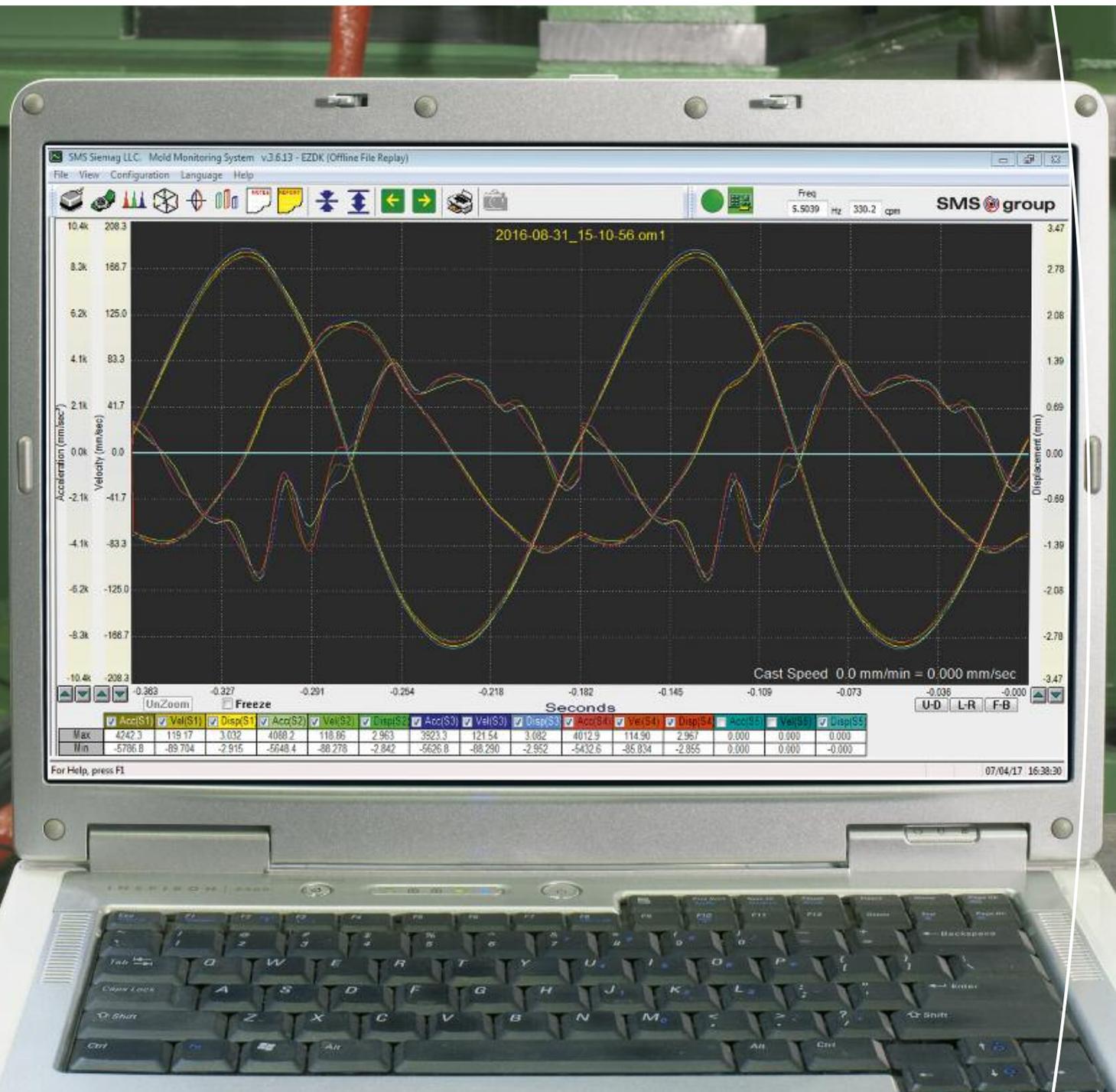


# Mobile Caster Monitoring Service



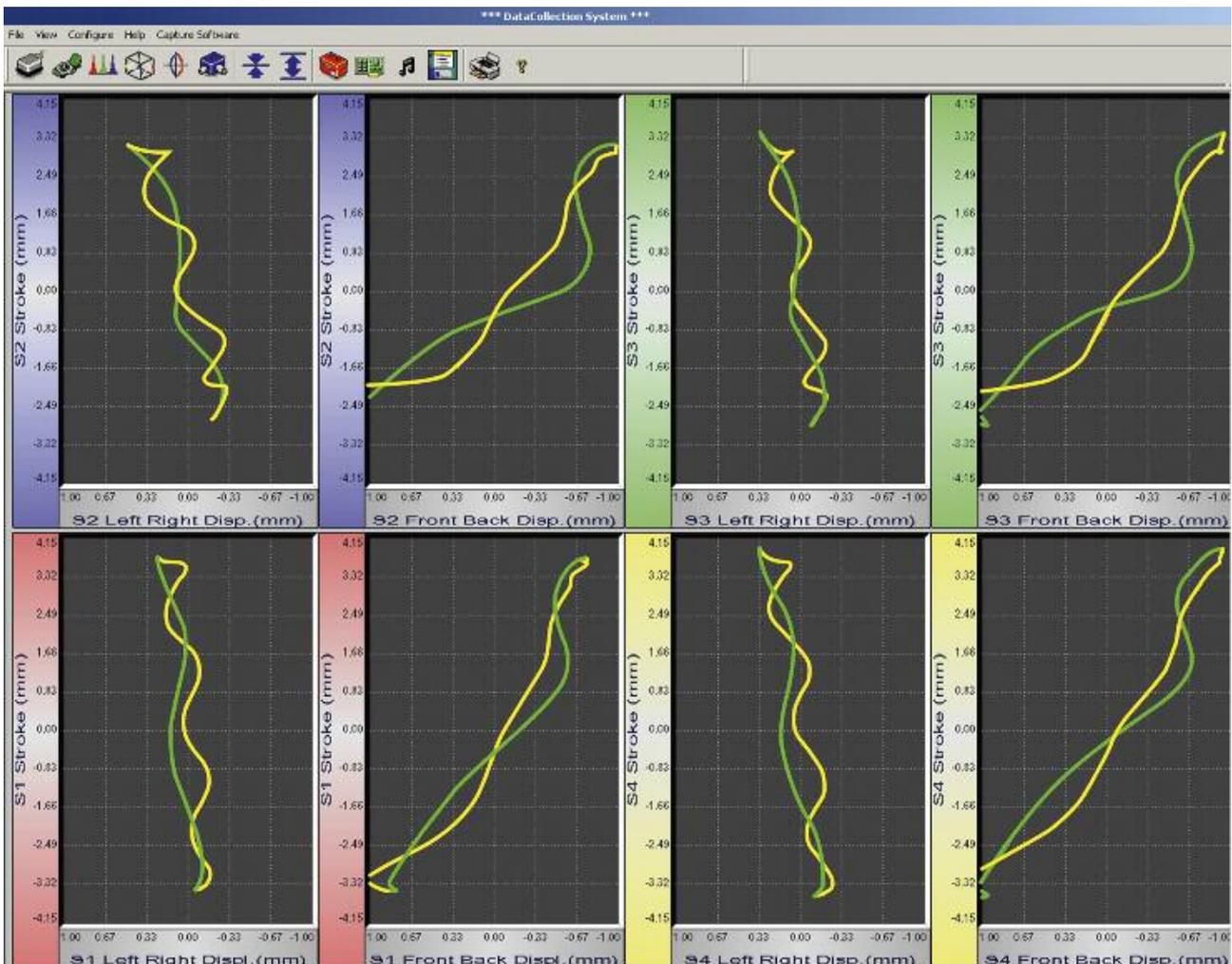
# Mobile Caster Monitoring

In today's world, the requirements for slab surface quality have become increasingly higher and can be compromised as a result of deep oscillation marks, localized stickers or bleeds. Very often the latter two, if severe enough, can result in a breakout. For grades within or close to the peritectic carbon range, oscillation marks can become excessively deep, requiring additional conditioning for subsequent application. Therefore, regular maintenance checks for the condition of the oscillation system make economic sense and ensure good quality during slab-casting production.

The quickest and most cost-effective method for doing this is to use the SMS group Caster Monitoring Service

on a regular basis. This service is available at short notice and requires the visit of one measurement expert together with our specially developed 3D Mobile Caster Condition Monitoring Equipment for half an hour. Since no suitable 3D measurement equipment was available for the high accuracy requirements relating to caster oscillation, SMS group has developed its own system including hardware and software and this has been successfully utilized in casters worldwide since 2002.

