

JUST-IN-TIME BY RAIL: ENABLING RAILFREIGHT TO RETURN TO THE CITY

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Introduction

The Economies of Urban Areas are dominated by Retail, Services and Manufacturing. Recent changes in the culture, which resulted from the Japanese manufacturing influx and evolution in the 1980s, have totally changed the face of these industries and the ways in which they supply themselves.

In particular, all are now dependent upon Just-in-Time technologies, which enable them to supply a vast range of products and services whilst containing stocks, space, waste and costs to acceptable levels. The transport element of this is expected to deliver:

- frequent departures/arrivals
- short journey times
- utter reliability
- continuous traceability and security

Unfortunately, the change in rail culture since World War 2 has tended to move in the opposite direction. Current Rail and Multi-modal Practices tend to worsen, not improve these Factors.

The issue is to understand how to allow rail to improve these factors

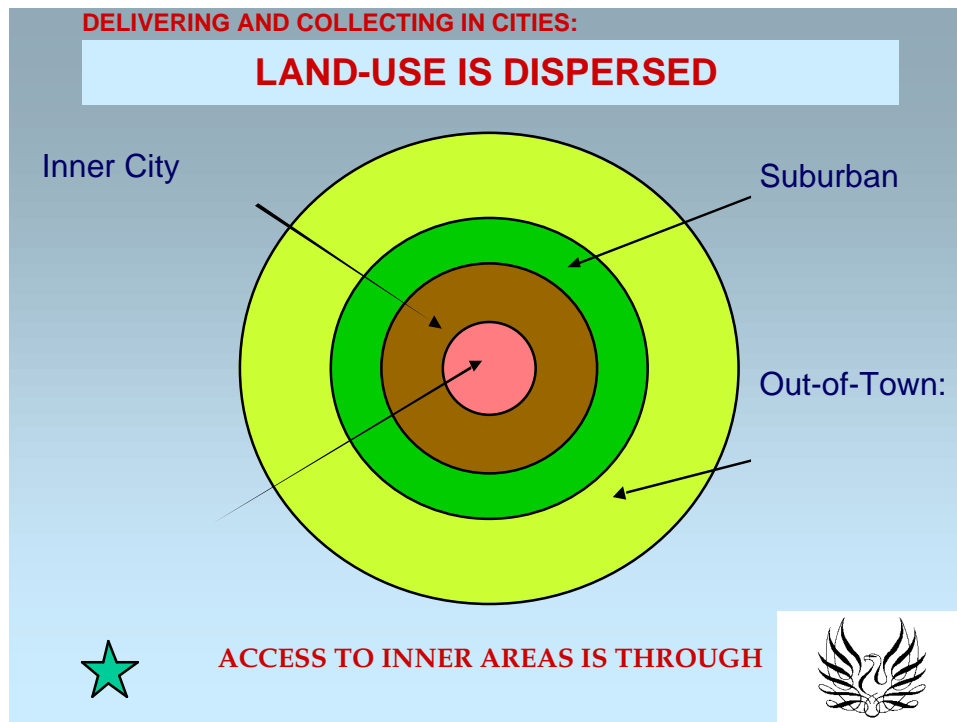
Delivering and Collecting in Cities

Cities and Urban Areas present special problems which make deliveries difficult:

- access to city centre and inner city goes through sensitive suburban areas
- road traffic congestion within urban areas is the key problem
- city centres and inner cities have narrow streets and poor access to delivery points
- retail and manufacturing stockrooms have been radically reduced in capacity

The traditional inner-city freight terminals have gone as part of a vicious circle in which worsening access and falling demand have fed each other until the business has been largely lost to rail. Out-of-town terminals ignore or worsen

these problems by leaving large gaps between the points of origin and demand and the railheads.



Time, Cost and Environment

The make-up of supply time is only to a moderate or even negligible extent dependent upon travel speed. Rail usually travels up to 80% faster through open country than HGV road vehicles. However, in a real situation, the key elements are concerned with interfaces between:

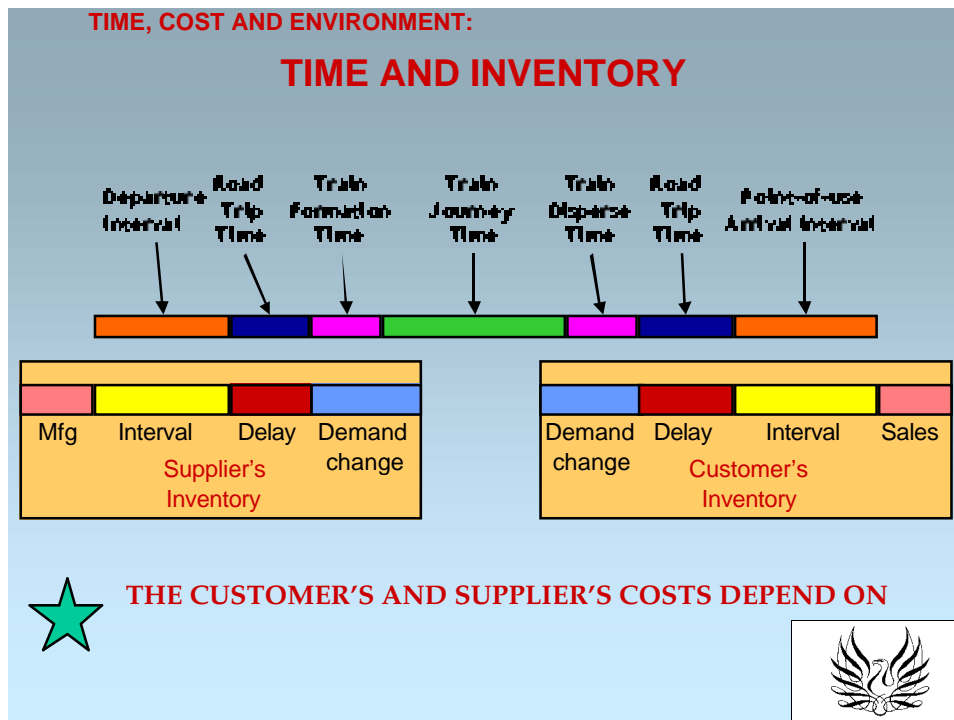
- manufacture and transport
- between modes
- between sections of modes (eg rail paths)
- between transport and destination (eg retail shop floor)

To move forward, it is important to go back to the basic objectives. For instance, the Key Performance Indicators for such logistics system might be defined as those which define the service and costs as experienced by customers and suppliers:

- overall journey time and frequency
- utilisation of all assets

- inventory and availability
- intrusion and pollution

All of these factors have to be positive to justify modal change.

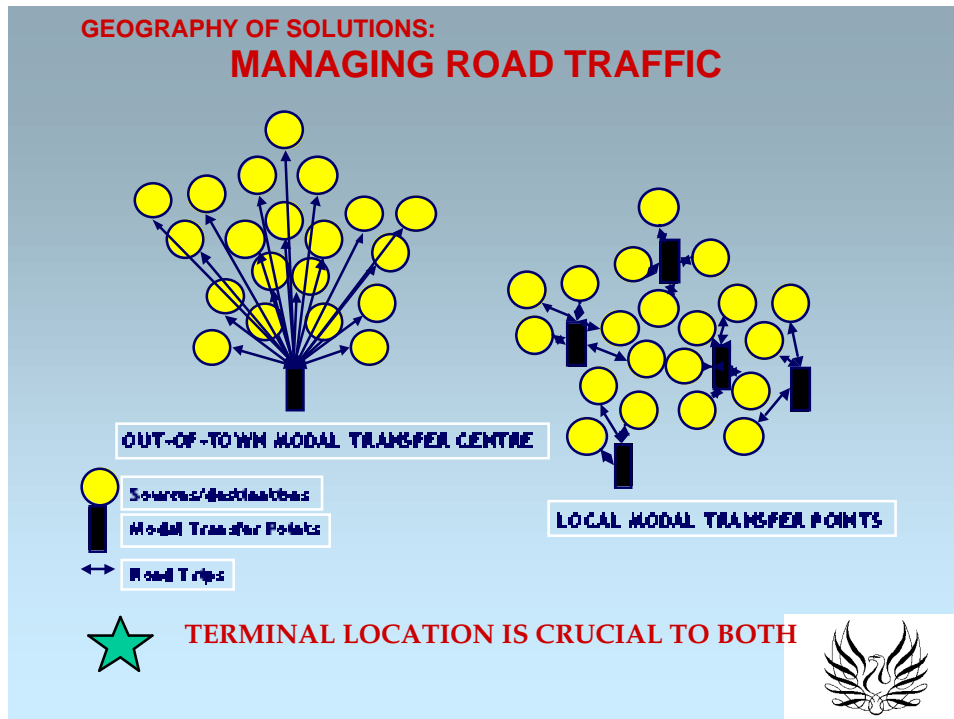


Geography of Solutions

Changing three key variables can have radical effects:

- more terminals nearer sources and destinations of cargo
- smaller terminals on brownfield sites

- more frequent, shorter trains



The best solutions usually involve mindset shifts. The first is terminal location. Terminal location is crucial to both transit time and environment

Apart from the supply time advantages, frequent short trains offer significant land-take reductions, by reducing both the length of sites and their width because the turnaround times to disperse and form trains are much shorter and more predictable.

