RailCalc

CALCULATION OF CHARGES FOR THE USE OF RAIL INFRASTRUCTURE

Discussion Paper

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1 Objectives

RAILCALC is a project commissioned by the Directorate-General for Transport and Energy (DG TREN) of the European Commission, aimed at developing a best practice guide on compliance of rail infrastructure charges with the rules of directive 2001/14/EC. The study started in October 2006 and will be finished by March 2008. ¹

2 Cost Accounting Framework

It is vitally important for every IM to understand the link between accounting and charging, requiring the adoption of a business logic that secures that cost drivers are well identified and controllable.

To face future needs the railway infrastructure cost accounting framework should not only deliver important background information for setting charges but also allow cost and revenues comparison by market segments underlying the decision on which services to focus business activities and what are the levels of public funding required to fulfil PSO (Public Service Obligations) agreements in the scope of multi-annual contracts with predefined levels of service. Finally, railway infrastructure cost accounting frameworks should also deliver accurate information for the regulator to ensure equity and fairness in railway market access. The leading principle for the regulator will be to check that the resulting differentiation of track prices is free of discrimination.

To this extent, the review of current accounting practices, allowed the identification of best practices on cost categorisation and adoption of cost centres deemed compatible with the concerns mentioned above.

In terms of cost categorisation, it is desirable to maintain a clear distinction of infrastructure-related cost categories supported by common definitions, regarding cost items depreciation, upgrading, renewals, maintenance and management/operation. Such a detailed categorisation should be combined with the adoption of accounting cost centres acting as building blocks defined at bottom levels of the physical and organisational infrastructure setting. This means a definition at the “line section” level for track related cost drivers (e.g. M&R (maintenance and renewal) associated to traffic), and at “organisational unit level” for service related cost drivers (e.g. management/operation).

¹ The current discussion paper is based on six deliverables: D1-Inventory of current practices; D2 – Analysis of current practices; D3 - Assessment criteria for costing/pricing schemes with respect to public welfare, private business incentives and European Competition; D4 – Assessment of current charging and accounting practices; D 5 – Report on accounting best practices; D6 – Report on charging best practices. A final deliverable (D7) on “Road Map for best practice implementation” is due at the closure of the study.
This combination of Cost Categorisation and Cost Accounting Units represents an essential requirement to understand how much of each cost category may be tied to incremental based charges. This also allows greater flexibility to face more complex approaches to railway cost accounting frameworks that may simultaneously fulfil the management, charging and regulation purposes. In brief, there is the need to have a structured cost accounting scheme which includes capacity costs in terms of life cycle costs of future maintenance, reinvestment and investment activities as well as running costs.

This recommendation on Best Practice on Cost Structure aims to bring more business focus to cost accounting, enabling a better insight on the cost of activities entailed in network provision. However, conventional cost accounting systems in railways have not been focused on delivering such detail. There is, therefore, an important improvement to consider in relation to state-of-the-art cost management systems and information systems in association with best practices on cost structuring.

Other challenges to cost accounting were identified, with a direct influence on the implementation of recommended best practices. Some of these challenges include asset valuation methodologies, estimation of running costs, allocation of costs, including the different costing approaches typically considered.

One of the most important challenges to cost accounting for charging in the spirit of the EU Directive 2001/14 has been the development of proper calculation of the differentiated costs incurred in network provision in support of charging decisions, often interpreted as the SRMC (Short Run Marginal Cost) level. It is then necessary to understand costs incurred in IMs (Infrastructure Managers) activity, their nature and corresponding drivers, an area of research clearly associated to two main different approaches, the econometric (top-down costing) and engineering approach (bottom-up costing).

Although marginal costs for the provision of the network can have a role to play it is of utmost importance to understand the need to change its definition along the change in the decision unit of the Infrastructure Manager, which can not continue to be the train, car or axle.km, but instead should be the group of slots that has to be made available for the successful provision of a particular railways service.

Yet, previous and current research show that it seems to be difficult to define incremental costs in relation to each cost category. It is thus necessary to simplify and homogenise calculation procedures, with incremental cost formulations that may allow a better understanding of cost drivers, encouraging cost efficiency, and improve IM’s financial performance.

Therefore, innovative cost management approaches are required for two major reasons:
**Internally:** to cut unnecessary activity costs, improving IM cost efficiency through better cost management, reaching higher value market segments

**Externally:** to identify sound reasons (such as enhanced “economic sustainability”, where environment and energy play an important role) for justifying public funding/subsidies for the remainder costs left uncovered by charges, set in such a way that cost efficiency goals are not counteracted. To accomplish this objective it seems to be indispensable to know how close a service comes to break even, considering the market revenues and the state service contributions on the revenue side.

