AN ANALYSIS OF FUTURE DEVELOPMENTS IN THE USE OF COMBINED ROAD RAIL TRANSPORT BY SHIPPERS

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INTRODUCTION

Within Europe combined road rail transport (CT) is increasingly regarded as an important alternative to road-only freight movements. A number of factors have in recent years given special urgency to this search for alternatives to road-only movements, among the most important are:

- concern about the environmental impact of road vehicles;
- growing congestion and resulting inefficiencies on inter-urban routes;
- a desire to use the rail resources more effectively.

Growing economic integration (Single European Market, German unification, East and Central European political changes) will all lead to a rise in the number of long-distance international goods movements and, as a consequence, an opportunity to implement CT solutions.

Research so far has tended to focus on the supply-side issues of CT such as possible capacity constraints. Relatively little research has analysed the needs of potential CT users and the extent to which these needs match the likely services they will be offered. In this context users may be manufacturers, retailers, road hauliers and freight forwarders.

Within the UK following the completion of the Channel Tunnel two markets for CT services will arise:

- a national market for movements wholly within the UK;
- an international market for movements between the UK and other European countries.

Clearly, the willingness of users to adopt CT in one or both of these markets will determine the ultimate success or failure of the CT concept in the UK. But the full potential of the CT market might not be realised if significant barriers hinder its use. For example uncertainty over the most attractive type of CT system and shippers' doubts about rail authorities ability to offer a quality service.

1. SURVEY OF POTENTIAL USERS

Given the limited research considering users perceptions of CT, the Polytechnic of Central London (PCL) carried out a study which focused on this subject area. The project examined, among other things, the following three factors which may influence shippers ability/opportunity to substitute CT for road-only transport:

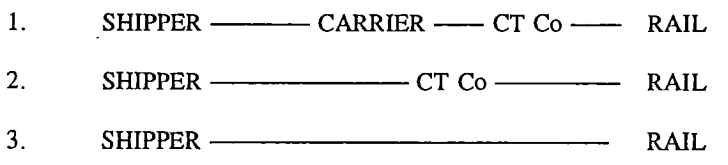
1. **Criteria for use** - it is important to identify the circumstances which would prompt shippers to use CT and how they would evaluate CT compared to road transport.
2. **Role of CT in shippers operations** - if shippers decide to incorporate CT techniques into their distribution operations it is helpful to know:
   - at what stage in their logistics process would CT be used (eg sending goods to a customers warehouse or between the users own manufacturing plants etc);
   - if shipment destinations are national, international or both.
3. **How are shippers going to purchase CT** - there are number of ways in which shippers can obtain road transport services. It is a key concern to learn whether shippers would simply adopt the same methods for purchasing CT services or would they opt for another means (eg lease CT equipment, but have a third party operator carry out the work; or contract a CT specialist company to supply and operate the equipment and distribution).

Information about these factors was obtained by conducting a survey of companies in six industry sectors; food and drink, domestic appliances, retailing, glass, paper, and automotive components.

2. MARKET STRUCTURE

Before discussing PCL's survey of shippers, it is appropriate to examine the market structure of CT, which is largely dictated by the operational structure of CT. The exact role of the railways here is very important. A critical question in the UK is whether the railways will seek to be both retailer and wholesalers of CT services? This is seen as a key factor because it is likely to influence shippers when they obtain CT services and equipment. For example, if railways retail CT services a very large shipper which has the capacity to organise collection and delivery at both ends of a haul might be inclined to procure its own combined transport equipment and buy CT services (eg line haul) direct from a railway operator. Such an operation has the characteristics of own-account distribution, since it provides a greater degree of control of vehicle and information movements. Conversely if the railways only wholesale their services then CT will only be obtainable through a CT company, which may either deal exclusively with affiliated carriers or offer door-to-door services. In this case a shipper could well employ a carrier or CT company as a third-party operator; a parallel can be drawn with the way in which contract distribution is used at present. Figure 1 illustrates the alternative commercial and operational links which may be found in CT.

Figure 1



Possible options for combined transport market structure.

Clearly the permutations as to how CT operations (and ultimately markets) can be organised have not been exhausted here, but as is shown later this question of shipper access is very significant.

Another perspective of the market concerns destinations. In mainland Europe CT has established itself first for domestic traffic and second, for international business. Statistics published by the International Union of Combined Road Rail Transport Companies (UIRR) indicate that domestic CT movements dominated the market until 1987, after which time international consignments increased significantly (UIRR,1991).

