in view of decreasing vessel turnaround time. However, the productivity improvements with each technological innovation are getting smaller or even marginal. This is partly because the major technological innovations in handling technology are now well established (cf. dual hoist and twin lift in the container business, pallet cages for reefer vessels carrying fruit, etc.)

and terminal operators are facing limits to the number of cranes per ship that they can deploy in an efficient and profitable manner. Given the physical boundaries of handling equipment, more and more attention is paid to the optimal and efficient use of the expensive quay and yard equipment. Port labour is being scrutinized in view of finding ways to yield productivity improvements. Examples of such improvements include (1) the full use of the shift in hours instead of allowing dock workers to already wrap up before the end of the shift; (2) optimizing the seamless transition between different shifts so that the idle time of the equipment is reduced (more usable time); (3) reducing the delay between the mooring of the ship and the start of operations, etc.. . In addition, dock workers are often urged to make an extra effort in view of ‘finishing’ a vessel within the specific shift, this to avoid that an additional shift is needed to finish the job.

Many terminal operators keep statistics on labour productivity per shift. They are used for internal purposes but also in relation to customers. Hence, contracts between terminal operators and shipping lines typically contain clauses on minimum terminal productivity guarantees. Productivity statistics can also be used to motivate and guide dock workers and to enhance a competitive spirit among the dock labour gangs.



High crane density at Container Terminal Tollerort in Hamburg

The scale increase in vessel size has another side effect. Very container vessels can generate a peak effect in terminals, not only at the quay side but also at the land side. Less frequented terminals might be confronted with short periods of intense terminal use combined with longer periods in which the terminal equipment is idle or at least underutilized. Large terminals try to reduce the peak effect generated by very large vessels through a more even spread of vessel arrivals. This can be achieved, for instance, by imposing berthing windows on container vessels, although the power of terminal operators to control vessel arrivals is often quite limited. Moreover, the schedule reliability of ships is not always sufficient to allow adequate terminal planning. Indeed, the in-depth schedule reliability surveys performed by Drewry Shipping Consultants reveal that in the period between December 2005 and December 2009 about 45% of vessels deployed on worldwide liner services arrived one or more days behind schedule. The average deviation from the estimated time of arrival

(ETA) amounted to 1.16 days (Johnson, 2010). Terminal operators, especially in those ports which are non-first port of call, are thus confronted with uncertainty with respect to the ETA of container vessels. A container ship missing its contractually negotiated berthing window affects both berth planning and yard planning at seaport terminals. Moreover, terminal operators can face sudden and unplanned peaks in volumes (forcing them to hire extra manpower), possibly leading to domino effects for ships berthing at the same terminal, aggravating problems even more.

Peaks in terminal demand and uncertainty with respect to ship arrival times are more outspoken in the conventional general cargo market than in the container market. As such, the conventional general cargo market typically faces a higher fluctuation in terminal activity resulting in more complex demands on the dispatch system for port workers. High additional costs might be incurred when dock worker gangs are booked too early or too late.

3.2.4. Changes in the commodity mix: increased containerisation

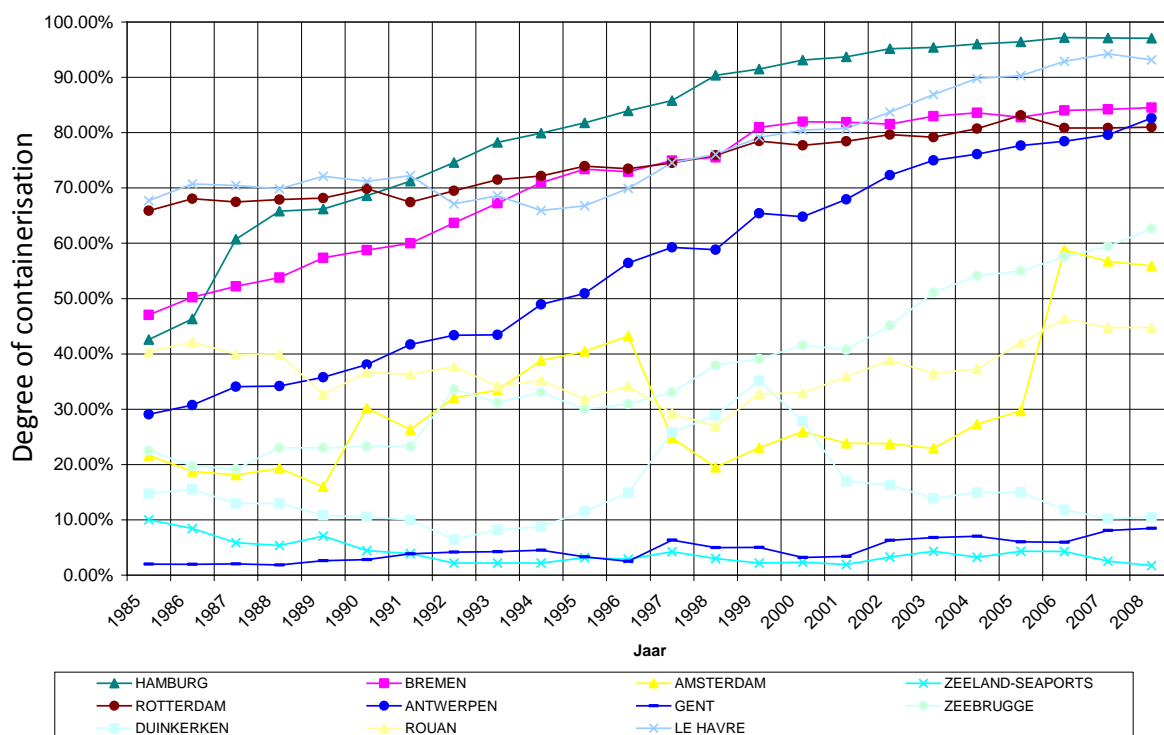
The increasing containerisation of conventional general cargo is a process that started more than 50 years ago and has even accelerated in the last decades. The year 1956 marked the beginning of the container era. Like many technological innovations, the container faced a long period of introduction which lasted about a decade. Although significant productivity improvements were realized along the transport segments it was initially applied in secondary markets (e.g. services to Hawaii and Puerto Rico). Major maritime shippers were unwilling to commit substantial financial resources to convert to containerization. Each was waiting things out, particularly which standard would eventually prevail. In the mid 1960s, the adoption of standard container sizes, particularly the 20 and 40 footers, and of standard latching systems marked a surge in containerized traffic. In 1966, the first transatlantic container service was inaugurated, opening up long distance containerized trade. Soon after in 1968, the first cellular containerships were introduced.



The Fairland of Sea-Land in Rotterdam on 3 May 1966

Despite the elevated containerisation degree in many ports around Europe (see figure 3.5 for an example on ports in the Le Havre-Hamburg range), large general cargo volumes remain unsuitable for containerisation, so that their substitutability by containers is low. For example, the physical dimensions of steel bars and project cargo often make containerisation not possible. Other cargoes still prefer specialized vessels over containerisation. For example, new cars are typically shipped using specialized pure car carriers (PCC) or pure car and truck carriers (PCTC). In many other commodity markets, an increasing competition can be observed between containers and conventional ways of shipments (e.g. competition between reefer vessels and reefer containers in the banana trade).

Figure 3.5. Degree of containerisation in the Le Havre-Hamburg range – 1985-2008



Note: The degree of containerization is defined as total containerized cargo divided by total general cargo (sum of ro-ro traffic, conventional general cargo and containerised cargo)

The explosive growth in containerised trade triggered a trend toward more permanent employment at container terminals, while the shrinking conventional cargo market still relies much more on casual work. Containerisation also brought an increased pressure on the training of port workers. The most talented and skilled port workers typically aim for a high-paying job at a container terminal, thereby putting pressure on conventional general cargo terminals to keep their best dock workers. Containerisation thus brought a stronger focus on training and career planning of dock workers.

3.2.5. Changing inland transport requirements

The gradual shift from conventional break-bulk terminals to container terminals since the early 1960s brought about a fundamental change in the function and layout of terminals (table 3.2). Conventional break-bulk terminals were mainly focused on direct transshipment from the deep sea vessel to inland transport modes. Direct transshipment is associated with very short dwell times (the average time the cargo remains stacked on the terminal and during which it waits for some activity to occur), requiring only a small temporary storage area on the terminal. Transshipment was very

labour intensive with operations managed on an *ad hoc* basis. It was common due to the lengthy loading or unloading process to have goods move directly from the land mode (trucks or rail) to the ship or vice-versa and ships staying at berth for several days.

Table 3.2. Characteristics of old-style conventional break bulk terminals vs. container terminals

Conventional	Container
Small terminal surface	Large terminal surface
Direct transshipment possible	Indirect transshipment (modal separation in time and space)
Limited mechanisation and automation	Advanced mechanisation and automation
Improvisation in terminal operations	Organization and planning

The introduction of container vessels meant larger cargo volumes per port call and shorter handling times per volume of freight. Both factors made direct transshipment no longer feasible as this would require a large amount of trucks, barges and trains to be in place during the vessel's short port stay. Due to congestion, capacity and availability of inland transportation, containerisation contributed to a modal separation on terminals and the setting of a significant buffer in the form of large storage areas such as the stack areas on container terminals. Each transport mode received a specific area on the terminal, so that operations on vessels, barges, trucks and trains could not obstruct one another (Rodrigue and Notteboom, 2009). This *modal separation in space* was a requirement for setting up a system of indirect transshipment whereby each transport mode follows its own time schedule and operational throughput, implying a *modal separation in time*. Under the indirect transshipment system, the terminal stacking area functions as a buffer and temporary storage area between the deep sea operations and the land transport operations that take place later in the process (or earlier depending on the stage along the supply chain). As a consequence, and in spite of higher turnover levels, the space consumed by terminals increased substantially. In turn, these space requirements changed the geography of ports and the migration of terminals to new peripheral sites.

The modal separation at terminals (both in terms of time and space) led to a disconnection between quay side and landside operations. As landside operations and maritime operations follow their own rhythm, quayside operations could in principle follow a 24h/7d approach, while terminal opening hours at the landside could be restricted. This transformation led in a number of ports to a discussion on the reach of dock work. In some ports, dock labour became confined to the loading and unloading of ships while other ports followed a very broad application of dock labour including all forms of cargo handling in a designated port area, including warehousing, stuffing and stripping, loading and unloading from inland waterway vessels, trucks, railway wagons, etc..

The pressure on hinterland transport continues to increase. Road transport remains very important in many ports' modal split, but rail, and in some ports also inland waterway transport, play a significant role as well. Most shippers and logistics service providers follow similar container delivery patterns characterized by daytime delivery (linked to opening hours of warehouses and factories in the hinterland). As many terminal customers drop-off and pick-up containers at the same time, peaks at truck gates of container terminals are common (for example a peak each Friday afternoon). Terminals may suffer from congestion at the landside. Several terminals around Europe have been involved in experiments aimed at longer opening hours at the landside of terminals, but the results of these experiments are mixed. The need for and feasibility of extending the opening hours at the landside is function of the needs or "demand pull" of the major shippers in the hinterland (e.g. large

retailers such as Carrefour). Port terminals depend on the supply chain practices of logistics companies in the (direct) hinterland and the preferences of truck drivers. More successful are the initiatives aimed at imposing time windows on trucks for the pick-up or drop-off of containers.



Modal separation at a container terminal (MSC Home Terminal in Antwerp)

3.2.6. The rise of terminal networks and dedicated terminals

There exists a noticeable trend in European ports towards more (semi-) dedicated terminals partly or fully controlled by shipping lines (see also the ESPO/ITMMA market report on the European port industry published in 2007). This trend is not only observable in container shipping, but is also becoming more common practice in other segments of the market. Not only shipping lines are establishing terminal networks. Large terminal operating groups such as Hutchison Port Holding, PSA, Euroports, DP World, Eurogate, APM Terminals and Sea-Invest have extended their reach over more than one port (figure 3.6).

In addition large logistics players are increasing acquiring greater market power in different segments of the logistics chain through vertical integration strategies. Multinational production companies are also increasingly involved in terminal operations as exemplified by investments of steel groups in bulk terminals (e.g. German steel groups Thyssen Krupp Stahl and Hüttenwerke Krupp Mannesmann are the full owners of the EECV terminal in Rotterdam; ArcelorMittal has own terminal facilities at many of its maritime steel plants), the setting-up of dedicated forest products terminals (e.g. StoraEnso) or the development of specialized fruit terminals (e.g. Dole, Chiquita). Large port customers and large cargo handling companies can exert a significant impact on port labour.

Figure 3.6. Presence of major global terminal operators in the European container business



Source: own compilation

First of all, these companies often develop a strong network focus by their presence in several ports. The experience they gain at different ports is the basis for explicit or implicit port labour benchmarking exercises comparing the turnaround time in each port, terminal productivity, flexibility in working practices, cost profiles, etc.. . International port companies try to apply best practices throughout their terminal network. They are, however, generally aware that a pure copy of work practices and structures from one port to another does not necessarily lead to the envisaged results due to differences in work cultures and historical patterns. Yet, the increased benchmarking at company level on an international scale exposes well-established structures and practices in a specific port area to external impulses for change.

Secondly, the internationalization in the cargo handling industry facilitates the transfer of new technologies over a wide range of ports. Port terminals are thus increasingly using similar modern transshipment superstructure. For example, Shanghai-based crane builder ZPMC accounts for around 60% of all new container gantry cranes in the world. Creating a competitive advantage in terms of terminal productivity is no longer only a question of operating modern terminal equipment, but more and more a matter of ensuring that the most efficient human resource system is in place to operate the terminal equipment. Empirical evidence shows that highly motivated and efficient dock worker gangs can attain cargo handling rates per container crane per shift which are two to three times higher than less motivated dock workers who are using similar cranes.

Thirdly, a loss or gain of a large customer can exert a major impact on the port and is directly reflected on the number of dock workers required. Consequently, numerical adaptations to a dock labour force are increasingly stepwise (sometimes even in the hundreds) instead of incremental.

Finally, the internationalization of cargo handling activities and the emergence of (semi-)dedicated terminals affects the traditional patronage structures in ports. Decades-old relationships between incumbent terminal operators and dock worker groups can be scrutinized by newcomers who want to implement their best practices regarding port labour. The decline of traditional patronage structures might lead to a certain level of alienation of dockers and reduced motivation. In some cases, traditional patronage structures conflict with the needs of a modern terminal management, making changes in employee-employer relations and the port labour system unavoidable.

3.2.7. The functional integration of terminals in logistics

Advances in logistics in the last decades gave a new meaning to the role of terminals. Instead of using the stacking area as a facilitator for a smooth synchronization between transport modes, shippers and logistics service providers started to use terminals as places for the temporary storage of consignments. This change in the functional use of terminals implied that high dwell times at (container) yards are not necessarily an indication of a poor connectivity, low productivity and lack of synchronization between maritime operations and land transport. High dwell times get more and more associated with deliberate actions of actors in the supply chain who want to make maximum use of the free storage time offered to them by terminal operators.