Given this change context, RAILCALC concluded that it has become crucial to **link cost accounting to the whole management approach to Infrastructure Management**. It is necessary to move from conventional cost accounting systems to new approaches focused on delivering the sort of detail and deeper cost knowledge, enabling effective benchmarking, that business depend upon.

Improving conventional cost accounting practices, upon better knowledge on usage related costs and their nature, brings to discussion the application of **Activity Based Costing** (ABC) in Railway Infrastructure Managers.

ABC represents a cost accounting system based on current costs of activities rather than historic costs, and is therefore advisable in order to reconcile top-down and bottom-up costing approaches. Moreover, ABC may take full advantage of the sophistication effort on bottom-up economic/engineering models, which in all cases are required to feed the ABC cost partition mechanisms.

The application of such cost accounting / allocation concept may help clarifying the somewhat blurred area that lies between shorter term and longer term cost assessment, by allowing an approach to pricing based on forward-looking incremental costs. From a managerial perspective, ABC also provides the ground for Activity-Based Management (ABM). Activity-based management focuses on managing activities to reduce costs and improve customer value and can be divided in²:

- **Operational ABM** (i.e. “doing things right”), **using ABC information to improve efficiency**. Those activities which add value to the “IM product” can be identified and improved. Activities that do not add value need to be reduced to cut costs without reducing product value.

- **Strategic ABM** (i.e. “doing the right things”), **using ABC information to decide which products to develop and which activities to use**. In the case of Railway’s Infrastructure Managers this means also anticipating market trends,

² Kaplan and Cooper (1998)
enable planning of new investments and supporting decisions for long term PSO contracts / Multi-annual contracts, ensuring that long term deficits are supported by public funding.

Such an approach to cost accounting structuring can contribute to ensure that IM expenditures are allocated to marketable services of the infrastructure managers, thus ensuring the cost relatedness of charges. Combined with proper cost allocation partition keys (based on marginal costing approaches to network usage parameters), ABC may deliver a pragmatic approach to justify charges on incremental cost basis. Moreover, it may open for more frequent and effective cost benchmarking, especially regarding allocation of common costs, allowing regular cost cross comparisons among Infrastructure Managers, and fulfilling the information requirements for railway regulators to accomplish their mission of surveillance for non-discriminatory practices.

3 Charging Framework

We have seen that the application of SRMC approaches faces obstacles when it comes to practical implementation as it is difficult to establish criteria for marginal cost calculation, regarding how much of each cost category may be deemed variable.

On the other hand, charging according to incremental costs, understood as Short Run Marginal Costs (SRMC), implies that the IM is unable to raise the necessary funds to develop its activity, requiring State Budget contributions to finance railway network development/improvement. Moreover, it does not generate a clear link to improved IM cost efficiency and cost optimisations strategies. Taking these concerns into consideration, RAILCALC reference framework for charging has assumed that railway infrastructure managers need to adopt a business oriented approach towards the future. Therefore, it is increasingly important that the charging system adopts a dynamic forward-looking approach to current and future costs, rather than historic costs. Based on this reference framework, current practices were assessed.

Indeed, despite developments in Marginal Cost calculations achieved in some research studies, incremental costing is often considered to be complex by IMs while there is a significant dispersion of practices and interpretations of the EC Directive 2001/14. On the other hand, current practices also bring about potential drawbacks, namely risk of uncontrolled overpricing, in particular if an incumbent detains infrastructure facilities also used by competitors, as illustrated in the next diagram.

Although EC Directive 2001/14 references that application of cumulative charges cannot exceed Total Costs (SRMC + Fixed Costs), uncontrolled overpricing may arise, ending up distorting overall charging, in the case when these added charges for special
services are set as an obstacle to new entrants, specially when Scarcity Charges and Markups are applied and already cover for Total Costs.

Consequently, an exclusion of competitors could also take place, even in the case of supposedly fair charging for all infrastructure components:

- If the essential facility is not open for use in case of Capacity constraints (e.g. the incumbent uses all of the possible slots on this part of the infrastructure and is not willing to share the paths, because of “grandfather rights”),
- In the case of Time constraints (e.g. all economic attractive slots within a certain period of time are allocated to restricted parties), and
- Under Technical Constraints (e.g. the infrastructure can only be used by a certain kind of trains with a certain technical design, without any interoperability to other parts of the network).

