

Dry ports and the maritime hinterland: gaining momentum

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The setting of dry ports

The evolution of inland freight distribution can be seen as an ongoing development of containerization and intermodal transportation. Modal availability, capacity and reliability of regional inland access all have an important role to play in shaping this development. As maritime shipping networks and port terminal activities become better integrated, the focus shifted on inland transportation and the inland terminal as a fundamental component of this strategy. Thus, after a phase that relied on the development of port terminals and maritime shipping networks, the integration of maritime and inland freight distribution systems has favored the setting of what has often been labeled 'dry ports'.

Using the term 'dry port' to define an inland terminal is open to debate since many inland terminals are in fact 'wet' given their direct access to inland waterway systems. Moreover, the inland location can effectively be a port if a barge service is concerned, but fundamentally cannot be considered a port if it involves a rail terminal. Thus, there seems to be no consensus on the terminology resulting in a wide range of terms including dry ports, inland terminals, inland ports, inland hubs, inland logistics centers, inland freight villages, etc. The reason for this lies in the multiple shapes, functions and network positions these nodes can have. Regardless of the terminology used, three fundamental characteristics are related to an inland node:

- An intermodal terminal, either rail or barge that has been built or expanded.
- A connection with a port terminal through rail, barge or truck services, often through a high capacity corridor.
- An array of logistical activities that support and organize the freight transited, often co-located with the intermodal terminal.

It can thus be seen that the functional specialization of dry ports has been linked with the clustering of logistical activities in the vicinity and have become excellent locations for consolidating a range of ancillary activities and logistics companies. In recent years, the dynamics in logistics networks have created the right conditions for a large-scale development of such logistics zones.

Driving forces: pushing economies of scale inland

Each dry port remains the outcome of considerations pertaining to modal availability and efficiency, market function and intensity as well as the regulatory framework and governance. Their emergence underlines some deficiency in conventional inland freight distribution that needed to be mitigated. On top of the list is real estate where many deep sea terminal facilities have limited land available for expansion. This favors the intensification of activities at the main terminal and the search of lower value locations supporting less intensive freight activities.

Capacity issues also appear to be one the main drivers of dry port development, since a system of inland terminals increases the intermodal capacity of inland freight distribution.

While trucking tends to be sufficient in the initial phase of the development of inland freight distribution systems, at some level of activity, diminishing returns such as congestion, energy and empty movements become strong incentives to consider the setting of inland terminals as the next step in regional freight planning. Inland locations tend to be serviced less by intermodal transportation than coastal regions. Through long distance transport corridors, inland ports confer a higher level of accessibility because of lower distribution costs and improved capacity. These high-capacity inland transport corridors allow ports to penetrate the local hinterland of competing ports and thus to extend their cargo base.

In addition to standard capacity and accessibility issues, a dry port is a location actively integrated within supply chain management practices, particularly in view of containerization. This takes many forms such as the agglomeration of freight distribution centers, container depots, customs clearance and logistical capabilities. The dry port can also become a buffer in supply chains, acting as a temporary warehousing facility often closely connected to the warehouse planning systems of nearby distribution centers.

Modal availability and capacity of regional inland access have an important role to play in shaping the emergence and development of dry ports. Each inland market has its own potential requiring different transport services. Thus, there is no single strategy for a dry port in terms of modal preferences as the regional effect remains fundamental.

Three functions within transport chains

Dry ports service three major functions. The first is one of a satellite terminal located in proximity to a port facility. It accommodates additional traffic and serves functions that either have become too expensive at the port such as warehousing and empty container depots or are less bound to a location near a deep-sea quay. A number of satellite terminals only have a transport function transshipping cargo from rail/barge to trucks and vice versa, as is the case for the 'container transferium' concept of the port of Rotterdam or the Gateway Access Point (GAP) concept in Belgium.

Satellite terminals can also serve as load centers for local or regional markets, particularly if economic density is high, in which case they form a multi-terminal cluster with the main port they are connected to through regular rail or barge shuttle services. For gateways with a strong import component, a satellite terminal can also serve a significant transloading function where the contents of maritime containers are transloaded into domestic containers or truckloads.

