

press

Sonderdruck - Reprint

SCHENCK PROCESS GmbH

from ASIA PACIFIC DEVELOPMENT, October 2001

Safety and check through weighing

Martin Stillger

Safety and check through weighing

In the year 2001, weighing technology is rising to the challenge of the new millennium. In addition to the classical commercial weighing tasks, safety-relevant diagnostics and monitoring systems are setting ever increasing standards for the manufacturer. The era of the classical weighbridge is over.

The markets of rail-bound traffic have witnessed dramatic changes. In the context of privatisation and border-crossing traffic, cost control and mutual supervision are gaining growing importance. Discussions on safety and cost reduction led to the demand for a capacity increase using the existing railway web. As a consequence, the tolerances relating to the admissible axle loads at growing speed must be fully utilised. Where costs are concerned, particularly for maintenance of railways and wagons, the focus is on the principle of causation, i.e. the party damaging the material by extreme stress pays a higher percentage.

train in regular intervals; the coal is weighed statically on weighbridges. The weighing result is exclusively used for invoicing the amounts supplied.

Traditionally, single decoupled wagons are weighed statically with highest accuracies defined by local verification or certification regulations. The method of static total wagon weighing on weighbridges – in use for more than 100 years – will be replaced by modern dynamic systems save some few exceptions.



Train weighing technology is now entering the 21st century



Efficiency on the railways can be the key to making profits

The modern weighing and diagnostics equipment serves this environment with systems reliably measuring, storing and evaluating the relevant data. Such systems transfer weight or diagnostic values together with automatic vehicle identification (AVI) data to the user network quickly and safely.

Depending on the application, autonomous, often state-controlled testing and certification establishments verify the compliance with specified parameters.

Totalisation for invoicing – overload monitoring

The classical weighing application is the 'commercial' weighing for invoicing. For instance: the coal power station receives the material by

Today's demands on state-of-the-art weighing systems in terms of operating costs and flexibility are higher than ever. Platform systems whose construction did not allow for economic railway usage, or are even forestalled through traffic, are rarely accepted nowadays. In addition, static platform systems are costly since quite a number of helpers are busy for several hours (e.g. weighing of liquids may require up to 20 minutes settling time per wagon). In dynamic mode, fully automatic weighing of total trains is done in a few minutes – just depending on the number of wagons.

Therefore, modern service providers and railway companies clearly opt for versatile weighing and control systems with continuous rails with a consistent service concept.

“ Where costs are concerned, particularly for maintenance of railways and wagons, the focus is on the principle of causation, i.e. the party damaging the material by extreme stress pays a higher percentage. ”

The Schenck MULTIRAIL weighing systems rise to industry's challenge thanks to the following performance characteristics:

- Highly accurate dynamic and static weighing.
- Easy installation in main routes without foundation and rail cuts.
- Weighing with adjusted accuracies in almost any speed range.
- Acquisition of wagon and train totals weights, and determination of axle and wheel loads complete with their left/right or front/rear ratios.
- Safe detection of wheel flats and out of round conditions.
- Easy and safe local replacement of individual sensors required for system operation.
- System interfacing with remote diagnostic systems via Internet.

Dynamic weighing on systems without foundation, with continuous rails and integrated static reference scale

The MULTIRAIL system incorporates rugged high-precision weighbeams mounted in concrete ties. Up to seven weighing ties are installed in the prepared ballast bed with no need for any foundation whilst ensuring the requisite bottom strength.

The complete train is weighed in transit by axle or bogie. Compared to static weighing, the train transporting the coal to the power station is weighed dynamically at 10 km/hour typical speed. In accordance with local regulations, the pertinent Verification Acts are considered and complied with. While 90 minutes and three helpers were required for static weighing of a 30 wagon train formation, dynamic weighing takes place fully automatically and is complete in less than five minutes with no need for operator intervention. The system automatically recognises the particular wagon type without using any rail switches. Modern weighing electronics and software solutions let the user create a database or interface MULTIRAIL with a host system.

The range of applications surpasses the typical 'coal train' by far; tank wagons, mixed trains and specialities, e.g. torpedo vehicles or 'rolling roads'.

The overload check of loaded wagons is another typical application as the loading company may be asked to prove that its wagon was loaded to a defined gross weight when entering the railway network. In addition to the MULTIRAIL systems described above, which permit extremely high accuracies to be achieved with the use of weighing ties installed below the rail, other Schenck rail weighing systems offer the possibility to equip the weighing rail with sensors, thus narrowing down the user contributions to an absolute minimum.