Terminals thus serve as buffers in logistics chains. This has allowed them to develop value-added logistics activities. Examples are:

- paper-cutting operations at forest products terminals;
- steel-cutting operations and packaging of project cargo at general cargo terminals;
- quality control and packaging at fruit terminals;
- sorting and blending operations at 'major bulk' terminals;
- PDI-activities (pre-delivery and inspection) at car terminals;
- Bagging at 'minor bulk' terminals (e.g. plastics);
- Etc..

In addition, ports are home to a wide range of distribution centres. Logistics activities can take place on the terminal itself, in a logistics park where several logistics activities are concentrated or in case of industrial subcontracting on the site of an industrial company. While there is a clear tendency in the container sector to move away from the terminal, in other cargo categories an expansion of logistics on the terminals itself can be witnessed. As such, a mixture of pure stevedoring activities and logistics activities occurs.

The combination of quay-related cargo-handling activities at terminals and a wide array of logistics activities at warehouses on or near the terminals has redefined and broadened port labour. Ports all over Europe were challenged to come up with a clear cut definition of what dock labour is and in some cases a distinction was made between ship-related dock labour and logistics dock labour in the port (see later in this report).



Examples of warehousing clusters: Antwerp (top left – older port area), Hamburg (bottom left - new development near Altenwerder terminal), Barcelona (top right), Göteborg (bottom right)

The increased integration of terminals in supply chains resulted in high demands of port customers such as shipping lines and shippers in terms of the agility and flexibility of the seaport and its terminals in dealing with the cargo flows. Complex logistics chains and networks and intense port competition result in increased challenges to adequately plan terminal operations and to cope with peaks and lows in cargo handling. To face these challenges terminal operators had to develop more advanced terminal and ship planning systems in combination with modern dock labour dispatch systems (often electronic).

3.2.8. Seaports and inland locations

As mentioned in the previous section, seaports are key constituents of many supply chains and prime locations for value-added logistics (VAL). Many seaports have responded by creating logistics parks inside the port area or in the immediate vicinity of the port. However, the rise of port-based activities in the hinterland has triggered processes of port regionalization (Notteboom and Rodrigue, 2005) and strengthened the formation of multi-port gateways (Notteboom, 2010). Logistics companies frequently set up close to one another, since they are attracted by the same location factors such as

the proximity of markets and the availability of intermodal transport and support facilities. Corridor development in Europe enhances the location of logistics sites in seaports and inland ports and along the axes between seaports and inland ports. The interaction between seaports and inland locations leads to the development of a large logistics pole consisting of several logistics zones. The trend towards geographical concentration of distribution platforms in many cases occurs spontaneously as the result of a slow, market-driven process. But also national, regional and/or local authorities try to direct this process. Seaports are the central nodes driving the dynamics in such a large logistics pole. But at the same time seaports rely heavily on inland ports to preserve their attractiveness.

The creation of large logistics poles poses new challenges in the relations between seaports and inland ports. Some ports fear the creation of logistics poles makes port benefits to 'leak' to users in inland locations. This fear and port users' focus on logistics networks are clear invitations to port managers to consider co-operation with inland ports in the field of traffic management, land issuing, hinterland connections and services, environmental protection and research and development. In practice, mainly private market players are involved in setting up these types of cooperative networks. But formal and informal programs of co-ordination between port authorities and inland ports are now slowly developing.

Logistics poles exert a locational pull on logistics sites by combining a strong intermodal orientation with cluster advantages. Geographical differences in labour costs, labour mentality and productivity, land costs, availability of land, level of congestion, the location vis-à-vis the service markets and government policy are among the many factors determining the spatial distribution of logistics sites. Logistics companies engage in benchmarking exercises to compare seaports and inland locations. Unfavourable labour conditions for logistics operations in seaports can enhance a move of value-added logistics activities from seaports to inland locations, thereby weakening the local logistics function and the direct economic impact of seaports. The knowledge that VAL-activities are increasingly 'footloose' in company-based logistics networks is a clear invitation to ports to focus on favourable port labour conditions. A competitive port labour force constitutes a key factor in view of extracting more added-value from cargo passing through the port.

3.3. Performance of dock labour

The dock labour system should be designed in such a way that dock workers perform to the market requirements in terms of labour productivity, flexibility and added value created.

3.3.1. Labour productivity

Labour productivity in ports is a complex issue and cannot be narrowed down to the output per man hour or tonnes per gang shift since these performance indicators do not reflect the technology used to handle the cargo. Benchmarking dock labour performance thus requires indicators which combine handling rates with the technology used, for instance by looking at 'output per man hour produced with a certain stock of fixed capital of a given technology and operational characteristics' as suggested by Haralambides (1995).

Labour productivity can thus not be treated in isolation as it is linked to a number of factors:

- **Technology used.** It is obvious that technological innovations / developments in cargo handling can dramatically increase labour productivity. A typical example is the unloading of bananas. Only a decade ago, toboggans cranes (crane equipped with a movable arm and a conveyor system) were quite common to unload individual banana boxes one by one from the hold of the reefer ship. Today, banana boxes transported by reefer vessels are palletised and handled by specially equipped pallet cages attached to a crane allowing unloading up to eight pallets in one move. Reefer containers are also commonly used which adds to labour productivity. The willingness to innovate among stevedoring companies in ports is partly related to the benefits at the level of port labour. If a technical innovation would in principle allow reducing the manpower per gang from 8 to 6 people, then the terminal operator will only benefit from the labour costs savings if the gangs are indeed reduced in size. If such a reduction in manpower is not possible within the contours of the port labour system then the stevedoring company will be far less eager to introduce technological innovations, which may pose a competitive disadvantage compared to other ports.



Banana handling technology for reefer vessels: spiral conveyor system for individual boxes (left) and pallet cage (right)

- **Training and experience levels.** Training and experience are essential in achieving a high labour productivity. Many cargo handling operations require specific skills. For example, a docker who has a lot of experience in dealing with steel does not necessarily achieve the same level of labour productivity if he would switch to another category of goods (e.g. a forest products terminal). The docker needs appropriate training and has to go through a learning curve period in order to get the same productivity than the dockers who have a long experience with the specificities of the commodity to be handled.
- **Training and career opportunities for longshoreman.** As mentioned earlier training is an essential element in achieving a high productivity. This necessitates a customized training plan in which the longshoreman have a view on a future career path based on experience and proven competence. As will be discussed later, many ports have a number of occupational categories of dock workers combined with clear rules regarding the flow from one category to another higher category. A number of ports and terminals still have a long way to go in establishing effective human resources policies and practices with recognized career patterns.
- **Quality of the influx of dockers.** The labour productivity within a port labour system is also dependent on the way the influx of new dockers is regulated. Key issues in this respect relate to the 'screening' of potential candidates, training facilities, the modalities for trial periods and the characteristics of labour evaluation systems.
- **Motivation and labour spirit.** The commitment and labour spirit of the docker is linked to a number of elements such as:
 - *The societal status of the profession and professional pride.* For example, the port of Antwerp has always had a strong record in attracting labourers from the city itself and the immediate surroundings to work in the port. Dock workers generally start to work as dock worker at a young age until they retire. Job loyalty and pride are high. In some other ports dock work is being regarded as a very low-status job and perceived of a temporary nature.
 - *Wages and bonus system.* It is obvious that high wages and a performance-based bonus system stimulate or should stimulate labour productivity and job loyalty.
 - *Existing industry relations between employers and employees.* When these relations focus on commitment and loyalty then dockers are stimulated to deliver a high performance. A spirit of consultation and social dialogue enhances employee-employer relationships.



- Labour productivity is also influenced by the *gang system* in place. A competitive spirit between dock worker gangs and a strong social control within a gang enhance labour productivity per shift. Strong and highly motivated foremen typically create an atmosphere of coherence and a focus on strong team work. A seamless transition from one shift to another results in continuous work on a ship thereby reducing idle time of the handling equipment. A high flexibility in the deployment of gangs (e.g. movement of a gang between vessels during a shift) also contributes to an optimal use of available dock workers. The existing recruitment and dispatching systems play a key role here.



Dockers at work in a ship's hold

Increasing productivity through dock workers is not only a matter of having them work harder. The key is not only to work harder but also to work smarter (Meletioui, 2006). Working smarter in a port context can be achieved by eliminating unnecessary tasks, developing a strong sense of teamwork, providing continuous training or giving workers more say about how to do their jobs and in problem solving. Psychosocial factors are a major source of productivity improvements in the port sector.

An objective comparison of labour productivity among ports is hardly possible due the existing diversity. A high productivity per vessel (tonnage loaded / unloaded per shift) is not always associated with a high productivity per dock worker (tonnage loaded / unloaded by port worker) as the outcome is strongly dependent on the size of the gang and the number and type of cranes and other equipment deployed to handle the vessel. Labour productivity should always be analyzed in relation to the labour costs.

3.3.2. Labour flexibility

The increased complexity of demand and supply relationships requires a high flexibility of dock labour. Flexibility, however, has many faces.

First there is flexibility in working hours. A distinction should be made between passive and active flexibility. Passive flexibility implies that the employer establishes schedules (taking into account the legal provisions) and taking into account breaks, holidays, etc. Active flexibility gives a lot of initiative to the employee. A port labour system with a large number of casual workers normally generates a high degree of active flexibility. It is the port workers who have, within certain limits, a freedom of choice for certain tasks. When the port labour system does not impose a work obligation at specific moments in time (for example for weekend work or work on holidays) finding enough volunteers is often a matter of providing generous bonuses for performing such tasks.

Secondly, there is flexibility in terms of the total labour quantity. This refers to the possibility to adapt the size of the workforce to the amount of work that needs to be done. In terminal operations that suffer from peaks in cargo handling demand, this kind of flexibility is crucial for a good business operation. One of the main incentives behind the establishment of dock labour pools is exactly to guarantee this kind of flexibility. Employers and employees then jointly determine the size of the docker workforce based on current and future needs (see discussion on decasualization schemes later in this report). There is also another dimension linked to this type of flexibility: the possibility to recruit workers outside of a dock workers pool (for instance via temporary labour offices) when there are shortages.

A third type of flexibility refers to the operational deployment of dock workers or the extent to which dock workers can be used for different types of tasks (multi-skilling or multi-tasking). When dock workers are assigned to specific job categories then such flexibility is only guaranteed when a system of qualifications (based on certification or training) allows dock workers' mobility between categories. When dock workers strictly adhere to their specific professional category then the multi-skilled nature over the categories is typically low. This can lead to discrepancies whereby shortages in one category cannot be compensated by surplus dockers in other (higher ranked) categories. The multi-skilling flexibility of a dock worker can also relate to a particular professional category: for example a driver who can be deployed both at a paper terminal (forklift equipped with a paper clip) and a banana terminal (forklift equipped to deal with four pallets simultaneously). A multi-skilling orientation of dock workers classifications is a plus when the port is confronted with large cargo flows with a highly cyclicity or seasonality. For example, dock workers of a given category who normally are deployed on a fruit terminal (e.g. citrus fruits) can shift during the low season to other terminals which might be confronted with cargo peaks.

Finally, there is flexibility in the assignment of gangs/teams, the size of the gangs and the shift system in place. In principle, the employers benefit the most when they have the widest possible freedom in switching gangs between vessels during a shift, to vary the size of the gangs to match the desired productivity per hour and to deploy every dock worker to work in the most appropriate shift. In practice, there are clear limits to such forms of flexibility. There are human and social boundaries (e.g. a frequent change of dock workers from night to day shift typically lowers concentration and thus has an impact on productivity and safety). There are also legal provisions on working and resting times and the provisions stipulated in local dock labour schemes.

The flexibility of a dock labour system can be evaluated in absolute terms (e.g. how often are shortages in gangs recorded) or in relative terms compared to benchmark ports. Employers often

strive for a higher flexibility. Labour flexibility in all its facets is a common theme during social dialogue between employers' organisations and trade unions. A broad array of measures exists to marginally or substantially increase flexibility in port labour. The most straightforward way is to increase the remuneration of dock workers by raising base wages or, more commonly, by installing bonus systems linked to flexible tasking and irregular working hours. In many cases, flexibility improvements can also be achieved by better using the formal possibilities for a more flexible use of dock workers. The modernisation of job assignment systems towards electronic dispatching can facilitate the distribution of dock labour in ports or terminals which have a high demand for a flexible work force.

3.4. Direct costs of dock labour

Port labour costs (blue collar) typically represent between 40 and 75% of total terminal operating costs of general cargo terminals. Even in the capital-intensive container handling industry, the share of port labour in total operating costs can be as high as 50%. The handling of dry bulk (i.e. major bulks such as iron ore and coal) requires less port labour due to the existence of conveyor belt systems throughout the bulk terminals. The share of labour costs in total operating costs at dry bulk terminals therefore typically ranges between 15 and 20%.

Bonuses and wage supplements are widespread in the port industry. In quite a number of cases, the base or guaranteed wage of a dock worker is only a fraction of the monthly income he can generate by collecting a wide range of bonuses and miscellaneous compensations linked to the nature, complexity and timeframe of his task.



A gantry crane driver at work on a container vessel

Empirical evidence shows that a high labour productivity and a high flexibility often come at a high price. If high wages for dock work are not compensated by clear advantages in terms of flexibility and productivity then the port or terminal in question faces a competitive disadvantage. In other words, the dock labour system in place in a port should create an optimal balance between direct costs in terms of wages and bonuses on the one hand and performance on the other hand. In many cases, this exercise is not easy. For example, when setting the height of wage supplements for tasks performed during a public holiday several considerations come to mind: is the wage supplement high enough to motivate enough dock workers to execute the task?, is the wage supplement transferrable to the port customer?, etc..

3.5. Indirect costs of dock labour

A dock labour system should be designed in order to minimize the risk of 'hidden costs' which affect the competitiveness of the port. 'Hidden costs' can take different forms.

First of all, a port or terminal can be confronted with a shortage of gangs or dock workers leading to substantial delays in vessel loading and discharging operations. Shortages can be caused by sudden non-anticipated peaks in demand or a (short-term) significant drop in the availability of dock workers (due to holiday period, weekends). Structural long-term shortages are an incentive to enlarge the number of dock workers.

Second, cargo damage incidents can generate high hidden costs and negatively affect the reputation of a terminal or port. A high incidence of damage cases might point to a lack of training or a low commitment of the dock worker (absence of a 'we care' attitude).

Third, short isolated strikes and long port-wide strikes by dock workers generate high hidden costs to ports and can even disrupt an entire economic system. Strikes cause port deviation costs for ship-owners, time costs for ships in port, lost revenues for inland transport operators and other port-related companies, time costs and broader logistics costs for cargo owners and potentially high costs to factories linked to major disruptions in the production line (stock-out). Strikes are typically a result of disputes regarding labour conditions with potentially detrimental long-term effects on the port's reputation. The history of the port industry has been earmarked by labour disputes. Most of the time, strikes were the result of disputes between labour unions (representing the interests of the dock workers) and employer organizations with respect to the terms and conditions for the renewal of collective bargaining agreements. As industry-wide strikes are considered as being detrimental to the national economy, federal governments often made legal provisions to bring strikes to an end. However, the cause of labour unrest was sometimes found in the dissatisfaction of dock workers with the union leaders acting as agents for the interests of the employers instead of defending the rights and earnings of the dock workers. Particularly in the 1950s to 1970s, quite a number of cases occurred where arbitrary decisions by union leaders resulted in an unfair distribution of workload and income among dock workers.