The system is very compact, makes use of a standard outdoor notebook and weighs less than 12kg. It is thus possible to utilize the system on all casters at one location.



The Mobile Caster Monitoring Service identifies a tumbling motion of the oscillator within minutes and, as a result, future possible breakouts can be prevented.

## Normal procedure for the Mobile Caster Monitoring Service

The Mobile Caster Monitoring Service procedure consists of a visit to site, normally during a mould change. The 3D sensors are quickly mounted on the caster and removed. The oscillator is then operated in the dry run mode without steel at speeds from very slow in fixed increments up to the highest speed according to the oscillation curve.

During the measurement it is possible to check the validity of the measured values and it is also possible to see any phase problems as well as excessively high acceleration values that may occur. All measured data is recorded on the mobile notebook hard drive and, after the measurement, production can be resumed immediately. Thereafter, the service includes an in-depth analysis of the measured data in order to determine possible causes of instabilities due to wear or oscillator marks on the slabs.

## Oscillator-related defect mechanisms

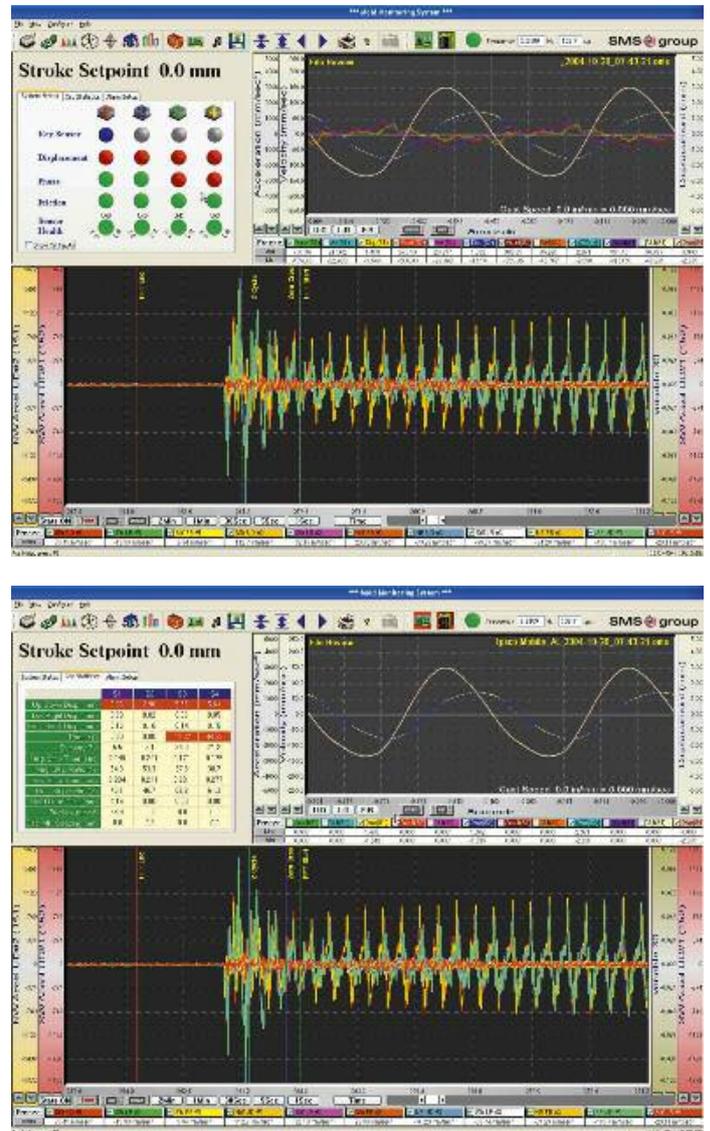
The mobile caster monitoring system can assist in identifying the following oscillator defects:

- Deep oscillation marks
- Mould powder consumption
- Mould friction, sticking and tearing
- Liquid friction
- Solid friction

## Mobile Caster Monitoring Service with oscillator analysis backed by SMS group's metallurgists

The mobile caster monitoring service comes with the OEM Analysis Software Package which is the result of many years of analysis experience on both mechanical and hydraulic oscillation systems.

The overview screenshots of the software indicate the three-dimensional movement of the oscillator table for all four sensors. Additionally, the software automatically calculates parameters like the phase angle and symmetry between the four sensors, further giving an indication of the dynamic stability of the three-dimensional movement of the oscillator table.



Screenshots from typical Mobile Caster Monitoring Service visits showing abnormally high forward and backward movements and phase instabilities.

