*Measure 43: Intermodal Loading Units and freight integrators*

**First page:**

*Policy package:*
**5:** Intermodal

*Measure 43:*
Propose by 2003 a new Community framework for the development of the profession of freight integrator and the standardisation of transport units and freight loading techniques.

*What is the problem being addressed ?*
This measure intends both to strengthen the logistics organisation and improve load rates of the equipment, used in intermodal transport, by providing framework conditions for the profession of freight integrators and standardisation of loading units.
In 2003 a consultation paper " freight integrator Action Plan –Supporting the organisers of Intermodal freight transport " was published by the Commission inviting interested parties to comment (the consultation closed at October 29th ). The consultation paper proposes actions to support the organisers of intermodal transport-"freight integrator" by improving framework conditions in which they have to work. These actors are indeed very important and when they are able to better operate costs in intermodal transport may decrease and competitiveness improve. Actually realising productivity improvement of freight operators by policy measures is both difficult to realise and also difficult to measure.
The progress of the freight integrator Action Plan is at its first steps, so in the following we will concentrate the discussion on the more advanced proposal on Intermodal Loading Units (ILU), one the major building block of the Programme for the Promotion of Short Sea Shipping (COM/2003/155 final of 7.4.2004).
The improvement of intermodal loading units (containers and swap bodies) is one of the measures put forwards in the White Paper on European Transport Policy for 2010. The current multitude of different configuration of these units creates friction costs and delays in handling operations between modes. This should be overcome by harmonising certain handling characteristics of loading units, such as the top or bottom corner fittings or steering tunnels. Furthermore, swap bodies are generally not stackable and, therefore, not suitable for maritime transport. On the other hand, containers do not fully utilise the allowable dimensions in road transport. Standardising a European Intermodal Loading Unit (EILU) that would combine the stackability of a container with the pallet-wide cargo space of a swap body offer a solution.

*Measure's costs and/or benefits:*
The main costs of the measure will be adaptation costs of business to the new intermodal loading unit (ILU) standards and professional requirements. The impact assessment form of the ILU proposal identifies affected businesses (manufactures, owners, holders and operators of ILU's, terminal operators and transporters) but does not make a quantitative assessment. No costs estimates are available with respect to the possible policy actions concerning freight integrators. However, there are serious concerns that sunk cost in the transition period, caused by the need of maintaining equipments to handle both old and new standardised loading units, might be very high for shipping companies, but especially for port terminal operators and hinterland transport modes (see below the appraisal of objective achievement). According to the European Sea Ports Organisation, this concern goes also beyond the transition period. Indeed, ESPO fears that the new EILU would lead to a discrepancy between intra-European and international standards and subsequent loss of efficiency in ports.

*Legislative implementation at the EU level:*
COM(2003) 155 final of 7.4.2004 – Communication from the Commission Programme for the Promotion of Short Sea Shipping, with annexed Proposal for a Directive of the European Parliament and of the Council on Intermodal Loading Units has recently been adopted.

*What are the objectives ?*

The extent of adoption of the new standards on intermodal loading units (market share e.g. expressed as percentage of total TEU or total number of containers used in freight transport), is the relevant implementation indicator. The envisaged use of the ILU, to be developed by standardisation bodies, will not be compulsory. Many standards in intermodal transport have been proposed and tried in the past and many again have disappeared, so perhaps some scepticism with respect to the results of this measure seems justified. However there are strong economic arguments in favour of the proposal. In particular the fact that the match of the new ILU's with Europallets measures will be significantly better. At present load rates of ISO containers with pallets are not optimal and may be improved by 32% for ISO 40' containers and even 63% for ISO 20' containers by using the new ILU's. So this economic rationale makes this proposal (albeit in the long term) attractive for the industry.

However, there are concerns about increasing costs in the short term. Indeed, the idea of introducing a new loading unit, which should replace the currently existing and world-wide spread 20' or 40' containers, seems attractive, but a big problem is the replacement of equipment the new standardised units require. First of all, all containers in use actually need to be replaced. This could be done gradually, in order to avoid useless waste of money through investment in new loading units just for the sake of it. In fact is not economically justifiable to require existing ILUs to be altered or refurbished with the harmonised characteristics. Therefore, as long as these ILUs remain in circulation, a certain amount of diversity will remain. According to COM (2003) 155 final, these old ILUSs will gradually disappear from the market with time (on average in 5 years for weaker swap bodies and 10-15 years for stronger containers). But a second and perhaps more important disadvantage is then that, during the period that both units are used, all equipment should be able to handle both types. This requires double investment (one capital element for each type), or flexibility if only one element of equipment is used, which is able to deal with both types. Even with immediate short-run phasing out of old units - so that there is nearly no overlap period where both types are used - huge investments are required to replace new for old equipment, with important sunk cost due the need to dismit still working and valuable equipment. This situation lays a financial burden with shipping companies (different stacking areas to be provided), but especially with terminal operators (other cranes, straddle carriers, etc. required and different storage area organisation) and with hinterland modes (different trains, trucks and barges required).