Schenck-made sensors can be exchanged in the field whenever servicing is required. This outperforms any solution where applications to the rail must be done in the manufacturer's works, not to mention the time-consuming export procedures.



Sensors can be applied anywhere in the field, not just in the manufacturer's workshop

Rail vehicle diagnosis/track monitoring

Apart from the typical 'commercial' weighing application, the weighing technology is making inroads in safety monitoring.

Since the weighing system is integrated into the existing track, the rail traffic can be checked on-line. MULTIRAIL weighing ties are designed to check wheel and axle loads, monitor trains' total weights or the load distribution in almost any speed range.

The on-line load check ensures safe and timely railway service and enables critical track sections to be controlled.

Another special MULTIRAIL feature is the detection of wheel flats during transit, so that immediate action can be taken. The aim is to develop status-oriented maintenance programmes and efficiently increase the safety of rail-bound traffic. Damaged wheels are identified and alarm levels are given so that appropriate actions can be taken immediately.

Another important aspect is the cost reduction regarding damaged tracks. The costs can be attributed appropriately – the party causing the damage is made to pay! Wheel flat recognition systems are benign to the environment; if properly used, the noise level is considerably reduced.

Any
MULTIRAIL
Rail Weighi

Different industr
The MULTIRAIL
you share the br
for many indust
Legal-for-trad
of liquids and

Photo: Schenck Weighing Systems

BV-24 018

The railways' noise protection budgets profit from the use of the Schenck weighing technology.



Rail traffic can be checked on-line, ensuring safety and speed

Wheels diagnosis in production and maintenance

In rail vehicle production and maintenance, the wheel load monitoring issue in the sense of the pertinent UIC guidelines or in the light of quality assurance, is the ideal MULTIRAIL application. The installation takes place in the field, typically in measuring rails, with the weighbeams being mounted in concrete foundations.



Evaluation and weighing can also take place within a specially constructed pit area

Another scenario is the installation in maintenance bays where the measuring rails are installed in a pit area. Varying as a function of wagon and engine types, the requirements can be met with the use of the weighbeam technology with the highest degree of accuracy.

The evaluation takes place with the use of PC programs preparing customised reports required for quality monitoring.

Summary

Thanks to the modular weighing technology integrated in the track, state and private railway users as well as all industries are offered flexible and accurate measuring systems which allow them to concentrate on their core competence whilst increasing safety and cutting current expenses. ■

“ Wheel flat recognition systems are benign to the environment; if properly used, the noise level is considerably reduced. The railways' noise protection budgets profit from the use of the Schenck weighing technology. ”

Civil str

by Prof. Dr.-Ing. Jörg Peter, Dipl.-Ing. (FH) Martin

The best way to fully understand

Lehigh Portland Cement Co. (LPCC) and Heidelberger Technology Center (HTC) are currently building a new kiln line at the cement plant in Bridge (see Figure 1). The new kiln line replaces the four old long kilns. The line has the largest single string, five stage preheater and is one of the most modern in the world.

The main structural parts besides the preheater tower and the limestone and additive storage buildings are the three silos for fly ash, blast furnace slag and clinker. These silos and their foundations were designed by Peter and Lochner.

At the same time, LPCC/HTC is upgrading the existing plant with a new fully automated ball mill, a new fully automated cement silo and a modernised extraction system for the existing cement loading silo group. The new cement silo, its foundation and modernised extraction system for the existing cement loading silo group, Peter and Lochner performed the structural design.

Furthermore, the company was assisted by the site as consultant engineers during the construction period to assist with and solve any problems that could be solved instantly on site. This not only saved time, but also increased the final quality of the building.

Crushed limestone from a nearby quarry is delivered by truck and transported to the

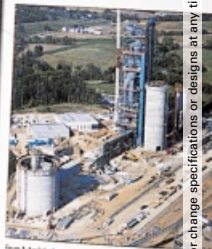


Figure 1: Aerial view of the construction site



Measuring and Process Systems

SCHENCK PROCESS GmbH
Marketing Communication
D-64273 Darmstadt
Phone: +49 (0) 61 51-32 29 87
Fax: +49 (0) 61 51-32 27 54
E-Mail: pr.process@schenck.net
www.schenck-process.net