

Indonesian tire producers select Sigmavision's Online Extrusion Profilometer

Indonesian tire producers PT Gajah Tunggal Tbk and PT Multistrada Arah Sarana Tbk recently selected Sigmavision Ltd to supply Online Extrusion Profilometers for their plants near Jakarta, Indonesia.

The measurement applications on two extrusion lines at Multistrada and on one line at Gajah Tunggal required Online Profilometers to be positioned close to the extruder die where the product temperature is 95°-100°C. Until recently operators had to cut samples from the line and use hand held gauges or offline profilometers to measure key dimensions in order to control the extrusion process. For both tire producers the drive to use online measurement is to eliminate manual measurements and improve control over tread dimensional accuracy thereby reducing scrap and raw material consumption.

The Online Profilometers supplied to both clients each consist of a frame that supports laser sheet of light sensors and a controller unit with TFT display, system software and graphical user interface. One advantage of Sigmavision's Online Profilometer is its modular construction that allows the system's horizontal field of view to be tailored to the maximum extrusion width. This in turn determines the number of laser sensors required. In the case of Gajah Tunggal the maximum tread width is 350mm and requires six laser sensors, three above and three below the line. For Multistrada dual extrusion dies are often used for sidewalls which increases the maximum horizontal field of view to 600mm. For these systems eight sensors are needed, four above and four below the line.

To operate close to the extruder and in hot conditions the frame and sensors require cooling using compressed air or a fan that circulates air through the sensor housings. Air exits these housings through viewing ports located by the sensor lenses. The stream of air therefore acts as an air knife to ensure debris cannot settle and the lenses are kept clean.



1) Frame mounted on the extrusion line



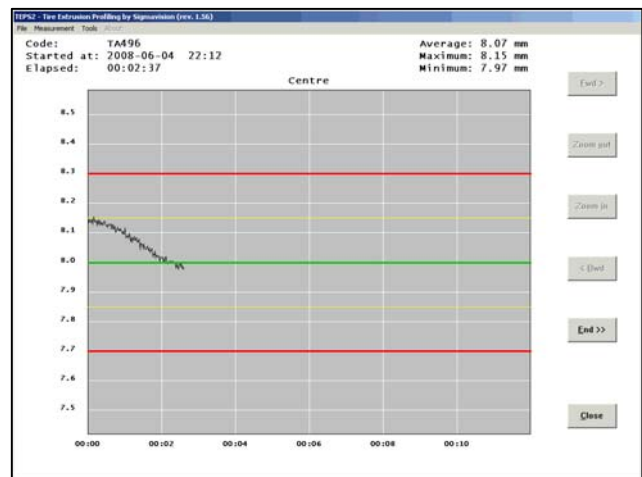
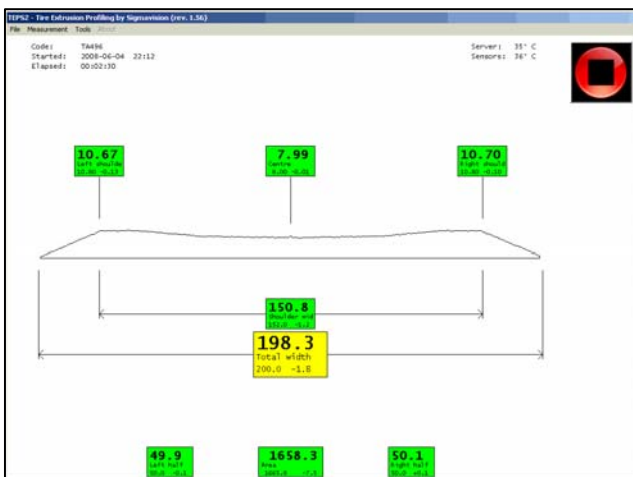
2) Operator station

Case study Online tread extrusion profiling



The operator station for each system is positioned close to the extruder line and houses the power supply, data acquisition hardware and system IPC. The Tread Extrusion Profiling System (TEPS) software application running on the IPC employs dedicated algorithms to filter and average data to remove erroneous measurements and improve measurement accuracy and repeatability. The software then assembles the images from each laser sensor and constructs a cross sectional profile of the entire tread at 100Hz and to an accuracy of <0.1mm (vertical) x <0.25mm (horizontal). The measured profile is then compared to a pre-programmed template in real time and deviations reported on the graphical user interface.

The user interface is configured to provide operators with real time measurements of key tread dimensions including total width, shoulder to shoulder (hump) width, left and right shoulder gauges and crown gauge. Up to 30 user defined width measurements and 15 thickness measurements may also be added when defining a measurement template along with other optional features including dual profile measurement, tread symmetry and die mark / die cut detection. Statistical reports may be generated after a production shift and a product library of >500 templates may be stored. The operator display and a typical summary report are illustrated below where colour coded warning and error alarms indicate deviations from the manufacturing tolerances:



3) Operator display

4) Measurement trend report

Both customers are now discussing further process control improvements using Sigmavision's Online Profilometers including interfacing to paint marking systems and closed loop control of the extruder.

The Online Extrusion Profilometer from Sigmavision is one in a range of cost saving, online laser systems for rubber and tyre manufacturing including calendered sheet width, thickness and length measurement, extrusion profiling, TBM splice control and green tire runout measurement. For more information please contact Dr Andrew Pryce at:

Sigmavision Ltd
CIE, Begbroke Science Park,
Yarnton, Oxon OX5 1PF, UK

Tel: +44 (0)1865 854820
Email: andy.pryce@sigmavision.com
Web: www.sigmavision.com