Within the UK, CT is still virtually unobtainable for both national and international traffic, with the exception of the highly distinct service provided for the inland movement of maritime containers. However, the opening of the Channel Tunnel will provide a major stimulus to the use of CT. It is probable UK shippers first use of CT will be for international freight consignments. However, when this factor is combined with that of operation, how will the market be structured?

Initially it is expected shippers will obtain CT services through structures (1) and (2) illustrated in figure 1. As CT is largely an unknown quantity for UK users, it is doubtful whether shippers are prepared to commit large sums of capital expenditure for the specialised road equipment (eg trailer chassis and swap-bodies) which is a prerequisite for CT use. Indeed there appears to be some hesitation by UK carriers affiliated to a CT operator to make an immediate investment in the necessary equipment (Commercial Motor, 1992).

3. SURVEY RESULTS

The aim of the survey was to provide information which would indicate how shippers view CT and how willing they are to adopt it for their distribution requirements. A problem that arises when addressing CT in the UK is that very few, if any, shippers have used the road-rail transportation systems which now exist in mainland Europe (eg swap-bodies, semi-trailer piggyback & rolling road). Consequently the survey was attempting to discover shippers' views of a distribution method which is not yet widely available in the UK.

The sample was randomly selected using annual turnover as the criterion by which companies were included. Industries used for the survey were chosen because their products were considered very suitable for CT transportation in that they were of a higher

than average density - a key factor according to an earlier analysis (Anderson, 1990).

A total of 180 self completing questionnaires were sent to the sample during July/August 1991. The number of returned questionnaires was 86, of which 92 per cent were usable.

The results of the survey are discussed under four main headings:

- general impressions;
- criteria for use;
- operational role of CT;
- purchasing CT services.

3.1. General impressions

Basic information concerning the use of CT in the UK does not readily exist and therefore questions designed to provide such data were incorporated in the survey. They addressed whether respondents had used CT before, if they would be inclined to use CT in the future and if they thought CT would become an important form of transport in the future.

The response to these questions revealed a positive attitude by shippers. Overall one in five respondents indicated they had used some form of CT before, which typically meant using sea-going containers for overland movement involving intermodal methods (ie Freightliner).

The proportion of respondents who stated they would seriously consider CT as a transport option was surprisingly high (70%), given the reservations voiced by UK industry about rail's ability to provide an acceptable freight service (Stiles, 1991). Interestingly, of those who said yes to using CT in the future 38 per cent indicated they would use CT for solely domestic movements. This was considerably more than the 15 per cent who stated they would use CT for just international shipments, where in view of the longer hauls larger savings would be expected. However the largest percentage of respondents (47%) indicated CT would be used for both national and international distribution. Finally nearly half (49%) of all respondents think CT will become an important form of transport in the future.

The key implications from this are:

- reasonable potential base for CT if past intermodal use is considered;
- overall, a large potential market;
- suggested destinations point to equal scope for domestic and international markets.

3.2. Criteria for use

The criteria for selecting CT have been divided into two groups:

a. factors which are important when directly comparing CT to road transport;

b. features which are important as an initial stimulus to consider using CT.

For the factors listed in group (a), shippers were asked the question 'If selecting combined transport as an alternative to road-only haulage, how important are the following criteria?'. Four categories of importance were offered, very, fairly, slight and not at all. Tariff and service quality out scored the other factors by a considerable margin, implying CT will have to match or surpass road transport in terms of these factors if it plans to attract a substantial patronage.

Table 1

Criteria	% : Importance	Mean Score	Rank
High quality service	95 Very	3.94	1
Competitive tariff	90 Very	3.89	2
Door to door	65 Very	3.47	3
Comprehensive network	60 Very	3.39	4
Terminal to terminal	29 Fairly	2.52	5

Factors considered important in choosing CT

Source: PCL survey, 1991

Similarly, for factors in group (b) shippers were asked the question 'How important are the following in your evaluation of the combined transport option? Again four importance ratings were offered (a great deal, quite a lot, slightly and not at all) for the criteria listed.