A major intermodal facility – load center – granting access to well defined regional markets that include production and consumption functions is the second function assumed by dry ports. It commonly corresponds to a metropolitan area where a variety of terminals serve concomitantly intermodal, warehousing, distribution and logistics functions. These tend to take place in logistics parks and free trade zones. The dry port is thus the

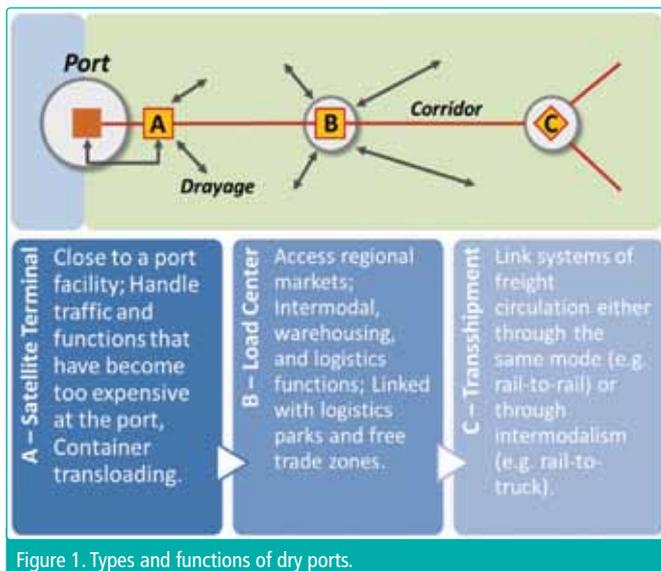


Figure 1. Types and functions of dry ports.

load center of a regional market. If the load center has a good intermediary location, such as being along a major rail corridor, then freight distribution activities servicing an extended market will be present.

The third function of a dry port is one of a transshipment facility that links large systems of freight circulation either through the same mode (e.g. rail-to-rail) or through intermodalism (rail-to-truck or even rail-to-barge). In the later case, the inland terminal assumes the role of a load center. The origin or the destination of the freight handled is outside the terminal's market area, a function similar to that of transshipment hubs in maritime shipping networks. Such transshipment terminals are often found near country borders in view of combining administrative processes linked to cross-border traffic to value-added logistics activities. Although this function remains marginal in most parts of the world, ongoing developments in inland freight distribution, where the scale and scope of intermodal services are increasing, are indicative that transshipment services are bound to become more prominent.

These functions are not exclusive, implying that dry ports can service several functions at once. For inbound or outbound freight flows, the dry port is the first tier of a functional hierarchy that defines its fundamental (activities it directly services) and extended (activities it indirectly services) hinterlands.

Dry port is the name, co-location is the game

Several dry port projects are set on the principle of co-location between an intermodal operator and a commercial real estate developer or a local public development office. Logistic zones tend to occupy a large amount of space to accommodate existing and anticipated freight distribution activities. Most co-located projects occupy at least 250 acres and several projects are well above 1,000 acres. Larger projects tend to have lower land acquisition costs. Also, since co-located projects involve two or more large players, they are able to tap into capital pools with better conditions than a smaller actor. For instance, CenterPoint Properties, one of North America's largest developer of logistic zones, is owned by the pension fund CalPERS (California public employees' retirement fund), enabling access to long-term capital. Another important aspect is that a co-located logistic project enables the joint planning of facilities.

A co-location project enables actors involved to focus on their core competencies, creating multiplying factors. For example, the rail company can focus on terminal development and operations, while the real estate promoter can develop and manage the freight distribution facilities. Both the terminal operator

and freight distribution activities at the logistic zone are their respective customers, implying that both partners have vested interests in the efficiency of their operations. The possibility of joint marketing where the logistic zone is promoted as a single intermodal package is also common since the terminal is sold as a value proposition to potential customers.

A co-location project offers notable operational advantages for drayage, not just because of close proximity, but because trucks can have a priority access through the terminal's gates. Drivers are able to perform more deliveries per day and the reliability of these deliveries improves. Intermodal transportation assets are capital intensive and there are pressures to increase their utilization level to achieve better returns on investments. Containers and chassis tend to be the assets that are the most prone to such strategies, namely through the setting of chassis pools and empty container depots. Finally, a co-location project offers the possibility to jointly plan information systems for terminal operations and the related supply chains, creating a dry port community system where users can have access to real time information about the status of their shipments. Both terminal operations and their related supply chains benefit.

How dry ports interact with their regional markets remain fundamental as it defines their modal characteristics, their regulatory framework and their commercial opportunities. Depending on the geographical setting and the structure, governance and ownership of inland transport systems, dry ports have different levels of development and integration with port terminals.

Europe: dry ports as part of ports' hinterland strategy

It is in Western Europe that the setting of dry ports is the most advanced, with a close integration of port terminals with rail shuttles and barge services. Since a good share of the European market is inland, a growth in international trade required the setting of intermediary locations inland to help accommodate larger flows between ports and their hinterland. Many dry ports have become fully-fledged logistics zones.

