

# CORE BRIEF

## ***Commissioning of new rolling stock***

*A recent UITP study concluded that changes and improvements are required in the procedures used to commission new rolling stock. Both rolling stock manufacturers and transport operators are being called upon to make contributions in this respect.*

Rolling stock manufacturers have to arrange more carefully for construction, production and delivery to be carried out by the relevant deadline, and should attempt to work in closer liaison with the transport operators. Quality assurance should also be improved where subcontractors are concerned and commissioning staff assigned greater specialist and organisational competence.

The specifications and/or requirements drawn up by the transport operators should be more precise. This concerns particularly the scope of documents to be provided and their acceptance, the range of acceptance testing, and the description of operating conditions. It also means that clear-cut contractual arrangements for deadlines, responsibilities and guarantees have to be made.

Both sides, the rolling stock manufacturers and the transport operators, have to concentrate in general on intensifying exchanges of experience and communication (to include subcontractors) so that a permanent cycle of experience and better products are guaranteed in the long run.

### ***Introduction***

A significant number of metro operators worldwide has experienced problems when commissioning new rolling stock. Late deliveries often signify the start of problems with, in some cases, excessively high failure rates in service during passenger operations. This can prolong the commissioning phase, with significant inconvenience for the passengers that causes the company's image to deteriorate in the public eye. In addition, transport companies are faced with additional costs, not just because rolling stock is out of action but also because they have to keep additional staff on call, both for normal operations and as backup for the suppliers' commissioning staff. A further fact is that, in the majority of cases, staff do not have much experience of the new technologies in use, with the result that suppliers and/or subcontractors

are only able to rectify breakdowns slowly and laboriously. Finally, it has emerged that disagreements keep occurring where customer guarantees are concerned, because contractual regulations are often not laid down precisely enough.

### ***Terms of reference and procedure***

The UITP Rolling Stock Sub-Committee conducted a survey of metro operators around the world on the “Commissioning of new rolling stock” in order to obtain an overview of the situation as it stands today, the problems that most frequently occur and the reasons why they occur. From here, they were to issue recommendations on how to improve the situation.

A questionnaire was sent out which covered the whole spectrum of rolling stock commissioning and recorded the experiences of as many metros as possible. The questionnaire covered difficulties which arose in the presentation of documents, organisational scheduling and the management of commissioning, and in the scope of acceptance testing (see illustration 1). In addition, operators were asked to record the experiences they had had when putting new rolling stock into operation for the first time and when rectifying faults which occurred.



*Illustration 1: Type testing car shell on pressure stand*

34 UITP member companies in the metro sector were approached, and 21 of them replied. This meant that the study could be based on a representative cross-section.

Evaluation of the questionnaire set out to record the situation as it now stands and also make recommendations on the following:

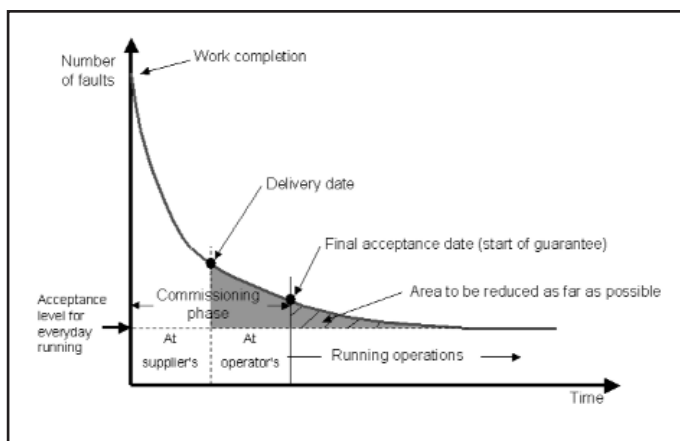
- The type and scope of technical tender documents
- How commissioning can be organised and scheduled
- How acceptance procedures can be optimised from the technical, operational and commercial point of view, including documentation
- How contracts with suppliers can be drawn up, with special emphasis on guarantees and contract penalties.

The commissioning process can be said to be ideal when all initial errors and defects, which can never be totally avoided when the newest types of technology are applied, are detected up front – i.e. prior to the first unit in a series being delivered to the transport company – and rectified at that point.

This is the only way to reduce the numerous defects and to keep them at a low (acceptable) level during the commissioning phase and, more importantly, after final acceptance testing, when in operation (see illustration 2).

### ***The chief problems***

Apart from objections to delays in rolling stock deliveries, transport operators primarily complained about considerable deficiencies when it came to presenting technical documents (construction drawings, calculations, certificates), as they



*Illustration 2: Organising commissioning*

were either delivered too late or not at all and, in many cases, were of unacceptably poor quality or not even up to date (see illustration 3).

Production errors and quality deficiencies are frequently an impediment to rolling stock ultimately being accepted. This is particularly so when new technological solutions are applied to problems without prior testing. Added to this, not enough – if any – spare parts are available in many cases. This is in spite of the fact that all parties are aware that the focal points for errors are largely the doors, driving and braking components and their controls, and transformers, traction motors and couplings – a fact confirmed by the questionnaire.

Other problems arise both for suppliers and operators when it comes to providing staff and qualified commissioning specialists. This includes staff liaison work on site.

Organisational competence is also lacking in some cases, as is the degree of influence suppliers' commissioning staff are able to exert over construction and production operations at their own plant. This leads to decisions often taking too long when faults have to be eliminated, with the result that respective delays in the commissioning process can ensue.