Fourth, a terminal or port can be confronted with hidden costs caused by accidents. A high accident rate typically points to a lack of training or impaired concentration due to chronic fatigue, etc..

Fifth, terminals and ports often have to deal with absenteeism or the failure of workers to report when they are scheduled to work. The reasons for absenteeism can be company-related (e.g. ineffective selection and placement procedures, excessive fatigue, ineffective use of skills, poor supervision, inadequate training or promotion programs, etc..) or personal causes (e.g. dual

occupation, alcoholism or drugs). As in other industries, absenteeism can relate to job satisfaction, but also as an indicator of worker's responsibility in fulfilling his/her contractual obligations. The power of absenteeism has been exercised many times by dock workers.

Finally, hidden costs can also be the result of operational inefficiencies due to a lack of communication between the vessel and the stevedores, possible breakdowns of equipment or the late reception of the load plans.

3.6. Legal and social conditions

3.6.1. Introduction

As previously stated, the internal organization of dock labour is taking place within a wider setting of legal and social conditions. The legal constraints are embedded in the appropriate port labour regulation and legislation and industry-wide labour and safety regulations.

The theme of social conditions, including labour relations, is complex, difficult to delineate and hard to measure. Of paramount importance is that a port labour system from a social perspective should seek motivation and work spirit among the dockers. As previously stated motivation and work ethic are factors with an important impact on labour productivity.



Some examples of statues dedicated to dock labour

Left: 'De Dokwerker' by Mari Andriessen in Amsterdam, in commemoration of the February strike of 1941

Middle: 'Buildrager', monument of the harbour worker by Constantin Meunier, near City Hall in Antwerp.

The words below the statue mean labour (arbeid) and freedom (vrijheid)

Top right: Dockers statue by Les Johnson at the north side of the Royal Victoria Dock, London

Middle right: Statue on the Liffey in Dublin

As is the case in other industries, dockers feel best when they can rely on structures that defend their interests. Often these structures are organized not at company level but at the level of the whole port or the whole industry. Dock workers have a strong preference for employment systems that combine job freedom with labour conditions that are found in permanent contracts (such as job security and guaranteed wages). Dock labour pools typically combine these elements. Freedom and team spirit are generally highly valued by dockers.

3.6.2. Dock work and casual labour

While a precise definition of casual labour is hard to find, the basic aspects of casual employment relate to uncertain and irregular, yet continual, of short duration and subject to change (Morewedge, 1970:14). Casual demand is at the heart of casual labour. Cargo handling operations in seaports typically are both continuous and irregular because of the variations in the activity of terminal operating companies as a result of the irregular and continual arrival and departure of ships. While terminal operators generally strive for a more evenly distributed ship arrival pattern (for example via allocating berthing windows), ship arrivals and departures remain to a large extent exogenous.

Some workers are casuals out of necessity: they could and would work regularly if they were given a chance to. Others started as casual workers from necessity but have evolved to casuals by inclination through long years of insufficient employment and of their irregular working habits. Casual labour typically involves a general lack of permanent attachment between employers and employees. The employees work for a particular employer for only a very short period of time, and neither employer nor employee can plan on seeing the other again in that same relationship.

For many decades, the longshore industry in quite a number of ports was characterized by irregular employment and a continuous market attachment of employer and employee. Both employer and employee are attached to the market since the employer is likely to be expecting a ship and the employee hopes to be reemployed shortly. All the men attached to the industry expect to get some work each working day. Since their work is not continuous, however, they become underemployed. The surplus of unemployed labour is strongly related to the fluctuation in the amount of employment offered by any one terminal operating company.

The above specificities of port-related labour make the industry somewhat unique. As early as the 1960s scholars argued that the longshore industry, because of its peculiar nature, should be considered as a separate labour market (see e.g. Weinstein, 1963). While dock labour is confronted with specific labour challenges not commonly found in many other industries (cf. manpower utilization, job security, flexibility, demand fluctuations, etc.), we do not go so far in trying to disconnect dock labour from the principles guiding labour deployment in other industries.

Also, containerisation led to a better predictability and regularity of employment. Despite schedule reliability problems and potential demand peaks linked to the arrival of large post-panamax vessels (see earlier in this report), many container terminals have a much lower need for casual labour than conventional cargo terminals.

3.6.3. Decasualization of dock labour

The problem of casual employment for cargo handling operations in seaports goes back to the late nineteenth century. Casual employment was the norm in a lot of European ports. This gave employers a pool of labour on which they could call according to their changing short-term needs. The port industry was confronted with the most severe economic and social effects of casual employment. The characteristics of port demand often resulted in an unfair distribution of labour income via favouritism, bribery and sometimes actual fighting and payment for jobs, chronic underemployment and dissatisfaction from dock workers. This led to government intervention in many ports through the introduction of decasualization schemes.

Public restrictive measures designed to reduce the excess supply of casual workers in ports were started in the early 20th century, but really took off after the Second World War in many large ports in Europe and in some American ports. New York established a decasualization program in 1953. In 1947, the voluntary registration schemes in many UK ports were replaced by the British National Dock Labour Board. These government interventions occurred due to the failure of private measures to reduce the excess supply. Other ports relied on the voluntary withdrawal of dock workers to reduce excess supply. Such approaches only worked in places where the oversupply of dock workers had led to a sharp decrease in dock workers' earnings making it interesting to leave the port industry and to look for job opportunities in other industries.

In case all terminal operators organize dock labour on an individual basis and no labour mobility schemes across firms are in place then the port might face situations where a number of men will remain idle on one terminal and a shortage of men occurs at another terminal. In order to avoid situations of labour shortages, each company will build up an individual reserve labour force to deal with peaks in demand. As a result the sum of dock labour of all individual terminal operating companies would far exceed the demand for dock workers on an average day. In other words, the particular character of the demand for labour, namely that of being scattered among many separate terminals and different employers, each of which is subject to fluctuations – both requires and produces a reserve of labour that is in excess of what the demand can absorb at any one time. The higher the number of terminal operating companies and terminals and the greater and more rapid the fluctuations in port demand, the larger will be the reserve of labour required. Decasualization schemes are designed to eliminate the oversupply of casual labour. The idea behind such reform is to concentrate the demand in a port in one or few places and give the right degree of flexibility to the supply. Competing firms in the same seaport draw their dock workers from a common centre or pool using the same reserve of labour. The need for reserve labour can be lowered by pooling dock labour across terminals and or cargo handling firms through the use of one or more centralized hiring centres in the port. This idea of concentration of the aggregate demand for dock labour can for instance be found in Belgium. It was also the basic idea behind the National Dock Labour Boards in 1947 in England by establishing the smallest possible number of hiring centres.

The dock pool schemes were historically introduced to protect dockers from inherent fluctuations in dock labour, a phenomenon which was more outspoken in the pre-container era. The registration of dock workers in a pool was partly justified by the fact that dock workers had to be adequately trained and experienced in order to be able to handle safely and efficiently the very expensive cargo-handling equipment. Job security and guaranteed wages in the pool raised economic and social standards. Decasualization schemes generally do not destroy the entire casual labour market. A successful scheme can also involve the establishment of some explicit standard in terms of which the supply of casual labour is restricted while its chronic surplus is eliminated. The schemes typically guarantee to all terminal operators an equal chance to obtain dock workers as they need them, and

to all dock workers an equal chance of getting a job whenever work is available. Decasualization in many ports was not realized in only a few years time but often took decades of experiments and internal processes to materialize (see textboxes).

Textbox 3.1. Decasualization of port labour in the port of Antwerp during the 1960s

The port of Antwerp started to move towards decasualization of dock work in the 1960s, much later than in Britain or the Netherlands. The trade unions in the port of Antwerp attempted to reform the hiring and employment systems in the port of Antwerp in 1963-1964 as casual labour in the port gave rise to work refusal, unemployment and job insecurity. Job insecurity posed several problems. First of all, until the early 1960s, labour unions tried to compensate job insecurity with financial guarantees. But despite the existence of premiums for dock workers who presented themselves for work in vain, job insecurity did not disappear. Secondly, quite a number of dock workers saw job refusal as a right to compensate for the fact that employers could not give job security.

The idea of employers and employees was to reconcile the demand fluctuations with the implementation of an affordable system of causal/permanent employment. Instead of opting for permanent employment by an employee, the decasualization scheme involved the creation of a paritary body or pool through which dock workers were made available to employees. This was combined with guaranteed weekly wages for dock workers (with the help of a Subsistence Compensation Fund) and a reform of the hiring system. Dock workers now had to attend one of the daily compulsory hiring sessions (in total four hiring sessions: day shift, early shift, late shift and night shift) and to accept every job they were offered. Dock workers were assigned to a specific hiring session. Job refusal led to lower guaranteed wages and could be sanctioned. This meant that the relation between employer and employee became an indirect one: the dock worker signed a contract with the pool which allowed him to be hired by a terminal operating company. Available dock workers were divided among the different employers depending on the distribution of demand. Employers had concerns with respect to the compulsory hiring system as they feared that only non-motivated dock workers would remain in case of compulsory hiring, with negative effects on the productivity of the gangs. Employers thus wanted to be able to hire their preferred dock workers at all times.

Permanent employment for a specific terminal operating company was being considered for executive dock workers such as foremen and warehouse keepers as it was considered less desirable to hire these classes of dock workers on a one-day basis. Foremen have a key responsibility to employers as they are in charge of hiring the dock workers for their gangs. In the end, foremen received a statute by which they were bound *de iure* to a specific company and by which a fixed salary could be guaranteed.

Source: based on Vanfraechem (2003)

Successful decasualization schemes all have opted for some sort of restriction of entry as to keep the growth of the pool of dock workers in line with growth in port demand. It is this restriction of entry that is still one of the main concerns linked to decasualized port labour schemes. As entry is strictly controlled, the governance structure and parties involved in regulating entry play a crucial role. Dock workers are registered in special registers controlled by the state (as was the case in England), the labour unions (e.g. US West Coast in the 1970s) or entities in which both employers and labour unions are presented. The determination of the number of dock workers needed in a pool remains a balancing exercise. A chronic limitation of supply in the long run increases the bargaining power of labour unions and might lead to structural labour shortages when handling vessels. It also puts pressure on terminal operators to look for alternative ways of dock employment (e.g. via external temporary labour offices), in itself a potential cause of labour disputes in ports. A structural oversupply of dock workers makes a decasualized system very expensive to terminal operators.

Textbox 3.2. Decasualization of port labour in the port of Rotterdam, 1914-1965

As early as the 1880s, the port employers in Rotterdam favoured a massive recruitment of casual labour and non-responsibility for dock workers. Trade unions were acting against casual labour. They advocated a labour pool system that should act as an employer for a fixed number of casual workers (the semi-regulars). This led to the 1914 Stevedoring Act. In 1918 the Labour Pool was established guaranteeing work and income to the thousands of dock workers at that time. The Labour Pool remained in operation until 1955. The founding of the Labour Pool meant that no casuals outside the pool could be employed. Only in exceptional situations and on a temporary basis, companies were allowed to hire workers from outside the pool. Another initiative, the Wages Board founded to settle disputes between employers and employees, ceased to exist during the big port strike in 1920-1921.

The reconstruction of the port of Rotterdam after the second World War triggered a massive port expansion of the port in the 1950s and 1960s. As a result, the number of dock workers increased from around 6,000 in 1945 to over 13,000 in 1950 and nearly 17,000 in 1965. The 1950s were characterized by labour shortages, particularly since dismissed dock workers easily found work in other industries. In the late 1950s, bonus systems were introduced to attract newcomers from the surroundings of Rotterdam. Strict procedures of bargaining on wages and other labour conditions in the port impeded competitive wages compared to other industries. Wages were kept low to stimulate economic development and some labour unions were banned from the wage setting decisions. In an attempt to attract and keep skilled dock workers, port employers came up with a range of semi-legal bonuses. The national wage policy came under heavy pressure in the late 1950s and collapsed in 1963. Soon after, official wages started to rise.

The period 1945-1965 saw decasualization processes in many forms. Terminal operators increased the number of regular dock workers at the expense of casual workers. The proportion of regulars reached 80% in 1965. The introduction of the container in 1966 totally changed the system of labour relations in the port and significantly raised labour productivity. The casuals were still part of a formal Labour Pool but were now granted the same rights as those of the regulars (holidays, social benefits, etc.). Pool workers were increasingly hired by the same employers and had no longer to report at the hiring office. The system improved in the sense that most pool workers were engaged for a new shift before they had finished their old one. Monthly schemes of employment became possible as long-term needs of labour could be better predicted. The employment schemes thus moved towards rather regular working hours and good social arrangements for evening and night shifts. At the same time, employers designed a policy to raise the social status of the dock worker and to tighten the employer-employee relationship. The 'Haven Vakschool', a school for vocational training, was set-up in 1949. The school produced a steady influx of trainees who often became regulars. The more recent development of dock labour arrangements in the port of Rotterdam will be discussed later in this report.

Source: based on Nijhof (2003)

Potential problems related to pools are high direct costs and the rigidity of the supply caused by strict job demarcation (dock worker categories), low labour mobility and large overmanned gang sizes. Other potential disadvantages of schemes of decasualizing port labour relate to restricted freedom enjoyed by both employers and employees, by introducing a bureaucracy and by limiting competition. Dock workers have preferential employment usually linked to a guaranteed minimum income or some equivalent arrangement. Employers get preferential access to a pool of labour on standardized terms. The preferential access on both sides may limit access and thus contestability, enabling rents to be intercepted in a variety of ways (e.g. excessive wages) and thus inhibiting a full passing on of efficiency gains or transport cost decreases to port users. The loyalty between dock workers and employers is another concern related to decasualized port labour systems. When dock workers are registered centrally and switch from one employer to another they may not develop loyalty towards one or more employers. In ports with strong labour unions, this might form a breeding ground for social conflicts between unions and employers' organizations.

Decasualization schemes do not necessarily exist forever. The most well-known case in this respect is the sudden abolition of the National Dock Labour Scheme in the UK in 1989 by repealing the Dockworkers (Regulation of Employment) Act 1946 (see later in this report). A key element in reversing decasualization schemes relates to the characteristics and requirements of casual labour. Any reversal of decasualization schemes should not result in employees hiring completely untrained workers plucked from the street corner or recruitment agency and put to work in the port for a short period of time without any proper training or supervision. Instead, casual dock workers should enjoy a thorough training course before employment commences and should be provided adequate safety apparel for dock side work. Cargo handling companies in ports without a decasualization scheme usually employ a core workforce. Peaks in labour demand are met by either using casual workers provided by third-party recruitment agencies or by own recruitment agencies. The extensive training of casual/part-time staff can be developed in-house or outsourced to professional training agencies. Often hands-on learning is combined with more theoretical courses.

