

Annex 8

SUSCEPTIBILITY TO EM INTERFERENCE – NON-AUTOMATIC WEIGHING INSTRUMENTS (NAWI)

During in-service surveillance of non-automatic weighing instruments (especially weighbridges) by the regional authority of legal metrology in North Rhine-Westphalia, Germany it has been established that the weighing indication can be significantly affected by standard radiotelephones (mobile phones, cellular phones). The deviations varied from several kilograms to tons and were stable enough to be printed or recorded. At the study group meeting in March 2005 in PTB Braunschweig, Germany the implications of this problem were discussed. As a result of this discussion the following points were established:

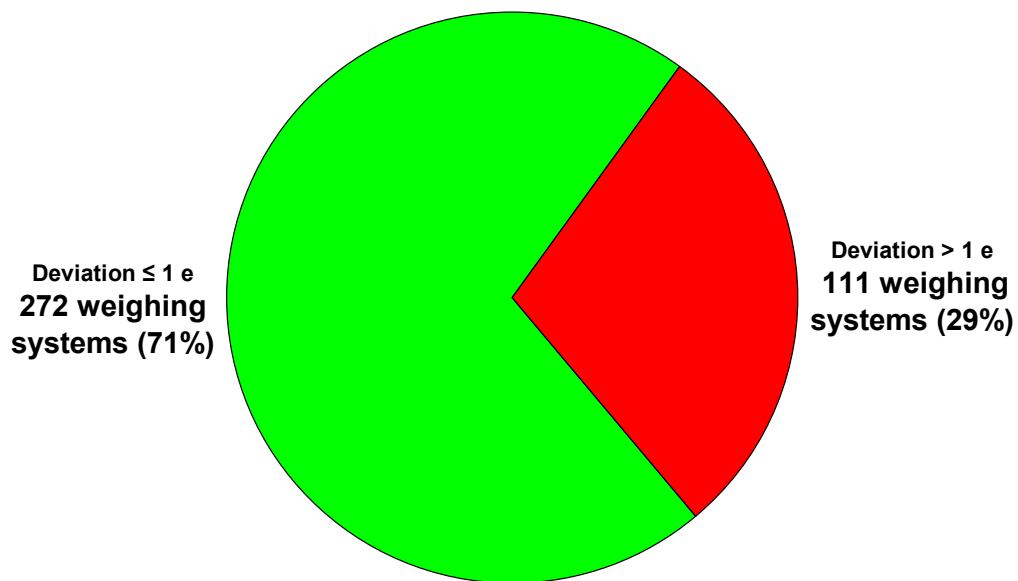
- during in-service surveillance of weighing instruments stricter requirements cannot be applied than during the type approval procedure;
- there is still a possibility of changes on the measuring instrument under surveillance that do not correspond to the type approval certificate;
- a correct installation (e.g. electromagnetic shield) might not comply with the manufacturers' guidelines.

It was decided to launch a more comprehensive study into this matter. The aim was to examine as many weighing systems as possible in a short time with lowest possible costs by using standard radiotelephones. The best way to achieve that goal is to attach the study to normal subsequent verifications and in-service surveillance of weighing systems.