A large concentration of dry ports can be found around the Rhine-Scheldt delta (Figure 2), which is Europe's most important gateway region with a total container throughput of 22.2 million TEU in 2010, and where the function of satellite terminals is prominent. Almost every European port has an inland terminal strategy as a way to secure hinterland traffic.

Rail-based dry ports are found throughout Europe, often linked to the development of logistics zones. Depending on the European country considered, these logistics zones are known under different names: 'plateformes logistiques' in France, the 'güterverkehrszentren' (GVZ) in Germany, 'interporti' in Italy, 'freight villages' in the UK, 'transport centres' in Denmark, and 'Zonas de Actividades Logísticas' (ZAL) in Spain. The rail liberalization process in Europe is supporting the development of real pan-European rail services on a one-stop shop basis. All over Europe, new entrants are emerging while some large former national railway companies have joined forces (cf. Railion). Rail terminals in Europe are mostly built and operated by large railway ventures. The largest rail facilities have bundles of up to 10 rail tracks with lengths of maximum 800 meters per track. Rail hubs are typically equipped to allow simultaneous batch exchanges (direct transshipment) through the use of rail-mounted gantry cranes that stretch over the rail bundles.

In northwest Europe, barge transport is taking up a more prominent role in dealing with gateway traffic. Barge container transport has its origins in transport between Antwerp, Rotterdam and the Rhine basin, and in the last decade it has also developed greatly along the north-south axis between the Benelux and

