Workshop 1: Implementation and verification of metering solutions

1. Introduction

The morning sessions taught us that many new products are developed, that ERESS is ready to settle the consumptions and that the data should be used to facilitate energy savings.

But what are the consequences for a Railway Undertaking of adding energy meters on existing rolling stock? Will the Notified Body in that case verify the energy meter? And do we already have a cross-acceptance of metrological certification?

Energy metering equipment should be able to fulfil the required metrological performances during operation. What solutions are offered by the manufacturers to guarantee this? How can we create a legal framework to come to a pragmatic solution?

2. Implementation

2.1. Adoption of new TSI

CR loc&pas TSI is adopted on April 26th 2011. But a significant number of projects or contracts, which started before this date, will lead to the production of conventional rolling stock which does not fully comply with this TSI.

A transition period is defined, during which the application of this TSI is not mandatory if that rolling stock is placed in service before the end date of the transition period. This transition period applies to:

- projects at advanced stage of development;
- contracts in course of performance;
- rolling stock of an existing design.

During the transition period, the vehicle may be authorised to be placed in service.

2.2. Verification and placing in service

The 'EC' verification procedure is performed by a Notified Body, that checks and certifies the subsystem compliance with the relevant TSI(s) and other European regulation. Other Notified Bodies will cross-accept this verification.

It is also possible to assess only a part of a subsystem, e.g. the Energy Measuring System. This will lead to an intermediate statement of verification.

The National Body shall check the technical compatibility of the subsystems with the system to which they are being integrated and shall also check the safe integration of the subsystems in accordance with the Safety Directive. This depends on the local situation. Cross-acceptance is not possible. The National Body will give an Authorisation to Place in Service.

2.3. Conformity Assessment of Energy Measuring System (EMS)

EN 50463 will become a harmonised standard. This means that all equipment that is compliant with EN 50463 automatically becomes compliant towards the metering requirement of TSI. But obviously this does not mean that all meters should be compliant to EN 50463. Appliance towards standards remains voluntary.

Retrofitting of Energy Measuring System on existing trains requires assessment by Notified Body, depending on Member State's National Safety Authority's opinion, renewal of the Authorisation to Place in Service.

3. Reverification

3.1. Technical proposals from manufacturers

The required overall accuracy shall remain valid during operation. It is advisable to choose a less precise accuracy class for the products to obtain a higher margin during operation. The accuracy of the new equipment will be much better than required for the chosen accuracy class, but the margin will permit to reduce the reverification costs (less tests or replacement of components).

Some manufacturers are able to deliver components respecting the data-sheet specifications during the complete life time of at least 20 years. The metrological performance can be reverified using a statistical sample.

Most manufacturers add test windings to test the function and accuracy of their transducers. This will facilitate the reverification procedure.

Other manufacturers propose to test their DC-transducers using a current injection already used to verify the performance of the circuit breakers.

New test tools are designed in order to reduce the modifications in the high voltage circuit relevant to the sensors under test and to shorten the test duration.

3.2. What about Germany?

Germany is one of the few countries where on-board energy metering is mandatory on all trains. The German metrological institute PTB has defined the requirements regarding type approval, verification and reverification of electricity meters and instrument transformers. These are only applicable to the 16,7 Hz used in Germany. Actually all energy meters need to pass reverification every 8 years. Reverification of instrument transformers is not needed.

PTB will propose to enlarge the scope towards all traction supply systems. The EN 50463-series shall be adopted for type approval, verification and reverification (if applicable). It is not yet decided who will be the regulator, PTB or EBC (the German railway agency). The reverification procedure shall be part of the initial conformity assessment certification.

3.3. Maintenance Plan

The party that submit the EMS to the homologation process shall provide a Maintenance Plan indicating the basic parameters that are subject to periodical verification during the EMS life. This is the case of accuracy values.

The EMS Maintenance Plan is included into the Maintenance Plan of the vehicle on which the EMS is installed.

The parameters to be verified and the frequencies of verification are defined and established according to the RAMS standards and will be checked during the initial conformity assessment certification.

The Railway Undertaking is in charge of the execution of the Maintenance Plan and consequently of the basic parameters regarding re-verification.

The Notified Body, which has issued the ‘EC’ verification, has the task of surveillance of the execution of the Maintenance Plan. When the certificate expires, the renewal is obtained if the Notified Body inspection and verification are generating a positive verdict.