*Interactions with other WP measures:*

The measure is closely linked to other policies to promote intermodal transport, like the Marco Polo Programme. Also the policies aiming to improve infrastructure (measures 44 and 45), stimulation of transport modes (like maritime transport and inland waterway transport) and in general all policies that may directly or indirectly affect modal shares (e.g. road pricing). Specifically with regard to the new member States there is a close link with the measure aiming to keep modal shares of rail transport at 35% (Measure 74).

**<u>Second page</u>**:

*Output indicators:*

The key implementation indicator is the "<u>rate of adoption in the market of the new European Intermodal Loading Unit</u>", measured as share of EILU on total loading units.

The current loading units are containers and swap bodies. The **containers** usually used in Europe (20' and 40' comply with the standards of the International Standardisation Organisation (ISO). Other containers are also in circulation, with different technical characteristics (width, height, construction etc.). These containers can generally be used in all four modes of transport. They are usually stackable and can be lifted with cranes. However, they do not generally offer optimum loading capacity for ISO pallets or fully utilise the maximum dimensions available in land transport. This is why they are not widely used in European road and rail transport. **Swap bodies** are primarily designed for transfer between road and rail. They allow good utilisation of capacity on road and rail vehicles, but they do not offer economic solutions for inland waterways or sea transport. They are usually not stackable owing to their weak wall construction, cannot withstand transport by sea and cannot be lifted with cranes. They come in different size and have a number

of different characteristics.
The new **EILU** should substitute both containers and swap bodies. By this way, the EILU, an optimal intermodal unit that combines the benefits of containers (their solidity and stackability) with those of swap bodies (in particular their greater capacity), could be used in the four modes of transport (rail, road, sea and inland waterways) and its transhipment between different modes would be simplified. However, a certain degree of diversity will remain on the market for a transition period in which it will be not economically viable to alter or scrap the old containers (10-15 year) and swap bodies (5 years), as well as beyond this transition period, because is not justifiable to require all ILUs to have the construction strength of a stackable ISO container. "Weak containers" and "weak swap bodies" will remain on the market because they are less expensive to construct and are suitable for a number of purposes (e.g. where waterborne transport is not a viable option).
The market success of the new EILU shall be monitored using logistic growth curves to fit real data of adoption and verify if potential market targets are being achieved.
Ideally EILU would replicate the success story of ISO containers. Despite some initial disadvantages when they were introduced in the '60, the world stock of containers increased from 0,5 to 14,3 million TEU between mid-1970 and mid-2000. Over the last five years, the average annual growth rate has been 9%. The success of the ISO standard is due in particular to the promotional efforts and investment made by shipowning companies and rental companies. It remains to be seen if the EILU will be able to replicate this experience in the coming decades, considering that they have now to struggle with the consolidated ISO international standards.

*Outcome indicators: intermediate impacts on transport markets*
Both positive and negative impacts are expected with the adoption of EILU, but the expectation is obviously that positive impacts will overcome the negative ones.

Costs of EILUs
In comparable production conditions, the EILUs could turn out to be more expensive than containers (due to the larger surface area available) or swap bodies, due to the probable need to strengthen their walls in order to allow stackability. However, the greater capacity of EILUs compared with containers should largely compensate for these additional costs. In any event, the cost of an EILU will depend on the number of units produced, i.e. on the success of this initiative. The variety of swap bodies prevents mass production, so the attainable economy of scale should compensate for the additional cost incurred by the need to strengthen their walls. The market indicator to be considered here is:

- Cost of an EILU compared with other loading units (containers and swap bodies)

Productivity of port and terminal handling operations
Due to the constraints imposed by interoperability across the four transport modes, it can be assumed that the new EILU will be smaller than the existing containers used in maritime transport. If this is the case, the total handling time is assumed to be influenced negatively, due to the increased number of operations needed to transfer the same tonnage. In that case, not only shipping companies, terminal operators and hinterland operators, but also shippers experience a disadvantage. However, the expected positive effects are by far more numerous. Even the disadvantage in port operations due to the possible reduced average size of the new loading units could be compensated for by their advantages in terms of faster handling times per unit and less terminal obstruction. Indeed, the EILU would have to be stackable in order to be worthwhile for short sea shipping and inland waterways. Ro-Ro ships can utilise their capacity their capacity more economically if at least two units can be transported in stack. Similarly, for intermediate storage in terminal and ports, the stackability of EILU offers clear economic advantages in terms of utilising the available space. Moreover, harmonising the characteristics of the loading units would contribute to ensuring uniformity in their handling. Some experts consider that such uniformity could, on average, halve the duration of transhipments (cfr. COM/2003/155 final). The market indicators to be considered here are:

- Average handling time of EILUs at ports and terminals compared with that of other loading units (time productivity)
- Amount of back-up land used per transferred tonne (space productivity)

Productivity of road freight transport

Based in the data available, the Commission estimates that the number of road vehicles required to transport the same amount of goods would be reduced by 25% if all fully loaded ILUs were to be replaced by fully loaded EILUs. The data used to draw this conclusion are summarised in the following tables (source Annex to the Explanatory Memorandum of the Proposal on Intermodal Loading Units):

| Containers | | | | allowing the transport of | |
|---|---|---|---|---|---|
| Type | % capacity | TEU | units | europallets (1.2 x 0.8 m) | UK pallets (1.2 x 1 m) |
| 20' | 37.18 % | 6 982 404 | 6 982 404 | 76 806 444 | 62 841 636 |
| 30' | 0.10 % | 18 780 | 12 520 | 237 880 | 187 800 |
| 40' | 61.22 % | 11 497 116 | 5 748 558 | 143 713 950 | 126 468 276 |
| 45' | 1.5 % | 281 700 | 125 200 | 4 131 600 | 3 255 200 |
| Totals | 100 % | 18 780 000 | 12 868 682 | 224 889 874 | 192 752 912 |

| Types | | Number of EILUs required to transport the same number of: | | | |
|---|---|---|---|---|---|
| Containers | EILUs | europallets | UK pallets | maximum | saving |
| 20' | short | 4 267 025 | 4 488 688 | 4 488 688 | 2 493 716 |
| 30' | short | 13 216 | 13 414 | 13 414 | -894 |
| 40' | long | 4 354 968 | 4 864 164 | 4 864 164 | 884 394 |
| 45' | long | 125 200 | 125 200 | 125 200 | 0 |
| Totals | | 8 760 408 | 9 491 467 | 9 491 467 | 3 377 215 |

The first table shows the 1999 number and capacity of ISO containers. Taking into account of the theoretical pallet capacity of EILUs, the number of EILUs of each type required to transport the pallets are computed in the second table. The results differ according to whether europallets or UK pallets are being transported. To be on the safe side, only the larger of the two numbers of EILUs resulting from calculation is considered. According to these computations, the number of intermodal loading units required would therefore decrease from 12.868.682 to 9.491.467, i.e. by circa 25%. This reduction in the number of intermodal loading units would lead to the same rate of reduction in the number of road vehicles required for the same volume of tonne-kilometres transported.

It is important to note that the following assumptions were made by the Commission:

- According to DGTREN's 2000 and 2001 statistical pocketbooks port hinterland container traffic in 1996 was circa 16.413.000 TEU. The increase in road services to ports, for containers, between 1996 and 1999 is assumed to be the same as that for road traffic, in tonne-kilometres, over this period. The volume of road services to ports at the year 1999, shown in the first table above, is therefore be estimated at 18,78 million TEU.
- The breakdown of capacity by type of container for road services to European ports is assumed to be similar to the global breakdown of the world stock of containers in 1999 (source: AFNOR/H90B), which is shown in the first table above.
- All ILUs are loaded to maximum capacity, with either europallets or UK pallets (and not a mixture of the two types).
- The final assumption made is that the saving, estimated only for road services to ports, would apply to

all other road freight transport.

The assumption of maximum capacity loading is obviously far from the real average load factors of road transport, but it is valid in so far as there is the need to estimate the potential of efficiency gains from adopting EILU not in absolute terms, but relative to the standard ILUs.

In any event, the key indicator to monitor in this respect should be the road load factor, because the more efficient loading of vehicles results in less vehicle kilometres being needed to transport the same number of tonnes, which causes the load factor to increase. Data concerning the road load factors in some European countries are shown in the table below:

**Road load factors in EU Member States, 1990-99**

Unit: tonne-km/vehicle-km

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 1.6 | 1.6 | 1.5 | N/A | N/A | N/A | N/A | N/A | N/A |
| Belgium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Denmark | 2.2 | 1.5 | 2.3 | 2.1 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 |
| Finland | 4.7 | 4.6 | 4.4 | 4.4 | 4.5 | 4.0 | 4.1 | 4.2 | 4.3 |
| France | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Germany | 4.5 | 4.6 | 4.4 | 4.3 | 4.4 | 4.3 | 4.5 | 4.6 | N/A |
| Greece | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Ireland | N/A | N/A | 2.5 | 2.5 | 2.3 | 2.8 | 2.7 | N/A | N/A |
| Italy | 3.7 | 3.7 | 3.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Luxembourg | 3.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Netherlands | 2.5 | 1.7 | 2.5 | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | N/A |
| Portugal | 5.4 | 4.5 | 6.4 | N/A | N/A | N/A | 4.7 | 4.6 | 4.8 |
| Spain | 3.1 | 6.0 | 3.2 | 3.1 | 3.2 | N/A | N/A | N/A | N/A |
| Sweden | 3.2 | 3.0 | 2.9 | 3.2 | 3.3 | 3.6 | 3.8 | 3.9 | 3.8 |
| United Kingdom | 2.0 | 2.0 | 1.9 | 4.5 | 4.6 | 4.8 | 4.7 | 4.6 | 5.0 |
| **EU-4** | **4.1** | **4.2** | **4.1** | **4.0** | **4.1** | **4.0** | **4.2** | **4.3** | **N/A** |

*Source:* Eurostat, 2002a.

It is important to note that the load factors are expressed here as the number of tonne-kilometres per vehicle-kilometre, instead of the percentage of available loading capacity (in volume and weight). This means that big trucks with the same percentage of used loading capacity as small trucks still perform better using this definition. Therefore, the results should be interpreted with care, because the composition of the goods vehicle fleet varies significantly in the different Member States. Ideally, it is preferable to use data on empty hauling, but EU-wide data are not available, and the few country examples indicate that there are large differences: for instance, empty hauling makes up only 25% of total truck vehicle-kilometres in Germany but more than 40% in the Netherlands (TERM 2002 – Load factors for freight transport indicator fact sheet). In conclusion, more work is needed to develop a better indicator of freight vehicle utilisation. The volume of goods carried is progressively becoming more important as truck space is often filled long before the maximum permitted weight is reached. Weight-based load factors therefore tend to underestimate the true level of utilisation. As a consequence, statistics should focus on the volume of goods transported more than on their weight. How relevant may become the optimisation of road freight vehicle utilisation is demonstrated by the example the French mashed potato producer VICO (source European Commission, 2000, Good practice in freight transport – A sourcebook). This changed the size of its packaging boxes to improve the loading rate of the trucks rented for delivery of its products. Combined with the introduction of specialised software for journey optimisation, the loading rate increased by 60%. This reduced the requirement for trucks in a year by 2000 (8000 lorries are now rented annually instead of 10000) for the same amount of products delivered, and reduced distance travelled by 960.000 km and fuel used by 300.000 litres. The cost of investment was about EUR 60000 and the payback time for the investment was less than a month.

Changes in overall freight transport market

If no action is taken, road freight transport will continue to increase, leading to more congestion, accidents and environmental damage. The objective of the planned measure is to contribute, directly and immediately, in the market for intermodal freight transport and logistics services, to simplifying intermediate handling operations, reducing the congestion of infrastructures, particularly road, and improving safety and the environmental performance of intermodal freight transport. The proposal will affect large as well as small and medium-size companies. In fact, whilst rail and sea carriers are usually large companies, this is not the case for road and inland waterway transport, not for terminal operators.

While addressing intermodal transport, the measure will contribute in particular to enhance the productivity and support an increase in the volumes of Short Sea Shipping. Indeed, the number of TEU transported in combined transport in all surface modes has been estimated at about 37 million in 1999. Of this total, 25 million TEU (67%) were transported in short sea shipping. As mentioned above, it will improve the efficiency of road hinterland transport, but it may contribute also to the revitalisation of rail freight traffic. The performance of rail compared to competing freight transport modes is very modest, but in some Member States the traffic performance has been more dynamic, such as in the UK where the transported volume by rail has risen by 50% since 1994. This growth of rail traffic has been aided, amongst other things, by a strong increase in maritime container transport by rail through UK ports, in total 56% between 1992 and 2001. The most relevant indicators to monitor changes in the freight transport market are:

- Tonnes and tonne-kilometre shifted to intermodal transport (this is in particular relevant for palletised products)
- Modal shares of intermodal transport and of individual modes
- Vehicle-km across modes, to observe changes in the network use of different infrastructure networks

*Outcome indicators: final impacts on transport users and non users*

The expected growth of intermodal transport, coupled also with a better efficiency of road haulage, will have positive impacts on pollution, safety and congestion. The key indicators and trends to be monitored are:

- Reduction in congestion levels
- Reduction of accidents
- Reduction of emission levels
- Reduction of external costs

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