### Reasons for problems occurring

There are many different reasons for these problems occurring. They range from imprecise or incomplete specifications or unsatisfactory co-operation and liaison work between suppliers and operators to uncritical endorsement of technical solutions taken from a totally different source and departures from specifications without prior consent. Similar problems often occur when orders for materials are placed in foreign countries and quality deficiencies arise. Additionally, there is the current trend towards “internationalisation“ where suppliers are concerned, which takes the form of company mergers and restructuring, bringing with it the following disadvantages:

- ever-changing contacts;
- loss of specific information and experience and;
- forfeiting know-how from previous cooperation.

Added to these factors is the high cost pressure on both sides, which can also cause considerable problems:

- Transport operators opt to do without demand-oriented specifications, make savings when it comes to supervising construction, and reduce the number of specialists in their workshops
- Manufacturers, on the other hand, use new production procedures which have not been tested to the full, and cut out prior testing when applying new technical solutions to problems.

Transport operators were asked to rate the reasons for these problems occurring. They are clearly depicted in the illustration 4.

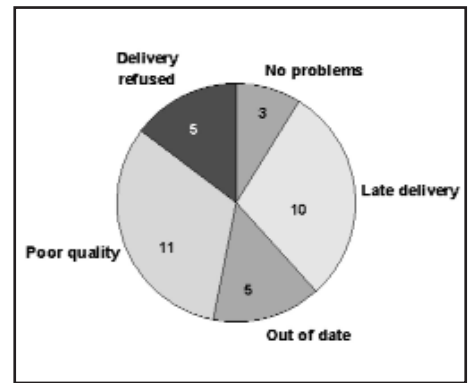


Illustration 3: Deficiencies when documents delivered

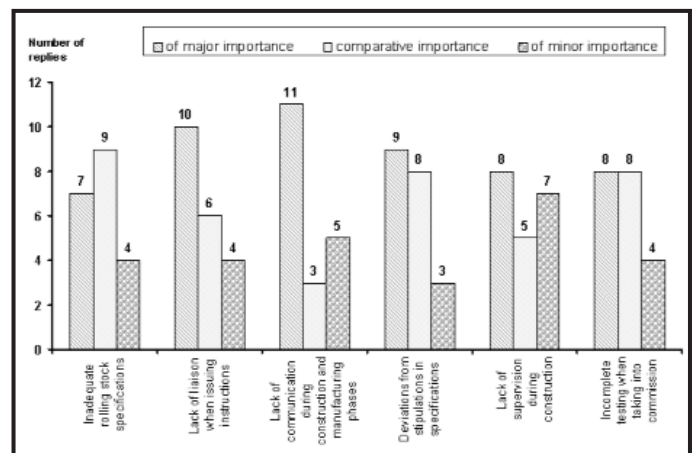


Illustration 4: Appraisal of reasons for problems arising

## Conclusions

The documents required when procuring new rolling stock (e.g. specifications) should be set out so that all demands made by the transport operator are represented as best as possible.

Among other things, this includes an exact stipulation of the conditions under which the rolling stock is to be run, the documents to be supplied (including their approval by the competent authority), a list of deadlines and contractual regulations for the commissioning schedule and the range of acceptance tests to be conducted.

The problem of guarantees should be addressed without ambiguity. It is important to define what a manufacturing fault is and the procedure to follow in such a case.

Also recommended is an evaluation procedure for proof of availability, which should be committed to paper and made contractually binding.

Finally, responsibilities and cost assignments for maintenance and supply of spare parts should be regulated contractually from the very start of the commissioning phase to the end of the guarantee period.

Prior testing is also required if long failure periods and problems with new technologies are to be avoided. Many metro operators have already started testing prototype units or running small pilot series, or have recommended this practice. Components can undergo testing on existing rolling stock or on test stands.

Deficiencies and weak points can thus be detected early on and eliminated by having design-related and manufacturing improvements made before a whole series is produced.

When improving the commissioning process for new rolling stock, it is particularly important that discussions and exchanges of experience between transport operators and suppliers be open and constructive.

This point is vital if continued communication and co-ordination between the manufacturers and the metro operators are to be sustained. Both sides (including the subcontractors) should hold liaison talks at regular intervals during the construction, production and commissioning phases. When doing so, they should bear in mind that the more precise the contract is, the better all parties concerned will be able to concentrate on essential commissioning work and putting mutual agreements into practice. It is therefore also necessary for continued discussions and exchanges of experience to be conducted during the periods before and after the commissioning phase between the operators, construction specialists and those responsible for production – e.g. on issues such as servicing – so that experience and the most important data (on availability, damage/defects, etc.) can be exchanged openly and an ongoing cycle of experience created and sustained (see illustration 5).

Apart from communication between the separate manufacturers and operators, general exchanges of experience should also take place and work be conducted in national and international associations. Work on committees dealing with guidelines, norms and standards should also be augmented in order to give know-how generally a much broader platform.

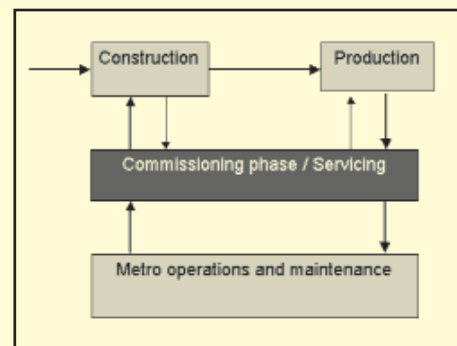


Illustration 5: Cycle of experience between suppliers and transport operators

This core brief has been prepared by the Rolling Stock Subcommittee of the UITP Metro Division.