3.6.4. Dock work and social dialogue

Trade unions are the principal institution of workers in modern capitalistic societies (Freeman and Medoff, 1984). On the one side, many economists view unions largely as monopolies in the labour market whose primary economic impact is to raise members' wages at the expense of unorganized labour and of the efficient functioning of the economy. Many social critics consider unions as socially unresponsive, elitist and non-democratic institutions. Excessive demands and power of trade unions can lead to excessive wages which put pressure on companies' competitiveness and employment levels, certainly if the high labour costs are not compensated by comparatively elevated labour productivity. On the other side, industrial relations experts stress the positive role of trade unions in collective bargaining towards a better management and higher productivity. Unions can increase the development and retention of skills, improve morale and pressure management to be more efficient in its operations. Trade unions in principle reduce the degree of economic inequality and represent the interest of those that tend to be underrepresented. Trade unions argue they provide workers both with protection against arbitrary management decisions and with a voice at the work place and in the political arena. While critics point to the collapse of many highly unionized industries, in many countries union membership remains high in a number of industries such as the automotive industry, the steel industry, rail and postal services. The variation in union decline and revitalization is affected by own actions and strategies, and by exogenous variables such as the type of capitalism in the country (see Hall and Soskice, 2001 for a typology in capitalism), the climate of industrial relations and the institutional and political environment.

Labour unions are typically very visible at the dock labour front, although major differences in union power can be observed across seaports and countries. Turnbull and Wass (2006) argue that trade union responses to port restructuring vary over time and space. For example, dock labour unions in the UK enjoyed elevated membership and well-established collective bargaining rights. The abolishment of the National Dock Labour Scheme in 1989 de-unionized the industry to some extent. Trade Unions are well organized in the hanseatic ports in Belgium, the Netherlands and Germany. These ports are among the most efficient ports in the world and their labour force is highly skilled, productive, well remunerated and union membership is high. While differences exist among these ports with respect to how and at what institutional level collective bargaining agreements are negotiated, the trade unions in these ports generally form a united front at the national level, the regional level, in the ports and at a port-company level.

Sociologists often refer to the structural peculiarities of port labour, such as the loose and indirect ties between workers and employers, absence of financial stability and faulty recruitment methods as historical reasons for strong trade unions. Up to the 1960s, dockers lived in the neighbourhood of the ports. Local coffee shops and bars not only had recreational functions, but also served as places for the recruitment of labourers. When organized industrial relations were introduced in the port industry and strikes became an integral part of the negotiating process between employers and employees, these places of recruitment were ideal for strikers to get support for their actions. Even today, in some ports and countries dock workers are considered as a tough and combatant workforce led by individuals who are able to keep the dockers in line in view of finishing cargo handling operations on a specific vessel in time. Militant leaders may gain support in preference to moderate ones. The strong presence of trade unions in some ports can be explained by historical concerns about social rights of casual work in ports. In view of defending their interests and protecting their labour conditions, these port workers started to organize themselves in trade unions, many of which are part of larger trade union associations at the national or even supranational level.

Social dialogue through effective bodies of joint consultation is considered as the key to a sustainable relation between employers and trade unions. When industrial relations are good, labour unions will have the opportunity to contribute in improving the service provision process and labour productivity. Unions can help dock workers to participate effectively in improving performance by creating a safe environment to criticize existing work methods. A climate of constructive dialogue thus enhances social peace in ports. In 2005, the International Labour Organization published a practical guide to social dialogue in the process of structural adjustment and private sector participation in ports. The manual authored by Turnbull (2006) aims at strengthening the institutions and capacity for social dialogue between the parties concerned in order to ensure that the issues concerning structural adjustment in ports are effectively addressed in a transparent manner. Social dialogue is about maximizing the potential for mutual gains by addressing the concerns of all rightful stakeholders involved.



Local union culture and style affect industrial relations in a port. Dock workers are often very direct in formulating their opinions, both internally during union meetings as towards others. While unions value directness, the solidarity and militancy of union members can be perceived by employers as opportunistic behaviour which can hinder negotiations. Negotiators thus require specific skills in terms of understanding the differences in negotiating tactics and styles of trade unions and employers. In order to maintain a good climate of industrial relations both employers and dock workers should have the feeling that their concerns and demands are met within a reasonable scope. Cargo handling companies and trade unions then find a balance which makes major disputes not desirable or needed.

3.6.5. Training and safety

Earlier in this report we pointed out that training is essential in achieving a high labour productivity and safety record. Training is also considered as a key element in achieving better social conditions for dock workers. The history of port training is described in textbox 3.3. Training can be organized by terminal operating companies, industry organizations and or specialized training centres at the level of the individual port or even at a global level. For example, the International Labour Organization (ILO) offers continuous training courses through a large number of training units that cover training needs for all levels of a dock worker's career. Training should not only be focused on technical skills, but also on teamwork, problem solving and social dialogue. In addition to port productivity

improvement, training programs are typically also aimed at enhancing the social status of dock workers and raising professionalism, motivation and commitment. Some ports are challenged to change the dock worker mentality in the business and to foster a philosophy of customer service amongst dock workers. Further advances in adequate training to perform their tasks safely and efficiently can help to create quality customer service.

Textbox 3.3. A short history on port training

The market developments discussed in section 3.2 have dramatically changed the organizational and management culture in ports. Terminal operators and other market players are subject to intense competition guided by service contracts and performance targets. Port authorities are rapidly gaining more knowledge of specialized trades and a range of new planning, customer service, managing and operating skills. Also, dock labour had to acquire a completely new set of skills in order to deal with the new technologies and supply chain practices. In the past fifty years, training in the port industry has been revolutionized.

After the second World War, changing ship and terminal technology and new dock labour decasualisation policies in a number of European countries (see later) contributed to a growing need for specialized port training. Since the 1960s, dockworker training centres at the port or national level were established and formal safety programs for dock workers were introduced in selected European countries. These initiatives were soon followed by the first recognized training schemes and higher qualifications in the industry. Port training schemes went global in the late 1970s and 1980s largely through public sector funding with the support of the United Nations (UNCTAD, ILO and IMO) and the World Bank. ILO, in particular, has been very instrumental in developing a global policy on the establishment of national or regional port worker training centres in developing countries. The 1990s brought a major extension and upgrading of the quality of port training materials. However, the 1990s were also characterized by the closure of public sector funded training centres putting greater reliance on on-the-job training. The new millennium brought an increased participation of the private sector and the introduction of structured company-based training schemes for white collar employees (e.g. global training programs of DP World and APM Terminals) and dock workers.

All these initiatives have led to the establishment of benchmarks and standards for training material and increased global cooperation and support in training in the industry through the exchange of knowledge.

Meletioui (2006) offers a good overview of the port-related conventions, recommendations, guidelines and manuals developed by the International Labour Organization (ILO) with relevance to port training.

The most far-reaching are the ILO conventions. The conventions are international treaties which are subject to ratification by ILO member states. Once ratified they create binding obligations under international law. There are currently two port-related ILO conventions:

- *The Dock Work Convention (No. 137) of 1973* is a convention on the social repercussions of new methods of cargo handling in docks. The convention assigns great importance on the worker-technology relationship in ports and particularly on the issues of efficiency and training. More specifically, Article 5 states that *“In order to secure the greatest social advantage of new methods of cargo handling, it shall be national policy to encourage co-operation between employers or their organisations, on the one hand, and workers' organisations, on the other hand, in improving the efficiency of work in ports, with the participation, as appropriate, of the competent authorities.”* Moreover, Article 6 stipulates that each member shall ensure that appropriate safety, health, welfare and vocational training provisions apply to dockworkers.

- *Occupational Safety and Health (Dock Work) Convention (No. 152) of 1979*. This Convention includes a number of mandatory requirements regarding training. For example, Article 4, paragraph 1.(c) states the following: *“National laws or regulations shall prescribe that measures complying with Part III of this Convention be taken as regards dock work with a view to providing the information, training and supervision necessary to ensure the protection of workers against risks of accident or injury to health arising out of or in the course of their employment”*. Article 4, paragraph 2.(r) states *“the measures to be taken in pursuance of this Convention shall cover training of workers”*. Also Article 38, paragraph 1 states *“no worker shall be employed in dock work unless he has been given adequate instruction or training as to the potential risks attaching to his work and the main precautions to be taken”*.

ILO also brings out Recommendations which set out guidelines, which can orient national policy and action and often complement corresponding conventions. There exist two port-related ILO recommendations: the Dock Work Recommendation (No. 145) of 1973 and the Occupational Safety and Health (Dock Work) Recommendation (No. 160) of 1979. The ILO has also published two port-related codes of practice: the ILO Code of Practice on Safety and Health in Ports (2005) and the ILO/IMO Code of Practice on Security in Ports (2004).

The need for appropriate training is also clearly visible in section 6.2 and 6.3 of the ‘Communication on a European Ports Policy’ by the European Commission (2007). The Commission underlines that there are currently no specific Community rules on training for port workers, but recognizes that training of port workers has become of primary importance for the safe and efficient operation of ports. The Commission indicates that a set of common requirements for training of port workers should be established at Community level which would enhance the mobility of European port workers by means of the mutual recognition of their qualifications. Directive 89/391/EEC29 (the “Framework” Directive which has been supplemented by 19 individual Directives covering specific sectors and risks) lays down rules on safety and health related training of workers which fully apply to work in ports. The Commission will closely monitor the implementation to ports of Community rules on safety and health of workers at work.

The publication “A Port Policy for all Seasons” of ESPO of May 2007, which served as input to the Commission’s Communication, also covered health, safety and training at work. ESPO emphasized the need for a qualified and well-trained workforce in ports covering all services and operations, both on land and on board ships (ESPO, 2007). Ports are one of the most dangerous working environments. Lost workdays due to an accident or injury can be up to 70 % higher in ports than in other industrial sectors (Workport project, 2000). Despite increased automation, work in ports still includes a lot of manual handling of loads. Work is also done in various weather conditions; in the dark, in the rain and in wintertime.

3.7. Dock labour and port reform

3.7.1. General considerations

Port reform is often strongly associated with dock labour reform. Low labour productivity in fully state-owned ports is one of the main driving forces behind port reform process throughout the world. Employment creation objectives of governments often go hand in hand with a surplus labour force in public ports, particularly in developing countries. Low productivity is combined with high costs since port employees in state-owned ports typically enjoy income stability, job security and fringe benefits. The need to reform port labour regimes is both a motivation to initiate private sector participation and an obstacle (see e.g. Hoffmann, 2001 on South American port reform processes). An IAPH survey on privatisation trends in the top 100 container ports in the world revealed that some 17% of ports regarded labour reform as a critical element, with a further 30% claiming it was either very important or important (Baird, 2002). The remaining ports viewed labour reform to be of rather less significance, mostly comprising the ports at which labour has already been reformed (e.g. the UK). Anecdotal evidence is strong that successful labour reform is a precondition for the private sector to be willing to assume the responsibility for a port or terminal. Trade unions are sometimes blamed for difficulties during the process of port privatization. If more foreign trade depends on organized labour this could be interpreted as an obstacle to private sector participation. On the other hand, it could also be true that union membership is positively correlated with a higher general level of a country's social and economic development.

Port workers' trade unions typically express great concerns prior to and during port reform processes because they fear job losses, casualisation of labour and changes in working conditions (see also table 3.4). The International Transport Workers' Federation expresses this sentiment: *"In nearly all cases, investments in new port infra- and superstructures coincided with downward pressure on working conditions and employment in order to cut labour costs as much as possible. Deregulation, privatization and growing competition are leading to this downward pressure and subsequently to the increasing use of non-union labour, casualisation of labour and flexibilisation of labour relations and working conditions, all of which are not in the interests of workers"* (International Transport Workers' Federation 1997, p. 9-10). While deregulation, privatisation and casualisation are aimed at increasing wealth for all, reform processes can be a recipe for mass dismissal of dock workers and a deterioration of working conditions including health and safety. This view seems to be supported by several studies. A survey of ILO revealed that port reforms in Australia, the United Kingdom and Argentina cut employment levels by 40 to 60% but this was mainly due to overmanning prior to the reform process (ILO, 1996). Others are more positive on the long-term employment effects of port reform. Port reforms generally lead to increased labour productivity measured in terms of output per dock worker. Employment reductions are one means of driving up productivity, and in some cases they are indispensable. Other ways in which port reform brings labour productivity improvements include capital investments, especially in new technology. Badly designed retrenchment programs are to be avoided since they can lead to the wrong workers leaving or to mass demoralization negatively affecting labour productivity.

Table 3.4. Possible effects of privatization on employment in ports

Employment effect	Employment condition	Labour–management relationship
Reclassification of posts	Greater job mobility	Greater emphasis on professionalism
New job patterns	Diminished guarantee of tenure and job security	Marginalization of unions' influence and bargaining power
Labour retrenchment and direct job losses	Need for retraining and skill upgrading	More tedious wage bargaining with preferences for individual rather than collective agreements
Medium- and long-term employment gains resulting from increased investment, growth of privatized firms, and diversification of services	Longer working hours and/or increased workload	Tougher stance of management on workers' performance and work discipline
	Payment by results schemes and pay freezes	Efficiency arguments and profit making gain importance over social objectives
	Loss of seniority and service grades	
	Wider wage differentials with greater incentive components	
	Loss of pension rights	

Source: based on UNCTAD (1995) and Labour Tool Kit of the World Bank

Stakeholders' relations management and social dialogue are prerequisites to a peaceful and successful port reform process. Governments and employers who do not involve trade unions throughout the entire restructuring from the early stages of the reform until the implementation of the changes face an increasing risk of disputes and strikes (Marges, 1999). In discussing port reform processes in New-Zealand, Taiwan and Australia, Chu (2007) concluded that union responses are usually less confrontational when government agents take the initiative. If port reform is launched by private companies like in the Australian case, then the port reform process typically turns industrial relations hostile and aggressive.

In order to secure dock workers' co-operation in the implementation of a port reform process, the benefits from the public sector's divestiture must be as tangible and clear as possible. In this context, the distribution of the benefits of increased efficiency among port stakeholders remains a key issue. Dock workers often have to be firmly convinced that reform serves the objectives of raising future incomes and standards of living. A clear stakeholder involvement and open social dialogue can shift trade unions' objectives from pursuing short-run job-preservation in a rapidly changing technological environment to embracing future job-creation. Labour reform processes which imply a shift to private sector employment through company-based labour agreements typically face opposition from unions since they often result in a reduced union density.

The timing of port reform is crucial for its success. Most port reform and port labour reform takes place in periods where there is a strong economic downturn and or there are serious problems with the competitiveness of individual ports or the (national) port system. When the port is doing well, trade unions are generally strong, supported by good prospects for more port employment. Employers enjoy a high utilization of their equipment and they will be more eager to keep things as they are in order to avoid disputes or even strikes which could temporarily immobilize their resources. When the economic situation in the port is less promising, cost-cutting strategies of employers might push towards a change in the status quo. The resulting call for changes in existing dock labour practices combined with lower port employment levels, typically changes the balance between employers and trade unions.