Table 2

Criteria	% : Importance	Mean Score	Rank
Access to network	58 a great deal	3.49	1
Volume of freight	51 quite a lot	3.23	2
Length of haul	42 a great deal	3.20	3
Road congestion	42 quite a lot	2.95	4
Environmental issues	38 quite a lot	2.78	5
I.T. support	41 slightly	2.44	6

Key factors in selecting using CT

Source: PCL survey, 1991

The results shown in table 1 are self explanatory since the majority of respondents thought most of the criteria to be very important when considering CT as an alternative to road-only transport. A very high percentage of respondents indicated service quality and competitive tariff would be the principal characteristics by which they will judge CT service. The type of service and the extent of network apparently will be a more secondary consideration.

The responses given in table 2 show a very different pattern, which may reflect the individual circumstances of shippers. The common concern is access to the network, a feature which can be related to demand and supply issues because it has two dimensions:

- **physical** - consideration about the actual road journey in relation to terminal location;
- **commercial** - consideration about how a CT service and equipment would be obtained.

No other factor in table 2 is clearly prominent. An explanation to this fact could be that while factors are ranked by their mean score the actual proportion of respondents rating a single factor may be doing so by a lower importance category. Thus, even though 'volume of freight' is ranked second numerically, its importance factor is in fact lower than that of 'length of haul', suggesting that this latter criteria would be considered before volume. Of the remaining criteria it is interesting to note that congestion and environmental issues do not yet feature very significantly as factors which might stimulate the use of CT services. Even less significantly placed is information technology (IT) support which could be interpreted as operators providing facilities such as electronic data interchange (EDI) for tracking and tracing of consignments.

The results in table 1 are not entirely unexpected from a UK perspective. The competitive nature of the UK road freight industry has prompted carriers to develop a range of sophisticated services to ensure they attract custom in a highly competitive market. As

a result shippers now expect such standards as normal practice, but at a competitive price. Therefore not only will they judge road carriers by these factors but also any competing forms of transport.

The factors listed in table 2 are more dependent on the circumstances of individual shippers. The general lack of any dominant factor (except access to network) may arise because, as yet, UK shippers are not very familiar with CT and therefore do not fully appreciate which of the listed criteria would need to be satisfied before they were persuaded to use CT services.

3.3. Operational role of CT

Within the logistics chain CT will probably be used to provide the trunking link rather than for the final distribution (ie it will be used between a manufacturing plant and a distribution centre rather than from a distribution centre to a retail outlet). Clearly this function is dependent upon the configuration of the logistics chain (ie whether a supplier's distribution centre is near to or far from a customer) and arguably the equipment used (ie large or small swap-bodies or semi-trailer piggyback).

Our interest in the operational role of CT was simply to establish where in fact potential CT users would utilise CT in the supply chain and what particular system might be chosen. Addressing the first point, the greatest proportion of responses indicated that CT would be used to a customer's distribution centre (22%), followed by a customers manufacturing plant (15%). Other options such as inter-site movements (for both manufacturing and distribution centres) were opted for by only 8 per cent of respondents. The remaining answers indicated various permutations some of which were feasible and others not.

The issue of equipment type produced an interesting response. Statistics originating from the UIRR state that some 60 per cent of all CT consignments travelling in mainland Europe are moved in swap-bodies, which has grown in popularity at the expense of semi-trailer piggyback techniques (UIRR, 1991). The results of the PCL survey, shown in table 3, suggest that semi-trailer piggyback techniques would be the preferred system in the UK. Undoubtedly this reflects UK industries preference for semi-trailers for road transport. It will be interesting to see if this preference changes as familiarity with swap-bodies increases. However, any immediate prospects for the adoption of swap-bodies are hinder by the fact that this type of system favours shorter length containers (7.15m) which are commonly transported by a rigid truck with trailer. In the UK current weight restrictions limit such road vehicle combinations to a maximum of 32.5t compared to 38t for semi-trailer trucks.

Table 3

Swap-body	Piggyback	Bimodal	Swap-body\ piggyback	Piggyback\ bimodal	Don't know
29	34	6	13	5	9

CT Equipment preferred by UK shippers (%)

Source: PCL survey, 1991

Responses concerning the operational role of CT were, perhaps, not unexpected. CT by its nature can only possibly fulfil a trunking role in the supply chain and predictably shippers also adopt this view. They regard CT as an alternative to road and cannot envisage it offering anything different or playing any other function. At present the choice of equipment is contrary to the users preference in mainland Europe, and simplified terminal handling methods for semi-trailer piggyback CT could well prevent swap-bodies gaining the dominance in the UK like they have on the continent. The bimodal option, which was also offered on the questionnaire, received a muted response, but this might arise from the total unfamiliarity of the system and knowledge of how it will work.