The second screenshot shows the alarm view indication when displacement tolerances are too high and there is an out-of-phase stability. The beauty of the system is that it is online and within seconds it is possible to see the results and the actual condition of the oscillation system.

### The main advantages of the Mobile Caster Monitoring Service are as follows:

- The ideal service for regularly checking the condition of the oscillator table
- SMS group as an OEM supplier of casting equipment can analyse the recorded data based on its know-how and experience
- This service ensures sustained quality and can determine functionality problems
- This service makes it possible to analyse the causes of oscillator problems
- The service is available at short notice and the analysis takes only a couple of minutes
- The analysis software makes it possible to obtain intermediate results thanks to an online 3D visualization tool

### This service utilizes our Mobile Caster Monitoring System developed in-house

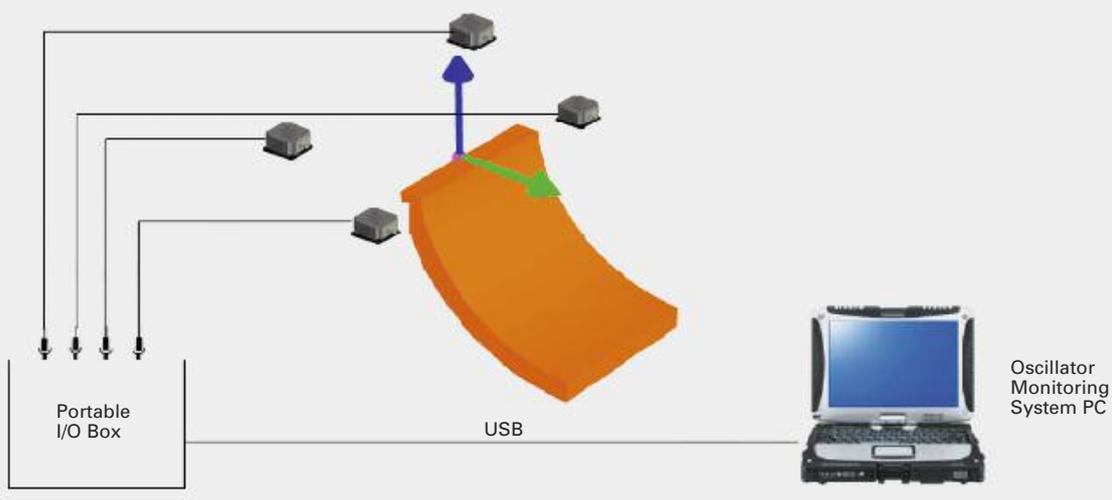
Ten years ago, SMS group developed its own caster monitoring measurement equipment with specially designed three-dimensional vibration sensors. These sensors used in the mobile monitoring equipment consist of tailor-made three-dimensional accelerometers mounted on a magnetic base so that they can be installed quickly and securely to ensure accurate measurement results. The sensitivity of the measurement is specially adapted to the application of measuring the three-dimensional movement of a caster oscillator table and thus makes it possible to pick up tumbling motion at a very early stage. This specially developed Caster Oscillation Monitoring System can also be purchased by customers directly either as a fixed, permanently installed sensor system or as a mobile monitoring package that can be utilized for more than one caster at the same location.



Magnetic mount style



The Mobile Caster Monitoring Service utilizes very light and compact measurement equipment made and developed by SMS group.



The Mobile Caster Monitoring Service consists of four 3D vibration sensors with a mobile analogue-to-digital conversion kit linked via USB to a notebook with OEM SMS group analysis software for immediate condition indication.

# Selected references

AK Steel	Butler Works, Mansfield Works, USA
Arcelor Mittal	Coatesville, Indiana Harbor, Weirton, USA
ArcelorMittal Asturias	Avilès, Spain
DEW Deutsche Edelstahlwerke	Witten, Germany
Evrast	Claymont, USA
Gallatin Steel	USA
SDI	Columbia City, USA
Severstal	Dearborn, Warren, Wheeling Pittsburgh, USA
SSAB	Iowa, Mobile, USA
SSAB	Oxelösund, Sweden
TATA Steel Limited Kalinganagar	Jajpur, India
TMK Ipsco	Koppel, USA
USS	Gary Works, Hamilton Works, 2 units Great Lakes, USA
EZ DK	Alexandria, Egypt
MMK	Russia
HKM	Germany

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