3.7.2. Key issues in port labour systems and reform in European ports

The aim of this section is to identify issues that typically arise when having smaller or larger changes to existing port labour practices. These changes more than once are part of broader port reform processes in European ports. The port industry has been undergoing port labour reform for over 100 years. The introduction of containerisation in the 1960s and with it the reduction of the port labour force accelerated reform processes in many ports around Europe. Much of the change has been driven by technological innovation. While the imperatives for change may have been the same, different countries and ports adopted quite different approaches to the change process. The British government clearly chose for a ‘big bang’ approach when abolishing the National Dock Labour Scheme in 1989 (see later), while other countries have followed a more ‘incremental’ approach based on a continuous evolution (not revolution) in existing dock labour arrangements.

European ports are confronted with different set-ups in dock labour systems and have gone through various reform processes. Since the 1960s, most ports have witnessed a decrease or at best a stagnation of the number of dock workers. The key issues that often appear in labour reform processes can be summarized as follows.

A. The definition of ‘dock work’ and the (legal) status of the dock worker

Quite a number of port labour systems require that only registered dock workers can perform dock work in the port. This obligation can be imposed by national or regional legislation or might also be the outcome of collective bargaining agreements between port employers and trade unions. Though not ratified by a lot of Member States, Article 3 of ILO Convention 137 makes explicit reference to the registration of dock workers: *“Registers shall be established and maintained for all occupational categories of dock workers, in a manner to be determined by national law or practice”* and *“Registered dock workers shall have priority of engagement for dock work”*. In those ports where employers have to use registered dock workers, the criteria to recognize dock workers and the entities involved in the recognition process might differ among ports. Port reform processes that envisage loosening the preferential relations between registered dock workers and port employers often face fierce opposition from labour unions out of fears of undermining their position. Following the EC Treaty, there can be no limitations to the free movement of workers and no discrimination on the basis of nationality².

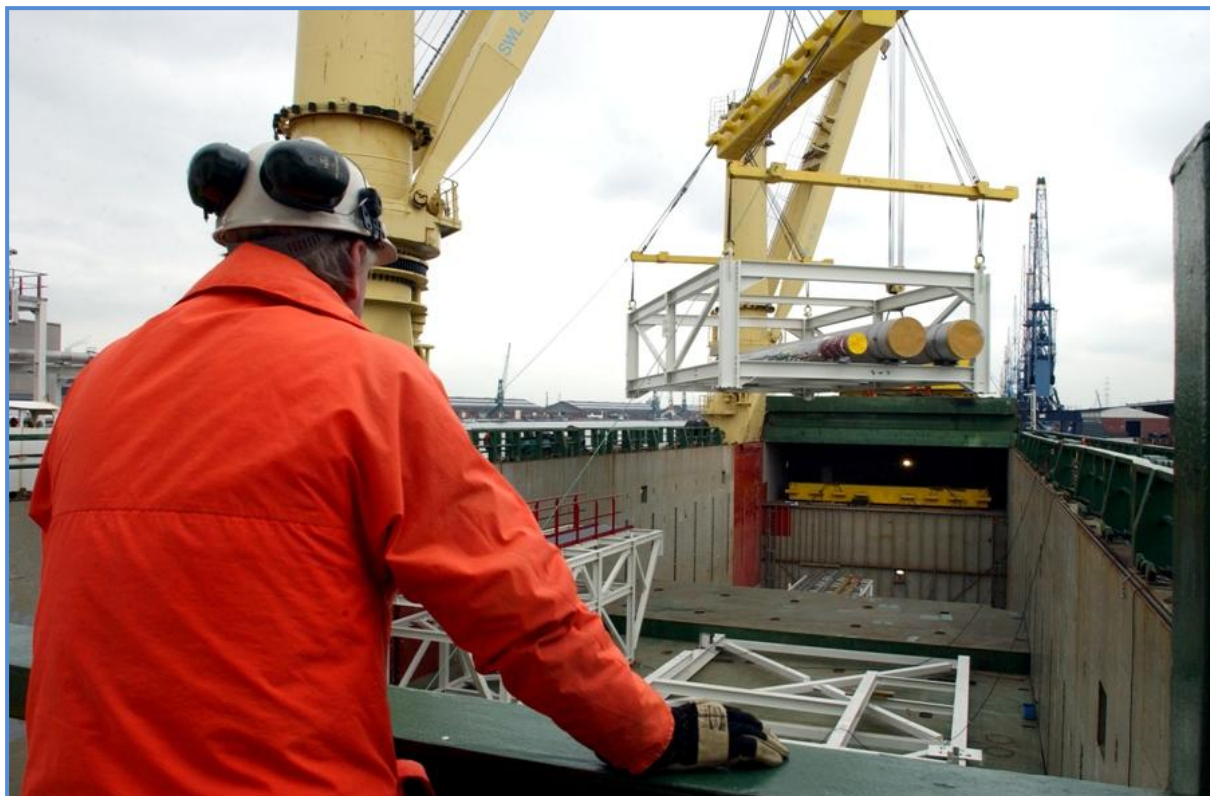
Another issue relates to the definition and interpretation of the term ‘dock labour’. In some ports, dock labour is confined to the loading and unloading of ships within the port area. Other ports are confronted with a very broad application of dock labour including all forms of cargo handling in a designated port area, including warehousing, stuffing and stripping, loading and unloading from inland waterway vessels, trucks, railway wagons, etc.. . The development of logistics activities in ports typically led to discussions on the reach of the definition of ‘dock work’. For example, the port of Le Havre was hit by docker strikes in 1999 partly on the grounds that new logistics work should be classified as ‘dock work’. In Antwerp and other Belgian ports a special (cheaper) category of dock workers was created for logistics activities in port warehouses.

Major differences also exist in the employment status of dock workers. They can be civil servants in state-owned service ports, workers directly employed by a private terminal operating company or workers employed through dock labour schemes.

² For example, in the *Merci Convenzionali* case, the European Court of Justice (ECJ) ruled against an Italian legislation which defined that members of dock companies had to be of Italian nationality (Jerman, 2009). Meanwhile, Italian legislation has been amended following the decision of the European Court of Justice.

B. Labour pools

A large variety in dock labour schemes can be observed. Cargo-handling is performed according to different settings across the European Union and even within one Member State. Ports can depend on a dock labour scheme based on a centrally managed pool of registered dock workers. The use of registered dockers through a pool can be mandatory or not. This obligation can be *de facto* or imposed by law.



By the 1960s or 1970s, many major ports had institutionalized, by law or by governmentally supported collective bargaining, organized systems for limiting competition in the dock labour market. The schemes generally involve three elements: (a) the designation of an "in-group" of officially registered (in effect, licensed) dock workers, (b) registered workers are not permanently employed at particular stevedoring enterprises are hired through a central pool or hiring hall, which stevedores are obligated to use for their primary source of casual labour and (c) a system of minimum pay guarantees or unemployment benefits for registered dockworkers who are left idle by a shortage of ships to be worked during a particular day, week or month. The decasualization schemes (see also discussion earlier in this report) differ in two principal ways: (a) the *de facto* relative power of labour unions in controlling work assignments and the inflow of new dockers, and (b) the sources and level of income support for idled registered workers. In some dock labour systems the unemployed casual workers receive unemployment benefits from the pool or the employers directly. In other systems, the government takes care of a substantial part of the guaranteed wages in case of underemployment. So, the scheme can be financed by all operating companies in a port or it can be (co-) financed by the port authority, subsidised by government, etc.. The overall role of government and its labour laws seem important in this regard, but so are a series of economic, cultural, and geographic factors.

Most port labour reforms have led to small or significant changes to labour pool arrangements in a sense that the matching of labour supply and demand in the port was altered. In an increasing number of ports, dock workers are directly employed by terminal operators, instead of contracted

via ‘pools’, entities in charge of recruiting and training port workers. In some cases (such as Germany and the Netherlands) employers are able to hire permanent company employees directly from the external labour market, but any additional (casual) labour must be hired from a regulated labour pool. In some cases, recent reforms have privatized the status and operation of these labour pools (e.g. in the Netherlands in 1995). A labour pool can be organised in the form of an (autonomous) undertaking that provides labour services to port operators or workers in a pool can be hired by these operators. There is a general trend towards open and autonomous pool systems with back-up of temporary employment agencies. Over the last 50 years or so, the collective bargaining process in many ports has progressively been decentralized to the company level. The labour pools are often involved in the training of dock workers. Some ports have analyzed whether it might not be better to replace one dockers pool for all sorts of cargo handling operations by two or more specialized pools for specific commodities (for example a separate pool for container operations), thereby risking to undermine the solidarity among terminals in dealing with peaks in demand.

The status of dock labour pools and the degree of openness of some of these pools remain points of attention and contention in European port circles. In its document ‘A port for all seasons’, ESPO urged the Commission to clarify under which conditions labour pools are compatible with the four basic freedoms of the Treaty and with the principle that *“service providers in ports should have full freedom in engaging qualified personnel of their own choice and employ them under conditions required by the service, provided all applicable social and safety legislation is respected”* (ESPO, 2007: p. 6). ESPO also questioned the compatibility of ILO Convention 137 with the EC Treaty, a Convention not ratified by all Member States. In several cases of 1999³, the European Court of Justice basically ruled that recognized dock workers and the associated collective agreements cannot be a subject of EC Treaty provisions as they cannot be regarded as constituting an ‘undertaking’ in conformity to the provisions of EC Treaty provisions. When referring to pool systems the European Commission in its Communication on a European Port Policy (2007) stated that *“the Treaty rules on freedom of establishment and freedom to provide services can fully apply to the activities carried out by the pools”* and that *“such arrangements should not be used to prevent suitably qualified individuals or undertakings from providing cargo-handling services, or to impose, on employers, workforce that they do not need, since this could under certain circumstances fall foul of the Treaty rules on the Internal Market, and in particular of Article 43 on freedom of establishment and Article 49 on freedom to provide services”*. A more elaborate discussion on the current state of the complex discussions on labour pools can be found in Jerman (2009) and Verhoeven (2010).

C. Arrangements at the work floor

While the pace of change differs among European ports, there is a general tendency or push from the employers’ side towards continuous working (via individual rather than collective breaks), flexible start times and variable shift lengths. Dock labour schemes show various ways in dealing with overtime, night shifts and weekend work. For example, in some ports weekend work is to some extent considered as a normal shift, while dockers in other ports have the freedom to accept weekend shifts (voluntary basis) with provisions in place for overtime money in case they do.

National and supranational legislation influences the scope for working hour arrangements for dock workers. For example, the Working Time Directive of the EC deals with minimum standards for daily and weekly working and rest time and night work. There are provisions to slightly deviate from the standards for certain activities that need continuity of service (as is the case for some port activities), but in these cases workers have to be granted compensatory rest periods.

³ See the case Jean Claude Becu, Annie Verweire, Smeg NV and Adia Interim NV in the port of Ghent (16 September 1999, C22/98 (1999) ECR I-5665) and the case Albany International BV/Stichting Bedrijfspensioenfonds Textielindustrie (21 September 1999, C-67/96 (1999) ECR I-5751).

European ports show a rather large variety in the way the respective labour systems deal with the composition of and flexibility within gangs or teams of dockers. There are systems advocating semi-autonomous and multi-skilled team-working with a high degree of freedom given to the teams to allocate tasks within specific shifts and over longer shift cycles. Other ports strongly rely on rather fixed gangs (linked to a supervisory system) as the central entities responsible for achieving a high productivity through experience, team-work and a spirit of competition among the gangs.

The hiring methods are guided by the provisions of local port labour schemes. Even in ports with a pool of registered dock workers, hiring systems can vary greatly in terms of:

- The hiring moment: e.g. hiring at fixed moments per week day or on a continuous basis;
- The persons involved in the hiring process: e.g. foreman, company officials;
- The characteristics and governance of the supervisory system;
- The interaction between docker and hiring person/entity: e.g. physical in a hiring hall or via electronic systems;
- The control given to the docker: e.g. matching on a voluntary basis or controlled externally (with or without taking into account the preferences of dockers);
- Etc..



D. Specialization/categorization/qualification of dock workers

Dockers in port are generally not a homogenous group. Significant differences between their members can relate to the particular tasks carried out, the required skills, the way they are hired, the training arrangements, career planning, etc.. .

One of the foundations for categorization of dock workers is the division between permanent and non-permanent workers. Increased mechanization and specialization in port, vessel and cargo load technology have introduced higher demands in terms of specialized skills and flexibility. International shipping lines and global terminal operators, particularly in the container business, increasingly demand direct employment for a significant number of their own workers, especially crane drivers and other operators of heavy yard equipment (the regulars). Casual workers are deployed during periods of peak demand. Even when a labour scheme is in place that includes a pool of registered casual workers, local port employers often hire a large part of the dockers on an almost continual basis (the quasi-permanent workers or semi-regulars). Labour schemes often include a 'continuity rule': a docker hired on a particular day can be rehired for the next day(s) to complete a ship without having to be rehired every one of these days in a central hiring place (the principle of 'repeat hiring'). The rule also gives the chance to new dock workers to become acquainted with the routines in a gang.

Some labour systems rely on a system of *job categories* of dockers, with varying degrees of labour mobility between categories. Other employment systems are based on *job qualifications*, allowing a (casual) docker to be deployed for any dock work as long as he has the right qualification(s). Port labour systems show various types and degrees of multi-skilling among dockers. The multi-skilling programs can be organized at company-level, by the pool or provided for by the state. Multi-skilling arrangements in some cases allow functional combinations of several jobs to be performed within the same shift.

In the following sections we discuss existing port labour practices in a number of Member States. At present, the organization of port labour and the associated dock labour systems vary considerably throughout Europe. In other words, the way the elements in the conceptual framework (figure 3.1) are combined in a port labour system differs among ports.

3.7.3. The French case ⁴

France has undergone a series of port reform processes.

A. Prior to 1992

Before the national reform of 1992 the access to the job of dock work was in principle managed by the BCMO (state labour office in each port) but in practice by the trade unions. A law of 1947 made that dock work was arranged via a pool system. Dock workers decided how much of them should work on a particular job. The management of the port operations was based on commercial agreements between the shipping lines and the stevedoring companies or port operators. The port authority supplied the port operators with quay equipment (cranes/gantry cranes/mobile cranes) and with drivers/maintenance staff for this equipment. The port operators hired casual dock workers via the pool. For example, the port of Le Havre had a casual workforce with allocation of dock workers to employers on a daily basis. Le Havre had ‘professionnels’ (guaranteed 300 half-day shifts per annum if they attended the hiring sessions on a daily basis) and ‘occasionnels’ (no guarantee and no obligation to attend work on a regular basis). The work guarantees were financed by the employers. By the mid-1980s, Le Havre suffered from a structural surplus in dock workers, partly as a result of the low mobility and flexibility of dockers and partly because the employed teams were too important. All attempts to introduce more permanent employment for a proportion of the labour force failed. Instead employers relied on a quasi-permanent system of employment whereby employers could select the same workers day after day (the regulars). However, the ‘professionnels’ continued to use their unique position in selecting the type of work and terminal on a daily basis. The attachment between employer and employee was low.