The mix of train sizes, paths and times can radically affect both performance and environmental impact. Long trains with single or few collection and drop points use minimal train paths but create both long road delivery legs and long transit times. Creating terminals where long trains can make multiple collections and drop-offs can substantially reduce both road distances and overall transit times, at a penalty of some increase in train path usage. The use of short trains can allow very short road transits and overall transit times, with very considerable service benefits, but may require unacceptable train path occupancy. There is serious need to optimise both transit time and access time.

The management of this trade off is not well understood, but may well be one of the key issues to be addressed in recovering these high-quality/value transits to rail.

Technology of Solutions: Vehicles

The technology of passenger trains has changed radically over the last 30 years. In particular, regional trains have become much smaller and more frequent. For this type of Just-in-Time freight operation, Key vehicle Parameters need to be reinvented:

- bidirectional vehicles reduce terminal size
- passenger train performance reduces train path waste
- four potential modes:
 - direct load (inside plant to inside plant)
 - container carrying (interface with deep-sea operations)
 - piggyback (carry standard trailers in some countries)
 - bimodal [“Roadrailer”] (carry compatible trailers)

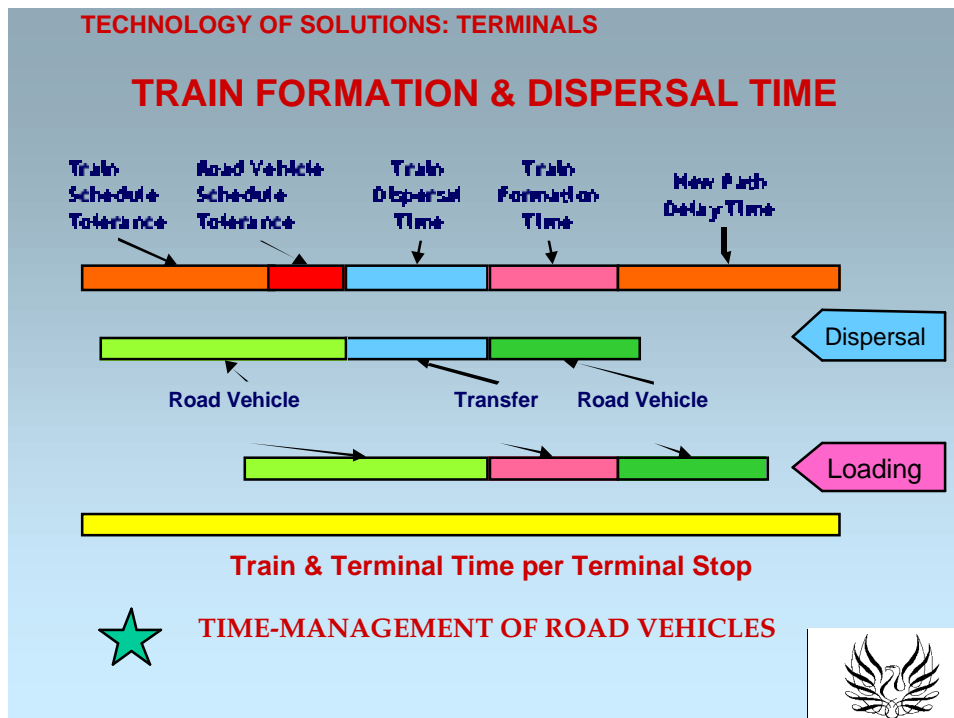
The presentation shows a range of FMU developments pioneered by Coventry University and Trucktrain Developments Ltd. These have demonstrated that vehicles are not the main obstacle to Just-in-Time by Rail.

Technology of Solutions: Terminals

The Just-in-Time Terminal does not yet exist. Current intermodal terminals generally involve long transfer times and hence long train stopped times. In view of the key part played by terminal times in total transit times, this problem needs to be addressed in depth and with a considerable mindset change.

