Applying the Force

Force calibration of cement, asphalt and RAP weighing equipment

With many years of weighing calibration experience, Precia-Molen say they can offer their customers a wide choice of methods to suit individual site requirements, but when it comes to the calibration of cement, asphalt and recycled asphalt planing (RAP) weighing equipment, their preferred and well proven method is 'force calibration'. This, they say, allows a traceable calibration to be performed quickly, non-invasively and often without taking the cement, asphalt or RAP hopper or silo out of service, thus reducing disruption and downtime to a minimum.

Force calibration of aggregate weigh hopper

Vessel under test

An approved process

The process approved by QSRMC and covered by Precia-Molen's ISO9001 quality system is simple. Small hydraulic jacks located on specially mounted reference load-cells are used to apply a load to the hopper or silo. By comparing the weight read-out of the reference load-cells with the system being calibrated, any errors can be determined.

Three or four reference load-cells (pre-calibrated, certified and traceable to national standards) and their associated hydraulic jacks are positioned between a solid structure and the silo, as close to the silo's load-cells as possible, to give the optimum result. The jacks are operated and the readings given by the reference load-cells and the silo load-cells are compared at fixed points throughout the weighing range.

Force calibration can be adapted to either 'push up' or 'push down' to suit the silo and the site operations. Often, this means that silos do not need to be emptied to carry out the calibration testing, which is a major advantage as product does not have to be stored or the plant stopped.

Using multiple reference load-cells positioned as near as possible to the silo's own load-cells, the calibration engineer can check the performance of individual load-cells, allowing the identification of any potential failure or malfunction. The force calibration equipment is both portable and flexible, allowing a wide range of silo capacities to be calibrated by carefully selecting the reference load-cell capacities. Precia-Molen have test rigs which can be used for silo capacities from 2,000kg up to 160,000kg.

Improved accuracy and stock control

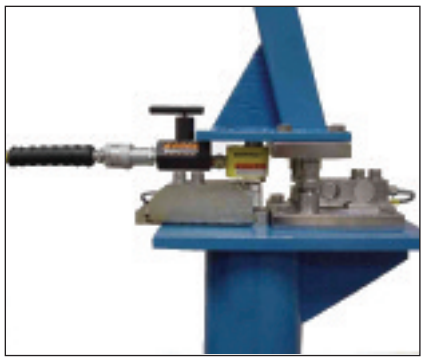
At the site of a major aggregate producer in Derbyshire, Precia-Molen calibrated the cement train-loading system using this method. Utilizing the force calibration system meant the silos could be tested to their maximum capacity more accurately and in a fraction of the time taken by any other calibration technique.

Force calibration equipment

The cement train-loading system was installed by Precia-Molen some years ago and each silo has a maximum capacity of 80,000kg and a batch size of 60,000kg. Prior to the use of force calibration the silos were calibrated using the 'load substitution' method involving a combination of calibrated test weights suspended by chains attached to the sides of the silo together with material used as 'ballast weight'. This method was both time-consuming and costly.

When asked to undertake a full calibration using force calibration, Precia-Molen produced a special high-capacity system utilizing four 40,000kg load-cells and four 30-tonne hydraulic jacks linked to an I200 battery-powered weight indicator.

According to Precia-Molen, the calibration tests were successful with repeatable errors of less than 20kg recorded throughout the weighing range. The customer was so pleased with the improved speed and accuracy of the force calibration system, together with the resulting improvement in stock control, that they subsequently entered into a service agreement which includes regular calibrations to ensure that performance is maintained.



Force calibration principle

For further information visit: www.preciamolen.co.uk