B. The port reform process of 1992

Since the late 1980s, Le Havre has been progressing towards a landlord model. Not all French ports moved at the same speed. The ports of Nantes-Saint-Nazaire and Dunkirk were among the first to recognize the need for reform in the early 1990s. Local dock union leaders played a considerable role in changing habits and attitudes and separated themselves from the more militant Ports and Docks Federation. The French dock labour scheme was reformed in the period 1992-1994. Between 1992 and the implementation of the national reform of 2008, things began to move, especially in Dunkirk where common operations were initiated between the port and the stevedoring companies and for instance in Le Havre, where some new cranes were bought by the stevedores, though still operated and maintained by the port. As cranes still belonged to the Port Authority, the tool port structure remained in Le Havre. The dock workers became employees of the port operators except for the gantry crane drivers (including maintenance staff) who still worked for the port authority. All the horizontal operations came under the responsibility of the stevedoring companies. Port operators continued to be supplied by the port authority with cranes and drivers/maintenance staff. Gantry crane drivers came under the supervision of the terminal operators but they were still paid by the port authority and the stevedoring company had no control on the allocation of drivers to terminals. This system led to a dissipation of responsibilities between the different actors, to conflicts over the

⁴ The discussion on French ports is based on Barton and Turnbull (2002), Slack and Frémont (2005) and input provided by the ports of Le Havre and Marseille.

maintenance of equipment and to inflexibility (e.g. a gantry crane driver cannot drive a straddle carrier).

The aim of the 1992 reform was to abolish the 1947 Law and the system of pools but some pools still exist for casual dock workers having the status of “G card” (for example in Marseille). This status is no longer authorized for new dock workers since 1992 and will disappear before 2020. Even though Le Havre’s dockers became company employees, they retained their ‘professionnel’ registration cards which in principle allow them to revert to industry employment if their employer goes out of business. The reform of 1992 has allowed dockers to become ordinary salaried staff, but this transformation has led to numerous strikes. The reform was crucial in opening up French ports to new investors (global terminal operators and shipping lines).

C. The port reform process initiated in 2008

In line with the port reform process initiated by Law n° 2008-660 concerning the French port reform of 4 July 2008, the port authority of Le Havre was renamed to Grand Port Maritime du Havre compared to Port Autonome du Havre prior to this change. In compliance with the new law, the Grand Port Maritime du Havre is now managed by a Management Board, under supervision of a Supervisory Board. An advisory body representing professional, social and community circles as well as regional and local authorities and their groupings were created with the Development Board. Le Havre is not the only Grand Port Maritime in France. Similar changes took place in the ports of Marseille, Rouen, Bordeaux, Dunkirk, La Rochelle and Nantes-Saint-Nazaire. Also the other Grands Ports Maritimes had to adjust their governance organs (e.g. Marseille completed this change in 2009). According to the Maritime Ports Code, an Interport Coordination Council is due to “provide consistency between the actions of the Grands Ports Maritimes and, should the case arise, of autonomous river ports..”.

One of the purposes of this reform is to optimize the operations under the sole authority of the port operators. Consequently, the crane drivers will be transferred to the stevedoring companies and the equipment has to be sold to the port operators. This should ultimately lead to a higher flexibility between the crane drivers and dock workers as all operations are under the responsibility of the stevedoring companies. Dock workers don’t depend on the Union des Ports de France but on the Union National des Industries de la Manutention.

The negotiations with the trade unions and terminal operators and the associated new concession contracts are expected to be completed by the end of 2010. This date should mark the end of the reform process and of the dock workers transfer process. The reform process led to labour unrest. Particularly in 2008, port traffic figures in Le Havre and Marseille were heavily affected by strikes, but also other ports such as Nantes-Saint-Nazaires saw strikes in 2008 and 2009 over the port’s plans to transfer dock workers to stand-alone operating companies under the French government’s national port reform.



Grand Port Maritime du Havre

D. Building blocks of the port labour system in French ports

The current classification of dock workers in French ports depends on their role in the gang (foreman, quay leader, reach stackers drivers, etc.). The system allows for some flexibility in the tasks but the dispatch appoints as much as possible the dock workers according to their specialisation (role in the gang and commodity). The composition of the gangs is based on negotiations between the unions and the port operators. Surplus and shortages of dock workers are managed through the temporary employment agency and labour leasing between port operators. Some port operators organize training sessions in order to avoid accidents and damages and to enhance labour productivity.

The labour system in Marseille provides a good example. The port counts some 1000 'professional' dockers and around 500 'occasional' dockers. Around 25% of the professional dockers are on the pay list of one operator and receive a monthly pay. The other 75% of professional dockers and all casual dockers are in the labour pools. They are recruited on a daily basis and can work for several operators. There are two kinds of labour pools. The first one, the Bureau Central de la Main d'Oeuvre (BCMO), is composed of "G card dockers", a historical status. This status should disappear in the medium term (around 2020). The Port Authority plays a role in the management of the BCMO. The second pool is composed of the 'new dockers' and is managed by stevedoring companies.

3.7.4. The UK case ⁵

Traditionally, dock labour in the UK has been casual in nature, allowing employers to hire and lay-off workers as and when needed. This casual system of employment between 1947 and 1967 meant that dock workers in London congregated twice a day (at 7h45 and 12h45) in hiring centres to compete for the ticket tags that guaranteed a day's labour. This method of employment worked quite well between the wars as this period was characterized by an abundant supply of affordable labour. Registration of dock workers was introduced during the Second World War. In 1946, this was formalized in the Dock Workers (Regulation of Employment) Act 1946 and the Dock Workers (Regulation of Employment) Orders 1947. The National Dock Labour Scheme (NDLS) became operative in 1947. The NDLS implied that all cargo handling and dock work within the designated

⁵ The discussion on UK ports is primarily based on Barton and Turnbull (2002), Goss (1998), McNamara and Tarver (1999), Turnbull and Weston (1993) and Dempster (2010)

port area had to be carried out by registered dock workers and only registered employers could employ these dockers. The NDLS applied to all 83 ports where casual labour was used. National Dock Labour Boards were installed and local boards were made responsible for the local labour supply. Levies on registered employers were used to finance the system.



The port of Southampton at dawn

The Rochdale Report of 1962 and the Devlin Report of 1965 resulted in changes to the Scheme. In 1967, shortly after the introduction of the container in Europe, the UK moved towards decasualization. Registered dock workers were no longer hired on a daily basis from the National Dock Labour Board (NDLB), but got permanently assigned to an individual employer. The new system was costly since labour surpluses occurred due to the introduction of labour-saving technology and since terminal operating companies carried the entire cost of financing idle time. Intercompany transfers were possible in principle, but in practice these led to disputes over wages, employment security, and other conditions of work. The employment of dockers on a permanent basis thus led to high costs and inflexibility. In 1972, an industrial agreement (the Jones/Aldington agreement) came into effect to protect registered dock workers. This arrangement, which resulted in the compulsory reallocation of dock workers from firms which had gone out of business to other port employers, put pressure on the remaining employers triggering a wave of closures. The number of employers in the port of London declined from 346 in 1967 to just 25 in 1989. The number of registered dock workers decreased from more than 16,000 in 1970 to less than 6000 in 1980 and just 1753 in 1989. Company closures provoked a succession of strikes in British ports and a dramatic reduction in private port investments. The industrial agreement implied that some port authorities became the places of last resort for dock workers, a practice that brought the ports of London and Liverpool on the verge of bankruptcy, forcing the Government to intervene with financial assistance. 1976 brought a failed attempt to extend the Scheme to all UK ports.

The abolition of the NDLS in 1989 drastically changed the system of labour regulation in British ports. The government passed several laws between 1979 and 1989 which virtually neutered trade unions. Legislation prevented unions from calling strikes except in the context of disputes with employers, on pain of having their assets sequestered by the courts. Non-Scheme ports failed to support strike calls. A lot of registered dock workers accepted the generous compensations that were offered to reduce redundancy. In the end, 7,000 of the 9,000 registered dock workers in 1989 eventually took redundancy costing the government £ 130 million. The abolishment was preceded by a lengthy

employers' campaign. After the abolition, the port industry revitalized. Employers now had the flexibility to employ labour as and when required and management was freed from the rigours of negotiating under the Scheme. Most stevedoring companies now employ a core workforce and run their own recruitment agencies to satisfy peaks in labour demand. They are also heavily involved in training casual staff. Some argue that the abolition is not a complete success as it led to a decrease in the welfare provisions of dock workers. The productivity of port workers in UK ports has generally increased. However, Goss (1998) states it is not at all clear how much of the productivity gains came from abolishing the Dock Labour Scheme and how much of it have been passed on to the port users and consumers. Turnbull and Weston (1993) argue that UK ports are now 'locked in a vicious spiral of cost-cutting, based predominantly on reducing labour costs'. Under the NDLS, dock workers had to undergo a four-week training course in a port training school which was financed with levies on employers. After 1989, the economies of scale of the port training schools were lost and employers had to make their own arrangements on training taking into account legislation in the field. Despite these comments, it is generally believed that the combination of privatization, increased capital investments and a plentiful supply of labour has contributed to the revitalisation of UK ports.

3.7.5. The Greek case ⁶

The port system in Greece counts 12 major international ports of which Piraeus Port Authority SA and the Thessaloniki Port Authority SA are listed on the Athens Stock Exchange (75% state, 25% individuals) and the other ten belong to the state. There are also two private concession holders: Cosco/PCT is concessionaire of Piers II and III in the port of Piraeus and Akarport manages and operates the port of Astakos Navipe. There are about 60 local port trusts which are entities under public law. The Piraeus Port Authority SA and the Thessaloniki Port Authority SA function as comprehensive ports i.e. both as authorities and port operators. The other smaller 10 Port Authorities SA function in a similar way, but the union of dockers enjoys its own list of tariffs and labour regulation.

Starting in late 2006, dock workers protested against Greek government plans for private sector container terminal concessions at Piraeus and Thessaloniki ports. The long campaign of dock worker actions particularly had its toll on Piraeus, where total container throughput fell 70% in 2008. The protests against Cosco Pacific's long term concession to operate a large tranche of Piraeus' container terminal reignited several times during 2009. The port of Piraeus was confronted with industrial action - overtime and weekend working bans - by dock workers. Despite the drawback of industrial unrest, port management secured an international tender for a concession to renovate Pier Two and to build/operate a new container terminal at Pier Three. The tender was won by Cosco Pacific. The existing container facility on Pier One will remain under the operation of Piraeus Port Authority. The total capacity of the container terminal in Piraeus is expected to 4.7 million TEU by the end of 2015 and will also introduce intra-port competition.

The port labour system in Greece has its own specific arrangements. There are two port labour categories in Greece. The permanent employees (crane and machinery drivers, workshop employees, planners and dispatchers, engineers, maintenance workers and administrative personnel) are represented by the 'Federation of Port Permanent Employees in Greece'. The second category, the dock workers (dockers, tallymen, signalmen, foremen and chief foremen), are represented by the 'Federation of Unloaders and Loaders in Greece'. The above Federations respectively sign a collective agreement with each Port Authority SA.

⁶ The information in this section was mainly obtained from Dr. Dimitrios Makris of Thessaloniki Port Authority/University of Thessaly and from Dr. Thanos Pallis of the University of the Aegean.

The permanent employees and dock workers are hired by contract for an indefinite period under private law. Specifically, Port Authority SA permanent employees and dock workers can be fired for reasons related only to their professional behaviour. The 10 Port Authorities and the many Port Trusts do not employ their dockers. They are supervised by a Regulatory Committee of Un/Loading Works consisting of a harbour master, a representative of the Ministry of Labour, a representative of the Chamber of Commerce, a representative of the Port Authority SA and a representative of the local dockers' union.

In accordance with the Presidential Decree 31/1990, all crane and machinery drivers in Greece must be qualified. The qualification or license is awarded by the government. There are four classes of licenses based on type of the equipment (thermal or electrical) and on the horse power of the machine's engine. The qualification procedure for port machinery drivers includes aspects such as the requirement of a car license, minimum working experience and examinations. There are no specific requirements imposed by law for the qualification of dock workers. A dock worker is essentially considered as a cargo handler. The Port Authority SA or Private port operator can add requirements in the dock worker hiring process based on job description as specified in the 'Internal Organisation & Operations Regulation (IOOR)' of the port company.

The hiring process for port machinery drivers and dock workers is based on the publication by the Port Authority SA in an official newspaper of a call for interest for machinery drivers or dock workers describing the number, the qualifications required and the evaluation criteria. The selected driver or docker passes a seven month trial period and then the Port Authority SA decides whether or not he/she will sign a job agreement. The hiring procedure for port machinery drivers is supervised by the Advanced Council for Selection of Personnel (for public sector). Private port/terminal operators have the right to select their personnel, but they must employ qualified machinery drivers.



The port of Piraeus

Greek ports are thus not based on pool systems. Flexibility in the system is achieved by allowing port machinery drivers or dockers to hold more than one machinery driving licence. The job description

typically specifies the requirements for multi-skilled personnel. Collective labour agreements also provide specific allowance for multi-licence holders.

The Port Authority SA usually calculates the number of drivers and dock workers based on the principle of the accepted peak given that all are permanent employees. This system is not generally flexible in case of Port Authorities SA. Private port operators can gain more flexibility by using multi-discipline personnel, subcontractors and casual workers. Port labour shortages can be eased by allowing legal overtime work to permanent employees, by exchanging daily personnel in excess among terminals in the port, by using private logistics or forwarding companies which undertake the major part of cargo handling services in warehouses and sheds, by allowing direct ship loading from trucks or by allowing casual loaders/unloaders to work in ship holds (very rarely, after prior consent of dockers' union). Port labour surpluses can be eased by occupying more port personnel in yard and warehouse activities, by transferring personnel, within legal limits, between shifts (e.g. 2nd to 3rd shift) or by exchanging daily personnel in excess among terminals in the port (e.g. from a container terminal to a conventional cargo terminal).

The demand for qualified crane drivers during an economic upturn exceeds the supply. This problem was more obvious in medium and small ports. A reason for the above imbalance in the labour market is related to the lengthy preparatory period before a driver takes the right to pass examinations for the required licence (e.g. in the best case it takes 335 working days or 1.5 year, but it usually takes up to 3 years). Terminal operators can organize vocational training for crane drivers provided certain minimum requirements are met.

3.7.6. The Maltese case⁷

The dock labour system in Malta is regulated by the Port Workers Ordinance of August 4, 1966 and the Port Workers Regulations of January 1, 1993. There also exist specific service contracts set-up directly between the Union representing the workers in the labour pool and the individual terminal operators. The terminal operators in Maltese ports (Marsaxlokk and Valetta) can employ workers of their choice in the handling of mechanical equipment. However, they have to use the common labour pool for manual work as, for example, lashing, driving, sweeping of bulk grain carriers and handling of conventional cargo. At present there are 370 port workers in the pool. There is only one common labour pool serving all ports and all terminal operators.