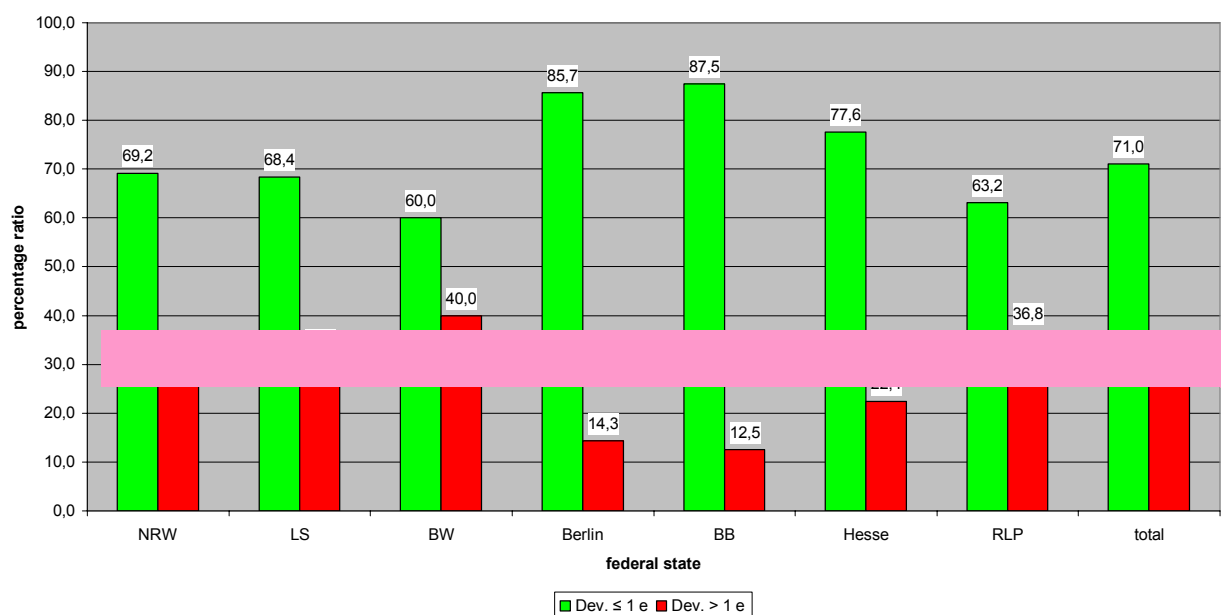
To secure identical or at least comparable conditions a technical guideline and a special form was prepared for the enforcement officers. The source of interference (radiotelephone) should be a standard radiotelephone with a transmitting power of approximately 500 mW. The enforcement officers were provided with a technical guideline with instructions how to carry out the examination, the results of the examination were recorded on the form. The period of examination was June 1, 2005 to July 31, 2005. In total 383 weighing systems were examined, predominantly weighbridges and other vehicle scales but also automatic gravimetric filling instruments and instruments for direct sale to public.

The results of the whole exercise are summarized on the following figures (TAC = type approval certificate):

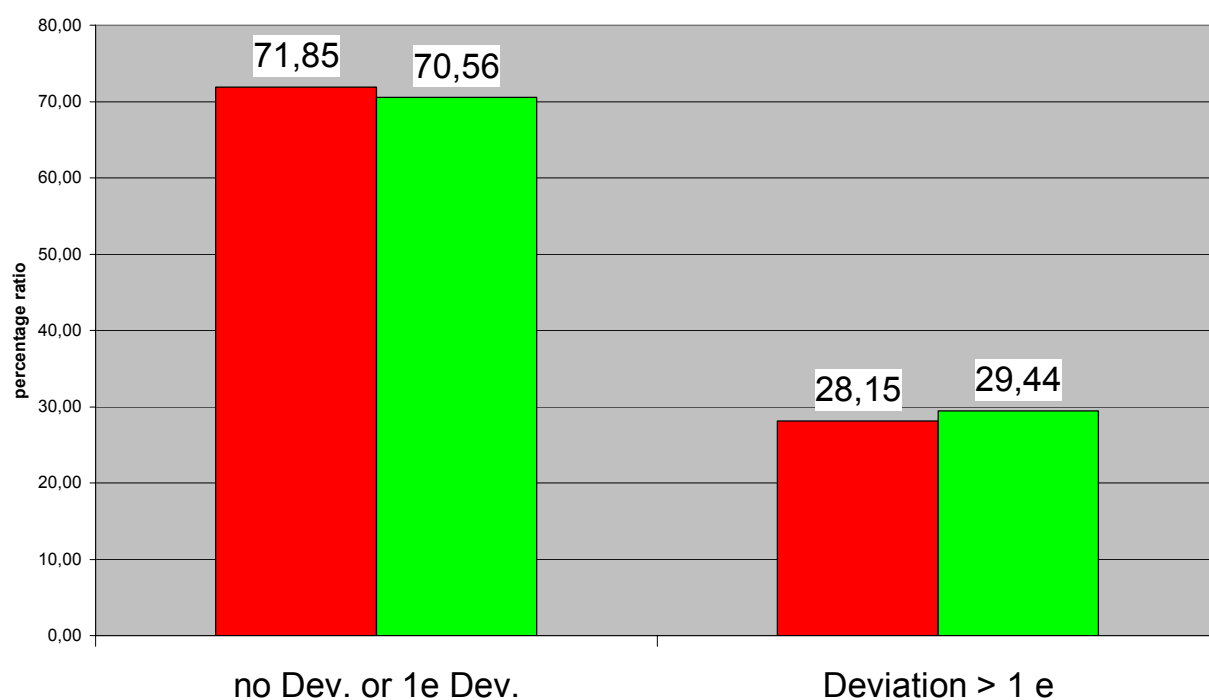
Result after examination of 383 weighing systems:



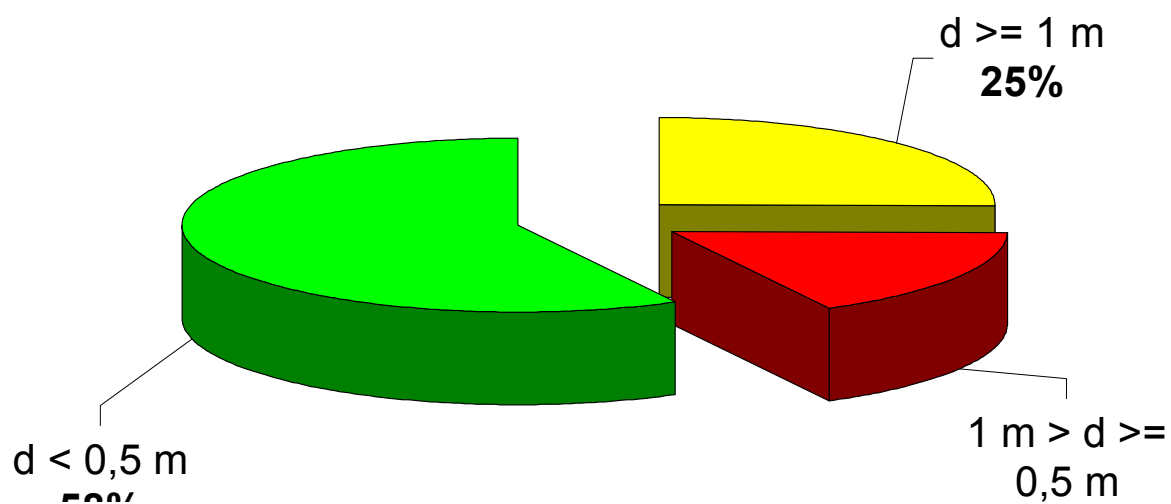
regional authorities



TAC before / after 1993



Distance of the source of interference to the indicator of the 111 influenceable weighing instruments



Conclusions:

- in general, an influence of standard radiotelephones on the indication of weighing systems exceeding MPEs is easily possible;
- the deviations can vary from $1 \cdot e$ up to **several $100 \cdot e$** ;
- these deviations can be printed and recorded;
- in most cases this effect occurs when a radiotelephone in operation is placed near to (**$d < 10 \text{ cm}$**) the measurement cables, A/D converter, indicator etc.

This case demonstrates the importance of the systems approach to metrological control: irrespective how carefully crafted technical regulations on measuring instruments might be their correctness has to be constantly examined in the real conditions in the field, especially in this time of fast technological changes.