Key issues are:

- train formation & dispersal time
- container standards for local deliveries
- inter-modal synchronisation
- just-large-enough
- communication & security



Apart from the need to make terminals much more flexible and time-efficient, there is a need for a new look at container which are smaller than the ISO shipping container standards. Typically, the standards would need to consider:

- modularity (to ISO?)
- fit to food, clothing, catering, consumer durables etc
- building-space-friendliness (eg doors, lifts etc)
- city road vehicle sizes (ie not tri-axle HGV trailer)
- unload friendliness
- security

The industrial experience of just-in-time is that compact layouts make for efficiency by removing non-moving materials. The same argument applies to terminals. A key issue will be to remove all but moving consignments from the transfer area, mostly by better management of incoming and outgoing road vehicles. This, combined with sensible train lengths, allows much smaller terminal sites. The benefits of this approach are:

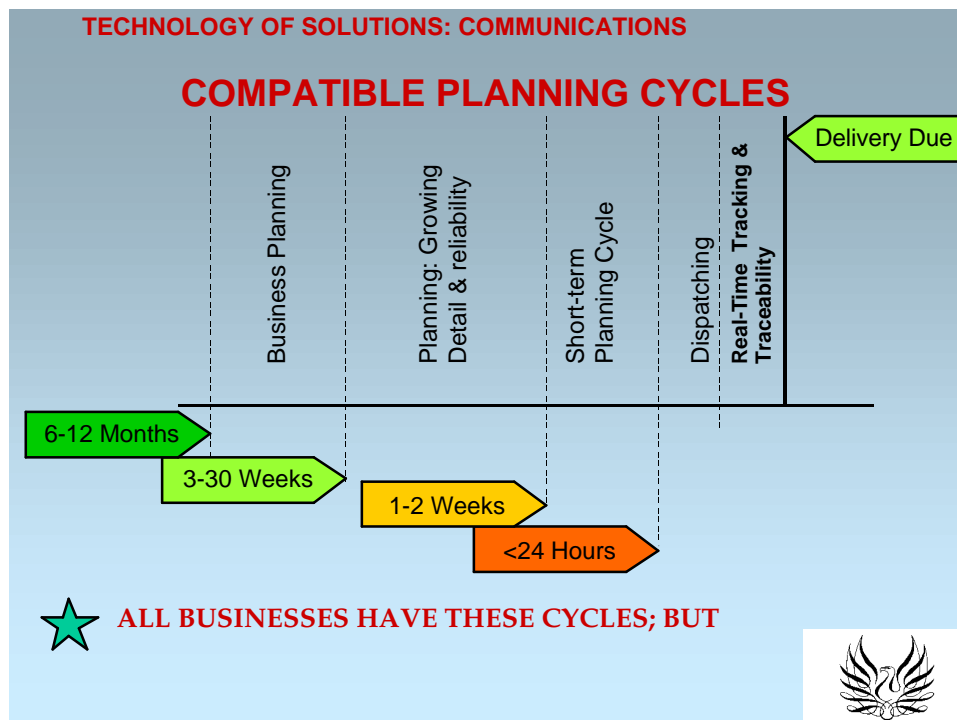
- faster turnround
- allows brownfield site

Technology of Solutions: Communications & Security

The industries concerned (Retail, Services and Manufacturing) have all addressed the issues of e-commerce to the point where they can order and manage the production of supplies and information without moving from their computer screens. However, this is not generally true yet of transits, especially those involving a rail element.

The problem is that interfaces between modes and with sources and destinations do not yet work:

- incompatible planning cycles
- no direct multi-way process and physical access for decisions and dispatching
- no independent access for tracking and traceability
- less than 100% GPS/GSM cover for emergencies



For instance, High-Value and perishable Cargoes need 100%:

- tracking
- manifest ° integrity
- tamper-prevention
- theft prevention
- cargo condition monitoring
- vehicle condition monitoring
- driver condition monitoring
- communications condition monitoring

This is a fundamental business problem but rail is currently least compliant.

Just-In-Time by Rail: Project Modelling Tools

In order to make available solutions which demonstrably address the issues the project has been set up to produce modelling tools which can be used for transit system design and Diagnosis:

- Cost and Environmental
- Logistical Performance and Risks
- Business Process and Communications Access

It is led by Coventry and Leeds Universities and has 7 Industrial Partners.

This project is designed to enable new high quality railfreight business.

Conclusions

Most high-value business operates in urban areas, but rail is currently moving away from these key markets

Paradigm shifts will be needed to regain this business:

- Vehicles
- Terminal Location & Size
- Communications