Recent changes in the legislation have primarily allowed the terminal operators to enter into direct negotiation with the Union to establish service contracts which are specific to the needs of the individual terminals, rather than simply relying on one system. The service contracts may establish the ordering procedures, conditions of work, pay systems, disciplinary procedures and the possibility of employing casual workers during peak periods. Those terminals that do not have a service contract with the labour pool have to abide with the conditions in the national legislation.

The pool system is quite flexible since there are no pre-established gang numbers and hence the terminal operators can order port workers based on the workload on particular days. Moreover, the pool is available on a 24-hour 7 day system throughout the year, with the exception of only 5 days per year. The workers in the pool are paid only for work carried out and the fees are based on a fee per unit (in the case of containers and ro-ro units) or on the tonnage handled in the case of conventional and bulk cargoes. Therefore, the terminals are not burdened with extra costs associated with maintaining the pool system.

⁷ The information was kindly provided by Maltese ports



The port of Valetta

There are no categories within the labour pool and all the workers in the pool are obliged to carry out all the duties of a port worker. However, the terminal operators have their own employees to handle the specialized mechanical equipment as cranes, fork lift trucks and bulk handling equipment. Self-handling is only allowed in the loading/unloading of tankers, fishing vessels and ship supplies.

Terminal operators who have a service contract with the Union representing the labour pool are allowed to employ casual workers to deal with peak periods – that is when there are not enough workers in the pool to cater for the demand by the terminal operator. The casual workers would have to be chosen from among persons who have previously completed a short course in port work.

3.7.7. The German case (Bremerhaven and Hamburg)

The number of dock workers in the [port of Hamburg](#) has fallen sharply in recent years. In 1980, there were more than 11,000 dock workers in the port. In 1990 that number fell to nearly 8,000 and in 2007 there were about 5,000 dock workers. The increasing mechanisation and containerisation are major sources of dock labour decline in Hamburg. This decrease was mainly absorbed by an early retirement of older dock workers and other (financial) arrangements. The Alterteizeit system was used to allow the inflow of younger dock workers. Under this system, older dockers (55 years) who retire can retain 85% of their salary. The government pays a portion of the salary (about 20%) and the remainder is paid by the port company.

The Gesamt Hafenbetriebs Gesellschaft (GHB) is the largest provider of port-related workers in the port of Hamburg. The “Unternehmensverband Hafen Hamburg”, an association of port companies, holds 97% of the shareholding of GHB. The remaining 3% of the shares are held by members of this association. All financial risks are covered by the shareholders. GHB provides a flexible work force to companies who have to deal with peaks in port demand. The port workers in the GHB can be used virtually in all sectors and are generally well trained. There is no close cooperation between the City of Hamburg and the GHB pool.

GHB can also function as transfer point for surplus dock workers. Companies can offer excess capacity to the pool, but the pool is not obliged to take it (in practice, the pool does not take employees without own interest). Dock workers that cannot be placed elsewhere receive a

guaranteed wage. In case dock workers (in the companies or in GHB) temporarily face less or no work, they receive a guaranteed wage ('freie schicht'). This salary is paid by the customers of the port through a 1.5% mark-up on the price for stevedoring services. This ensures that qualified dock workers remain in the port and can be redeployed when traffic volumes and port labour demand picks up. GHB works according to the 7d/24h principle.



Container gantry cranes in Bremerhaven

In **Bremen/Bremerhaven**, there is cooperation between the City and the port. Similar to the Hamburg case, an independent pool was established now functioning under the name Gesamt Hafen Betriebs Verein im Lande Bremen E.V. (GHBV). Also this pool consists of well-trained dock workers who can be deployed for all kinds of port activities. The terminal operators communicate about the number of dock workers needed and the job qualifications required and GHBV arranges the selection and the overall supply. The workers of the pool can be full-time workers, part-time workers or can be employed as permanent staff of the stevedoring company. GHBV guarantees a minimum guaranteed income regardless of the level of employment.

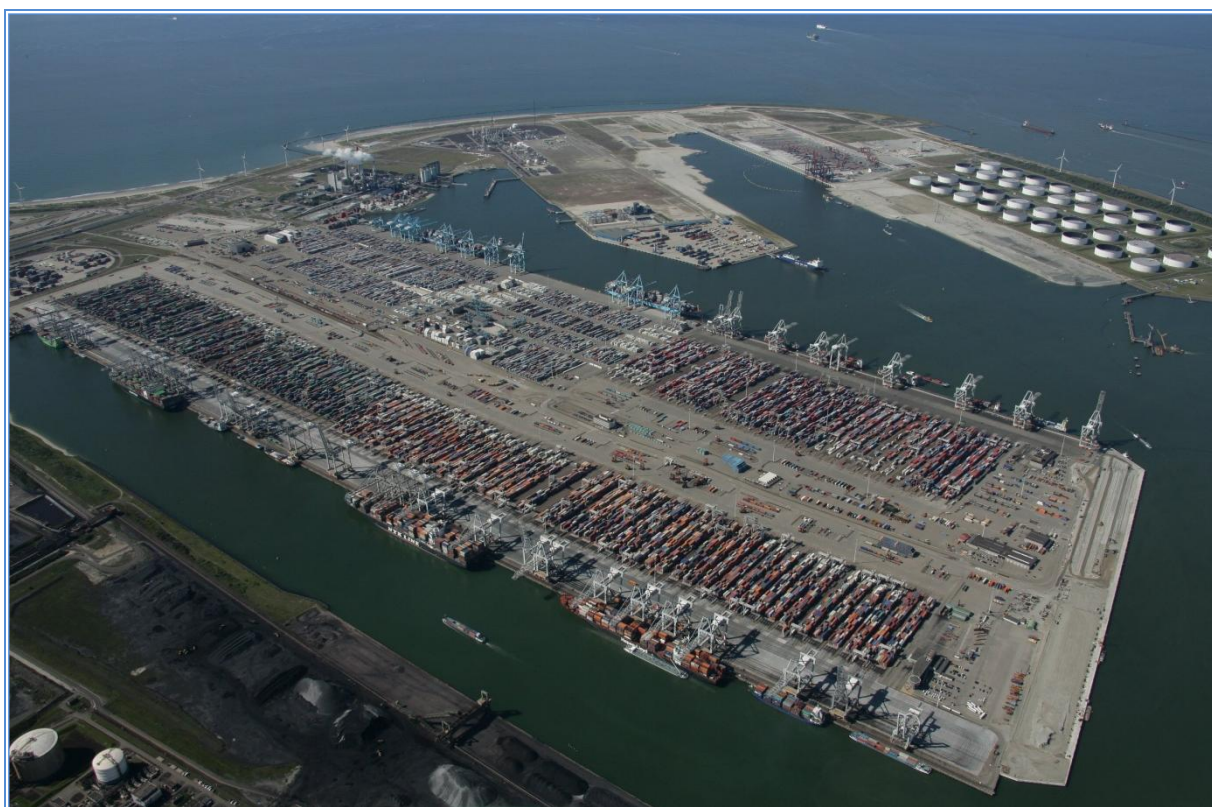
Besides the pool of dock workers there is also a backup system in place based on 'rote Karte': casual workers who are standby to fulfil temporary assignments. These employees are mostly students and unemployed people who followed a course, received minimum general safety training and are subject to a selection test. This category of people is mainly used in warehouse operations, absorbing peak activity, and for conducting logistical tasks. GHBV has its own training facilities and provides training for its workers pool, in consultation with port companies.

3.7.8. The Dutch case

Dock labour systems in Dutch ports are governed by collective bargaining agreements. Most of the collective bargaining agreements stipulate that the port employer shall only use its permanent dock workers or the dock workers of a labour pool for activities that fall under the collective bargaining agreement. Since the port employers face some cyclicity and unpredictability in cargo flows, they have worked on setting up a flexible system combining permanent employees (who have a labour contract with one terminal operator) and casual workers linked to a labour pool.

Textbox 3.2 highlighted the process of decasualization in the port of Rotterdam till 1965. The first dock labour pool in the **port of Rotterdam**, the 'Haven Arbeids Reserve' (HAR) was founded in 1916. HAR was a joint venture between employers and the staff of HAR was to be regarded as the joint staff of the port companies. This pool was aimed at distributing the available port labour supply in an optimal way. The government paid part of the cost of idle dock workers and the cost associated with redundancy, given the great economic importance of the port of Rotterdam and in view of avoiding

poor social conditions for dockers. In the period 1955-1968 the HAR was transformed into the 'Centrale voor Arbeidsvoorziening' (CVA). On January 1, 1968 CVA became a separate legal entity under the name 'Stichting Samenwerkende Havenbedrijven Rotterdam' (SSHB). The port companies jointly remained financially responsible for the state of affairs within SSHB. The employees of SSHB were employees of the joint terminal operating companies. The costs related to labour redundancy were largely financed by the government. From 1976 onward, the financial means needed were collected based on an annual financial contribution to the General Unemployment Fund ('Algemeen Werkloosheidsfonds' or AWF) which found its roots in the now expired Article 69 of the Unemployment Law.



The 'Maasvlakte' in the port of Rotterdam

In mid 1993, the Minister of Social Affairs and Employment announced that he would stop financing the pools in Dutch ports. Following the intention of Minister Melkert it was decided to reorganize SSHB. This process resulted in the 'Port Agreement' ('Akkoord Modernisering SHB Rotterdam' of November 1994) and the installation of SHB Havenpool Rotterdam B.V. (SHB) in April 1995. SHB took over most of the activities of SSHB. An agreement was reached with the Minister of Social Affairs about the financial compensation in connection with the termination of the port contribution arrangements. This agreement was captured in the Act of 20 December 1995 ('Wet tijdelijke bijdrage herstructurering arbeidsvoorziening havens' or WTH). The Act had two objectives: to end the port contribution arrangements and to allow for a temporary state contribution (till 1999) in the restructuring costs incurred by ports as a result of the installation of independent dock labour pools. SHB had incorporated many redundant workers from port companies. The average age of the workforce of SHB was relatively high which made the pool quite expensive. In the late 1990s, SHB had about 900 employees and provided approximately 15% of the dock workers in the port. An SHB Holding was founded in 1999 as an umbrella structure on top of SHB and SSHB.

The operation of SHB was structured as follows. The dock workers had a permanent employment contract with SHB and worked according to a fixed schedule. There was a wide choice of work

schedules ranging from part-time, full time, weekend work, etc.. SHB guaranteed the payment of an agreed amount of tasks. A profile was drawn from SHB worker with an overview of work experience, job qualifications, past training, preference of type of work or employer, training needs, etc.. All this information was contained in a central database. The port companies sent details to SHB on a daily basis by specifying the number of dock workers needed, the required job qualifications, location, etc.. The SHB staff used their worker database to match the requested profiles. SHB pool workers were also available for non port-related activities such as logistics, project work and other types of temporary work. Depending on the nature of the activities SHB could charge a lower rate than the port-related tariff.

The Act of 1995 undermined the role of SHB and increased the importance of permanent employment with a stevedoring company, not only in Rotterdam but also in other Dutch ports. In late 2008, SHB faced serious financial problems. In January 2009, a Rotterdam court declared bankruptcy over SHB. All 440 employees were affected, most of them working in the container handling business. In February 2009, most of the activities of SHB were revamped into Rotterdam Port Services. The new company kept 300 employees of the former SHB at work. By April 2009, most of the former workers of SHB did not have a single day of work yet.

Rotterdam provides a structured training program for its workers. Before any person can work in the port he or she had to attend an approved course at the Port Training College, which is run by the port transport industry in collaboration with the Rotterdam Port Employee's Association, trade unions, the municipal authority and government. This training division was founded in 1949 (see also textbox 3.2).

Also **the port of Amsterdam** has a labour pool. However, due to the above policy decision of Minister Melkert in 1995 the number of dock workers in the pool was reduced drastically from more than 400 to only 150. After 1995, the pool was transformed into an autonomous and market-oriented company: the Arbeidspool. Despite the government support of about 12 million euro the Arbeidspool went bankrupt in September 1997. Soon after, the port of Amsterdam set-up a leaner version of a pool: 'Stichting Personeelsvoorziening Amsterdam Noordzeekanaalgebied Operationeel' or SPANO. SPANO currently includes a pool of about 90 dock workers who can be hired during peak demand. If labour demand exceeds supply, private port companies are allowed to hire outside workers. In the reverse situation, when the labour supply exceeds demand, the dock workers in the pool can exceptionally be deployed at Schiphol airport. Dock workers (permanent or casual) in the port of Amsterdam are used exclusively for water-related tasks. Logistical tasks fall under the collective agreements concluded at company level.

The port labour organization in **Flushing and Terneuzen** (managed by Zeeland Seaports) is characterized by a high degree of flexibility. People with the right qualification have access to the profession of dock worker. The high degree of flexibility is also reflected in the recruitment of casual dockers, the deployment of multi-skilled dock workers (exchange of workers between different terminals during a shift), the composition of the gangs, etc.. Terminal operating companies largely rely on permanent dockers paid according to the collective bargaining agreement at company level. Wage differentiation is based on three elements: qualifications, seniority and bonuses/surcharges. The peaks in port demand can be absorbed through casual workers made available via temporary labour offices such as Tense Logistics and Labour Services Zeeland. Casual workers sign contracts with these labour offices and work according to the conditions contained therein (hourly wage, working hours, leave, allowances, etc.). The terms and provisions of the contracts between the casual worker and the temporary labour office apply (such as the start of a shift or shift duration). Permanent and casual dock workers in Flushing and Terneuzen can only be deployed exclusively for water-related tasks. Logistical tasks fall under the collective agreements which are concluded at company level.

3.7.9. The Belgian case

A. The 'Major Act': cornerstone of dock work in Belgian ports

Antwerp, Zeebrugge, Ghent and Ostend are the main seaports of Belgium. Textbox 3.1 discussed the trends towards decasualization of the port labour system in Antwerp in the 1960s. Since the early seventies, the term 'dock work' got a specific legal meaning and content. Belgian seaports are subject to the Act of June 8, 1972 (B.S. 10/08/1972), better known as the Major Act ('Wet Major'). Article one of the Major Act stipulates that only recognized dockers are allowed to perform dock work in the port areas. The definitions of port areas and dock labour are described in the Act of December 5, 1968. According to article 3 of the Major Act, the King sets the terms and conditions of dock workers' recognition based on the advice of the joint committee for the port area concerned. All cargo handling activities within the port area are considered as dock work, so the Major Act is not limited to the loading and unloading of ships only. The Royal Decree of January 12, 1973 stipulates that dock work includes (a) all handling of goods loaded on or discharged from seagoing vessels, inland barges, rail wagons or trucks, (b) related ancillary services on navigable waterways, on the quays or in facilities that focus on the import, export and transit of goods and (3) all cargo handling activities on the quays of industrial premises in the port areas. This implies that all goods entering or leaving a Belgian seaport, and all services related to these goods, should be treated by registered port workers. Only few exceptions exist to this general rule (for instance in the framework of collective bargaining agreements): the handling of oil products and the treatment of fish brought in by fishing vessels are not subject to the compulsory use of registered dock workers.