3.4. Purchasing CT

The method by which a shipper will purchase CT will depend on factors such as:

- size and organisational dispersion;
- regular or occasional freight flows;
- volume of freight shipments.

In turn we can expect these features to be reflected in the type of CT supplier chosen by a shipper. With these considerations in mind the survey sought to discover which CT service provider would most likely be used. Three possibilities were presented to the respondents:

- independent CT companies;
- railway operators;
- recognised distribution companies utilising CT as part of its own operations.

Forty four per cent of the respondents indicated the final option as their most likely choice, with another 22 per cent selecting combined transport companies. Only a very small proportion (5%) opted for railway operators. Finally 15 per cent thought it appropriate to select both CT companies and distribution companies as a means of obtaining a CT service.

A further issue related to the purchasing side is the procurement of the necessary equipment.

Again three options were offered to the respondents:

- outright purchase;
- leasing;
- provision by a third party operator.

Some 59 per cent of the respondents indicated that a third-party operator source would be preferred. Interestingly 16 per cent opted for a combination of leasing and third party operators. The least popular choices were the straight lease (9%) or purchase of own equipment (7%).

The methods by which users are prepared to purchase CT services and equipment perhaps demonstrates the uncertainty that is felt to exist around CT in the UK. Because CT is a relatively unknown quantity, shippers are not surprisingly, reluctant to commit themselves to major purchases of equipment. As can be seen they expect the carrier organisations to undertake the initial investment and financial risk. Alternatively, shippers may simply be adopting a similar strategy to obtaining CT to that of road transport. Only after CT establishes itself as a viable alternative to road-only transport in the UK does it seem likely that this uncertainty will be resolved. The responses to the question of service provider display a tendency for shippers to opt for the known quantity - third-party operators. Furthermore, in many instances we can translate the result into large shippers using large carriers, which in all probability are the same carriers who will eventually offer CT services as part of their portfolio of services

4. CONCLUSION

The response to the PLC survey provides an interesting insight as to how shippers perceive CT. Clearly their willingness to seriously consider CT as an alternative to road-only transport has significant implications in a number of areas. The implications will be mainly for:

- providers of the CT services;
- users of CT services;
- railway authorities.

4.1. Providers of the CT services

Shippers have indicated considerable interest in trying out new systems of an established concept. However, any switch from road-only transport to CT needs to made as painless and non-risky as possible. This means that ways must be found to reduce the need for shippers' to lock themselves into inflexible systems using equipment that is only suited to CT.

In addition it is clear that shippers are prepared to try CT for both domestic and international freight movements. The providers of services should bear this in mind in their marketing, since shippers may expect to discuss and buy a complete package covering national and international services.

4.2. Users of CT services

Users emerge from the survey rather risk averse. This may mean they are unable to take advantage of potentially better systems such as CT. Consequently, users may need to alter the way they evaluate completely new options in order to allow them to be more adventurous/experimental when deciding on their transport arrangements. It could well be that in future on the one hand they will be compelled to consider issues, such as, road congestion and environmental impact in their transport solutions. On the other competitive pressure could lead to them seek more cost effective and quality enhancing features for their products (ie IT support from their carriers).

4.3. Railway authorities

The development of CT in the UK is now presenting a new challenge to the railways. In the past rail freight services were easily defined (ie wagonload, trainload etc) and it was simple to distinguish between the retail and wholesale sectors. The emergence of the CT option, however, now blurs this distinction and at present the railway provider is reluctant to indicate whether it is committed to the retail, the wholesale or both sectors. The PLC survey showed that shippers were not enthusiastic toward buying CT direct from the railways, which implies the market will decide who or who does not supply CT services. What is certain the railway will, in the immediate future, be required to provide the line haul component of CT.

But perhaps a more serious problem for the railways (and CT suppliers) in the short term, is persuading a shipper to be the first to put its toe in the water. At present there appears to be a problem of circularity - potential shippers will not use CT until the system proves itself, but the system cannot prove itself unless it is used. It is most important that this difficulty is overcome if CT in the UK is to develop.

Finally the next phase of the PCL research is to document a number of case studies to illustrate the effects of a switch from road-only distribution to a CT strategy.

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