These examples emphasise the need for the regulator to control access not only in terms of primary charges (minimum access package), but also on additional charges.

Another drawback is the fact that the adoption of Scarcity Charges (SCA) and Mark-ups (MUP) share a common association to “Willingness to Pay” (WTP) of Train Operating Companies. Moreover, current charging practices allow adding up WTP related elements to basic SMC (Social Marginal Cost) charges. This means that WTP prevails over SMC considerations.

So, whenever WTP considerations are brought to charging practices, (no matter if through Mark-Ups or Scarcity Charges), marginal costs consideration and calculations become useful merely as a general indication for charging. Overall charge in this case
is actually determined by the acceptance by the TOC of a certain market bearable charge, overriding SMC considerations.

This dynamic is illustrated in the next diagram, depicting the contradictory effects associated to current practices in relation to the cumulative use of different charging elements.

In this context, the adoption of ABC systems in railways, as per the RAILCALC proposition illustrated in the diagram, may be considered as a pragmatic approach to setup a basis for forward-looking incremental cost based charging system. This proposition keeps the essential spirit behind the existing legal framework, namely the charging principle being based on incremental costs (EC 2001/14), while it also has the potential to deliver better focus on IM business orientation, without compromising fair access conditions.

Infrastructure charging centred on ABC (activity based costing), would comprise the marginal operational costs attributable to IM activity level. Therefore, on top of charges based on Marginal External Costs (MEC), added charges should be set also considering marginal operational costs. Such charging approach will depend on the market acceptability, i.e. WTP considerations, defining a minimum setting at an indicative SMC reference level.

This proposition represents an improvement over current charging practices, as it develops around the concept of operational costs optimisation complemented by willingness to pay as a driver for the application of mark-ups above SMC level. It also requires addressing the slot charge as a whole, including use of facilities, depending on market conditions.

The approach might be extended to the point of covering for total costs, with longer term related charging remaining within the remits of the LRMC (Long Run Marginal Cost) and LCC (Life cycle cost) concepts. In this circumstance, mark-ups would
represent a combination of SRMC/MRMC and LRMC concerns, promoting cost coverage to the cost components, with an impact in the long term sustainability of the railway activity, namely.

- ABC related costs (Short / Medium Run Marginal Costs)
- LCC related costs (Long Run Marginal Costs)

It should be noticed that charging below ABC level and higher than SMC estimated level is still possible depending on IM Management decision (e.g. through discounts, at the light of the EC Charging Directive principles). This approach is also compatible with the legal framework to the extent that WTP can be seen a compounded measure for Slot Reservation (RES), Scarcity (SCA) and Mark-ups (MUP), still leaving the chance for the adoption of Discounts (DIS) and Performance Schemes (PER).

Regarding main implementation issues related to regulation, it is important to notice that capturing the market value of the slots offered by the IM above the point where charges are at ABC level, requires the adoption of auctioning mechanisms. From the regulatory viewpoint, it can be supported that charges above the Total Cost would further require setting up slots reservation for new entrants, this way avoiding prevalence of incumbent operators under exceptional market conditions.

Following the approach already adopted for similar circumstances, namely in the road sector, on the side of charging regulation, it is suggested to cap the “Peak” pricing in relation to “Out of Peak” pricing by a factor of 2. By adopting such price cap principle, the regulator will ensure that there will be an incentive to invest in expansion of capacity, avoiding situations where the IM could simply exploit “peak” charges in relation to “off peak” charges under capacity constraints. Therefore, the thresholds that should deserve regulator attention are the “ABC charge” (with evidences required from ABC Information Systems) and “Total Costs” levels.

4 Conclusions

An accounting framework based on a systematic ABC rationale would allow identifying with greater rigour functional costs that enable charging equal or above Marginal External Costs and below Total Costs, clarifying the drivers for each cost category. It constitutes an approach to pricing based on forward-looking incremental cost supported by current costs rather than historic costs. Hence, ABC principles applied to IM business may provide multiple contributions to the development of railway business, namely:

- By providing the level of transparency needed for effective regulatory monitoring (REGULATORY Perspective)
- By enhancing cost accounting accuracy and enabling cost management (MANAGEMENT Perspective)
- By providing effective link between cost of activities and charging in order to send sound economic signals to TOCs (MARKET Perspective)
- By fostering cost efficiency and reliable market reactions for decisions on investment (INVESTMENT perspective)

Finally, the current legal framework offers no barriers to the implementation of what RAILCALC defined as a best practice on bridging cost accounting and charging for railways infrastructure services.