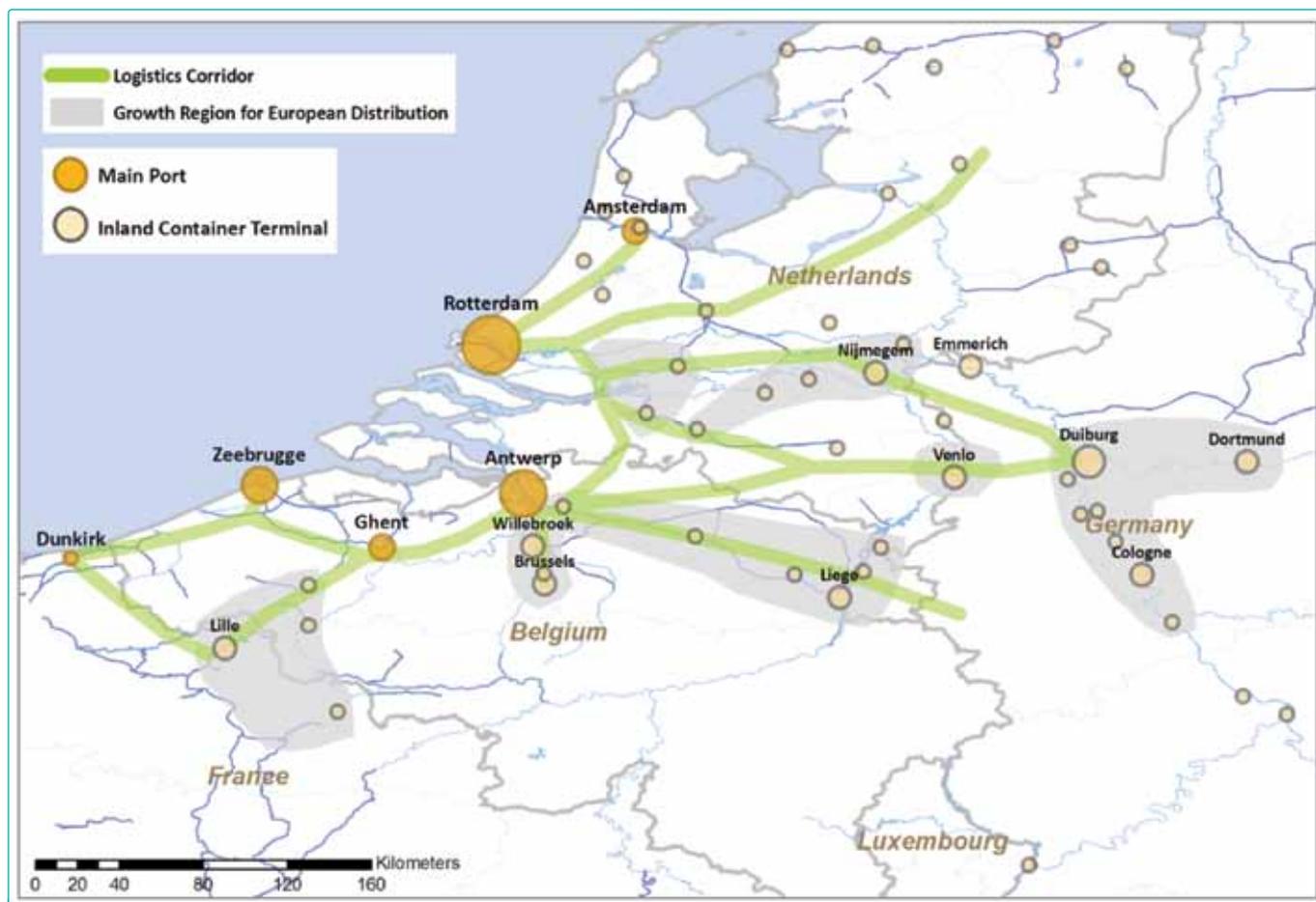


Figure 2. Dry ports and Logistics Zones around the Rhine-Scheldt delta.

northern France. Antwerp and Rotterdam together handled nearly 5 million TEU of inland barge traffic in 2010 or about 95% of total European container transport by barge. Promising barging developments are also found on the Seine between Le Havre and the Paris region, in the Rhône/Seine basin between Marseille, Lyon and Dijon, on the Elbe and the Weser in Northern Germany and on the Danube river out of the port of Constantza. Fluviomar recently started barge services on the Po River connecting the Port of Venice with Mantua and Cremona, near Milan.

North America: dry ports and long distance trade corridors

There have been dry ports in North America since the development of the continental railway system in the late 19th century. Their setting was a natural process where dry ports corresponded to metropolitan areas commanding a regional manufacturing and resource base. Although exports were significant, particularly for agricultural goods, this system of dry ports was mostly for domestic freight distribution. With globalization and intermodalism two main categories of dry ports have emerged in North America. The first is related to ocean trade where dry ports are an extension of a maritime terminal located in one of the three major ranges (Atlantic, Gulf and Pacific) either as satellite terminals and more commonly as inland load centers (e.g. Chicago). The second category concerns inland terminals mainly connected to NAFTA trade that can act as custom pre-clearance centers. Kansas City can be considered the most advanced inland port initiative in North America as it combines intermodal rail facilities from four different rail operators, foreign trade zones and logistics parks at various locations through the metropolitan area. Like Chicago, the city can essentially be perceived as a terminal.

Several recent logistic zones projects in North America are capitalizing from this advantage, where the planning and setting of a new intermodal rail terminal is done concomitantly with a logistics zone project (Figure 3). This partnership fundamentally acts as a filter for the commercial potential of the project as both actors must make the decision to go ahead with their respective capital investment in terminal facilities and commercial real estate. Compared to Europe, North American dry ports tend to be larger, but covering a much more substantial market area.

Asia: dry ports as satellite terminals or load centers?

For Asia, coastal population concentrations and export-oriented development strategies have not been prone to the setting of dry ports. Several container depots have appeared inland as a way to improve the availability of export containers within manufacturing clusters (e.g. South Korea, Thailand, India), but containers are mainly carried by truck.

In China there is the potential for a network of dry ports to emerge. Strong dry port development is taking place on the Yangtze river all the way up to the upper stretches near Chongqing, some 2400km upstream from Shanghai. Intermodal rail development faces the strong focus of the existing rail network on passengers and dry bulk commodities. As the Chinese economy moves towards a more extensive internal market, intermodal rail and barge traffic will increase.

Eventually, another system of dry ports is likely to emerge in Southeast Asia, particularly along the Mekong. In light of the North American and European experiences, the question remains of how Pacific Asia can develop its own dry port strategy. The unique geographical characteristics of the region are likely



Figure 3. Main trade corridors, dry ports and selected co-located logistic zones in North America.

to rely much on the satellite terminal concept and inland load centers in relative proximity. In this context, the European example is more suitable. However, the setting of long distance intermodal rail corridors within China and through Central Asia is prone to support the development to the inland load center system common in North America.

The development of dry ports around the world has clearly underlined an emerging functional relation of port terminals and their hinterland. Based upon their regional setting, dry ports

assume a variety of functions with co-location with logistical zones a dominant development paradigm. While the interest in dry ports has increased we have to be aware that no two dry ports are the same. Each dry port is confronted with a local/regional economic, geographical and regulatory setting which not only define the functions taken up by the dry port, but its relations vis-à-vis seaports. Best practices can only be applied successfully if one takes into account the relative uniqueness of each dry port setting.

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