Although the above legislation forms the basis for dock work in the Belgian seaports, there are differences among the ports in terms of port labour organization and hiring. This situation is the result of differences in regional and sectoral collective bargaining agreements which are in turn linked to the specificity of each port, its historical background and its labour relations. The collective bargaining agreements are concluded in the so-called Joint or 'Paritary' Subcommittees. The Joint Committee number 301 ('Paritair Comité 301') has jurisdiction in this matter. An autonomous Joint Subcommittee was established in each Belgian seaport. The collective bargaining agreements are grouped to a larger agreement: the Codex. Antwerp, Zeebrugge and Ghent each have their own Codex. The port of Ostend follows the Zeebrugge Codex. Each codex describes in detail the prevailing labour regulations applicable within the port. The codex of Antwerp is very elaborate. The codex of Zeebrugge/Ostend is rather compact while the code of Ghent is quite extensive for a medium-sized port. Each port-specific Codex contains stipulations on wages and working conditions and also includes a clear description of the geographical area for which the regulations apply. The existence of labour regulation through a Codex implies that competition among operators in the same port (intra-port competition) is predominantly based on service and productivity, rather than labour costs. Changes and additions to a port's Codex are the responsibility of the competent Joint Subcommittee in which representatives of both employers (terminal operators) and trade unions are represented on an equal footing. The responsibilities of the Joint Committee and the Joint Subcommittees, and the recognition of dockers are arranged in a number of Royal Decrees.

The law of July 17, 1985 obliges port companies (who employ dock workers) to join the employers' association of the relevant port: CEPA for the port of Antwerp, CEPG for the port of Ghent, CEWEZ for the port of Zeebrugge and CWO for the port of Ostend. These employers' associations are member of the employer's federation of Belgian ports. The Royal Decree of 10/07/1986 (B.S. 13/08/1986) gave these non-profit associations the exclusive mandate to act for the employers who engage the services of dock workers in the port areas, with the purpose of fulfilling all their obligations arising from this employment pursuant to the application of the labour and social security legislation. CEPA pays all dockers' wages and other benefits in the port of Antwerp, even for regular workers. The other associations do the same in their respective ports. If an employer breaks the

Codex, the association imposes a fine. The associations also take responsibility for port-wide training, ensuring high levels of competency across the entire labour force. The training centres offer obligatory professional training courses for newly registered dockers and special schooling for dockers willing to move to another job category.



The port of Zeebrugge © www.henderyckx.com

B. Evolution in dock worker numbers

Employers in a Belgian port have to employ the locally registered dock workers. Casual workers from outside the system can only be deployed in case of shortages of registered dockers (strict conditions apply). Wages for dockers are considered high when compared to other industries, but at the same time Belgian dockers are often cited for having a strong record when it comes to labour productivity. In the early 1980s there were about 9,000 registered dock workers in the port of Antwerp down from 12,368 in 1970. The number of dockers continued to decrease to a low of 5,400 in 2001. In recent years, the contingent slowly increased to about 6,900 dock workers in 2008, partly due to the growing needs in the container handling industry. Total cargo throughput in Antwerp rose from 80 million tons in the early 1980s to 189 million tons in 2008. The port of Ghent saw a gradual decrease in registered dock workers in the pool to less than 500 in 2008. The port of Zeebrugge is the only Belgian seaport with a growing number of dockers (from only 327 in 1980 to 1,645 in 2008) mainly due to rising manpower demand at container and ro-ro terminals.

The economic crisis and the traffic losses in the conventional general cargo market resulted in continued high levels of unemployment among dockers in the port of Antwerp. The percentage of registered dock workers without work rose to 28% during the first quarter of 2010. A special fund that pays unemployed dock workers an allowance on top of their unemployment benefit is drying up. However, the fund forms part of the collective labour agreement for dock workers that runs until

March 2011. It is likely that the fund will be a main factor in the negotiations for a new collective labour agreement for dock workers to be drawn up in 2011.

Union membership is very high among Belgian dock workers, partly because of the specificities of the process to get recognized as dock worker. BTB, ACV-Transcom and ACLVB are the major trade unions in the context of dock labour. The unions closely monitor the compliance of port operations to legislation and the local Codex. They have adopted a rather pragmatic approach in contract negotiations. The Belgian ports have a long tradition of social dialogue, both via formal and informal channels. In case of disputes, a disputes-resolution procedure sets in to resolve problems.

C. Categories of dock workers

The increasing specialisation in cargo handling and the growth in port-related logistics activities lie at the heart of dock workers' categories in Antwerp, Ghent and Zeebrugge. Registered dock workers are categorized into two separate groups, namely the General Contingent and the Logistics Contingent (in Antwerp via the law of December 19, 2000 and in Zeebrugge via the Royal Decree of July 5, 2004). Dock workers of the General Contingent perform dock labour in the sense of article 1 of the Royal Decree of January 12, 1973 (see earlier). Dock workers of the Logistics Contingent perform dock labour in locations where, in preparation of the further distribution or forwarding of the goods, the latter undergo a transformation resulting indirectly in identifiable added value. These latter dock workers are contracted by an employer on a permanent basis. The categorization allowed for separate remuneration conditions, recognition procedures and working conditions for each of the two categories of dock workers as contained in the collective bargaining agreements. A similar arrangement exists in the port of Ghent although the names of the contingents are different.

The General Contingent in Antwerp is composed of (a) regular or permanently employed dockers (dock workers who always work for the same employer) and (b) casual workers. Private operators employ just key workers as regulars, principally to operate specialist equipment and oversee/lead operations. The casual workers form the labour pool. There are four hiring sessions per day for casual workers (day shift, morning shift, afternoon shift and night shift) held at a central hiring hall close to the city centre overseen by government officials. However, about two thirds of all casual dockers are effectively quasi-permanent or semi-regular, working for the same employer on a regular basis via a 'repeat hiring' by a regular employer. Casual dockers value the idea that they can return to the hiring hall whenever they like, even when many of them work as semi-regulars and seldom visit the hiring hall. When demand is low, terminal operators can return surplus dockers to the hiring hall. The guaranteed payments, for casuals dockers and returned semi-regular dockers confronted with a short or prolonged period of unemployment, are mainly financed by the state via an unemployment benefit and partly also by the employers via a special fund. The unemployment benefits system helps dockers who want to work but don't find work, and avoids abuse by dock workers who are not willing to work. The gang system in the port is key to the motivation and productivity of the dock workers. Each gang/team is managed by a foreman. A so-called 'ceelbaas' oversees several gangs working on the same ship. Both the foreman and ceelbaas work on a permanent basis for a certain employer (strong employer alliance) and are also union members. Other job categories for permanent dockers include a.o. the 'conterbaas' (responsible for hiring casual dockers), chief-tallyman, assistant chief-tallyman, container repairer and quay crane driver. The job categories of causal dockers include dockers 'general work', tallymen, deck men, 'minerai' men (for the handling of ores) and several categories of drivers of mechanical equipment. The job categories used in other Belgian ports differ only slightly.

D. Some differences among Belgian seaports

Despite the existence of a common legal framework in Belgium (Major Act), there are quite a number of differences between local port regulations (Codex) as demonstrated by the following examples.

First of all, the hiring system for casual dockers differs among ports. For example, employers in the port of Antwerp are bound to fixed shift hours (day, morning, afternoon and night shift) connected to four daily sessions at a central hiring hall. Ghent has two hiring sessions per weekday, Zeebrugge only one. Half shifts or continuous hiring (starting a shift at a preferred moment in time) are not possible in Antwerp. Under certain conditions, half shifts and slight changes to shift hours are possible in Zeebrugge and Ghent. Second, there is the issue of the determination of the number of required registered dock workers. Employers' organizations and trade unions carefully monitor the need for any extension or suspension of recruitment. Particularly in Antwerp, the many job categories of dock workers, the limited mobility between job categories and the fact that dock workers are assigned to the same shift for longer periods of time can complicate matters. A shortage in one job category and shift may not easily be compensated by surpluses in other categories or shifts. Third, there are small differences in the recognition process of new dockers. Fourth, about 85% of the dockers in Zeebrugge work according to a 'timetable system'. Employers allocate port workers for a certain period. The dockers have to attain an average number of shifts during that period. The remaining 15% of workers have to come to the hiring hall (unemployment possible). Fifth, there are differences in how weekend work is approached (in Antwerp on a voluntary basis).

3.7.10. The Spanish case ⁸

Dock labour pools in Spanish ports are legally constituted as private enterprises and take the legal form of 'Port Group of Economic Interest' (APIE), which are owned by the stevedoring companies and authorized by Spanish legislation to render cargo handling services in ports. Only one APIE is allowed per port, and this mercantile entity is specifically for the port industry, with no existing similar groups outside it. The form was derived from the general concept of 'Group of Economic Interest' (AIE).

Port authorities have no direct involvement in APIE's, the latter having only the obligation to inform port authorities of the relevant agreements reached. This allows port authorities to react in case decisions are taken against the general interest of the port. If this is the case, the port authority may temporarily suspend the agreement during 20 days, or even contest it before a civil court. If the agreement is not contested by the port authority, the suspension cannot be extended. If the agreement is contested before a civil court, the court will decide on its suspension.



Port of Valencia

⁸ Based on information provided by Puertos del Estado

4. Conclusions

1. European ports are increasingly functioning not as individual places that handle ships but as turntables within global supply chains and global production networks. European ports are important generators of employment at the local, regional, national and even European level. The increased logistics integration between ports and logistics and production sites in regional hinterlands has extended the reach of the employment effects of many gateway ports from a local to a larger spatial scale. Seaports create direct port employment through cargo handling services, ship operations and services, industrial activities and government agencies. Ports activities are responsible for a wide range of indirect employment effects, through the linkages of harbours with other economic sectors and the spatial interactions with large logistics and economic poles outside port areas.
2. Measuring the employment impacts of ports is not an easy task. At present, benchmarking employment impacts of European ports is extremely difficult given the large variety in methodologies applied (mostly bottom-up approaches) and a general lack of port-relevant economic input-output data at the macro-economic scale. Still, the fragmented results in European ports underline the significant direct and indirect employment impacts of ports.
3. Job creation in ports can serve as a way to increase the public awareness and public image of ports. Investments in the 'softer values' of ports are beneficial to employment levels in the tourism sector and cultural segments of the economic spectrum.
4. While the economic effects of ports are far-reaching, cargo handling operations lie at the core of the *raison d'être* of ports. The efficiency and effectiveness, with which loading and discharging activities take place in a port, are important to the port's competitiveness and its ability to generate wider economic effects in terms of employment and value-added creation. Dock labour systems have an important role to play in this context.
5. Technological advances and scale increases in ship types and terminals, increased containerisation, changes in inland transport requirements, the rise of terminal networks and the functional integration of terminals in supply chain management practices and broader logistics poles have led to renewed market requirements on dock labour. Market players demand a maximization of the performance of dock workers (with an optimization of the direct costs of port work as a prerequisite) and a minimization of the indirect costs of port labour. The response to changing market requirements takes place within a wider setting of legal and social conditions.
6. Since the 1960s, most ports have witnessed a decrease or at best a stagnation of the number of dock workers. The organization of port labour and the associated dock labour systems vary considerably throughout Europe. In other words, ports across Europe are different in the way the dock labour system tries to provide an answer to the market needs in terms of flexibility, productivity, quality and cost efficiency of dock workers.
7. The key issues that often appear in labour reform processes relate to the definition of dock work, the legal status of the dock worker, the functioning of labour pools, practical arrangements at the work floor and the categorization and qualification of dock workers.
8. Ports can depend on a dock labour scheme based on a centrally managed pool of registered dock workers. The use of registered dockers through a pool can be mandatory or not. This obligation can be *de facto* or imposed by law. While the pace of change differs among European ports,

there is a general trend towards open and autonomous pool systems with back-up of temporary employment agencies and a general tendency or push from the employers' side towards continuous working, flexible start times and variable shift lengths. European ports show a rather large variety in the way the respective labour systems deal with the composition of and flexibility within gangs or teams of dockers.

9. One of the foundations for categorization of dock workers is the division between permanent and non-permanent workers. Labour schemes often include a 'continuity rule' via the principle of 'repeat hiring'. Such arrangements created quasi-permanent or semi-regular dockers. Some labour systems rely on a system of job categories of dockers, with varying degrees of labour mobility between categories. Other employment systems are based on job qualifications, allowing a (casual) docker to be deployed for any dock work as long as he has the right qualification(s).
10. Social dialogue through effective bodies of joint consultation at the level considered appropriate by the social partners (e.g. regional, national) is considered as the key to a sustainable relation between employers and trade unions. Social dialogue is about maximizing the potential for mutual gains by addressing the concerns of all rightful stakeholders involved. In order to maintain a good climate of industrial relations both employers and dock workers should have the feeling that their concerns and demands are met within a reasonable scope.
11. Training is essential in achieving a high labour productivity and safety record. Training is also considered as a key element in achieving better social conditions for dock workers and in enhancing the social status of dock workers, professionalism, motivation and commitment. Training should not only be focused on technical skills, but also on teamwork, problem solving and dialogue. Further advances in adequate training to perform their tasks safely and efficiently can help to create quality customer service.

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Other port studies by ITMMA commissioned by ESPO

This is the fourth report in a series of port studies realized within the framework of the existing service agreement between the European Sea Ports Organisation and the Institute of Transport and Maritime Management Antwerp (ITMMA), an institute of the University of Antwerp. Below we provide you with a short overview of the other three reports. All these reports can be downloaded from ESPO website (www.espo.be).



2007 – ESPO/ITMMA Market report on the European port industry

The ESPO annual report 2006-2007 contains a large section on market developments in European seaports. This part of the annual report analyses five markets: the container market, the RoRo market, the market for conventional general cargo, the liquid bulk market and the dry bulk market. Detailed statistics on cargo handling in European seaports for 2005-2006 are provided as well as an overview of main developments and trends in each of the market segments. The report aims for a balanced approach covering all port regions in Europe and large as well as mid-sized and small ports.



2008 – Report on the awarding of terminals in European seaports

This report contains the main findings of a survey on the awarding of terminals in Europe. The survey was commissioned by ESPO in response to the European Commission's ports policy communication which was published in October 2007. The report provides a better understanding of current practices and viewpoints of managing bodies of seaports in Europe on the awarding of terminals.



2009 – An economic analysis of the European port system

This report aims at providing a deeper understanding of the market dynamics behind freight distribution patterns in the European port system. The findings of the report served as input for the discussion on the revision of the TEN-T program of the European Commission. The 'multi-port gateway' concept was first introduced in this report. The first part discusses cargo dynamics in the European port system by analyzing the geographical spread of freight volumes in the European port system. Next, the report zooms in on the market dynamics behind the routing of good flows via the European port system.

About ITMMA – University of Antwerp



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