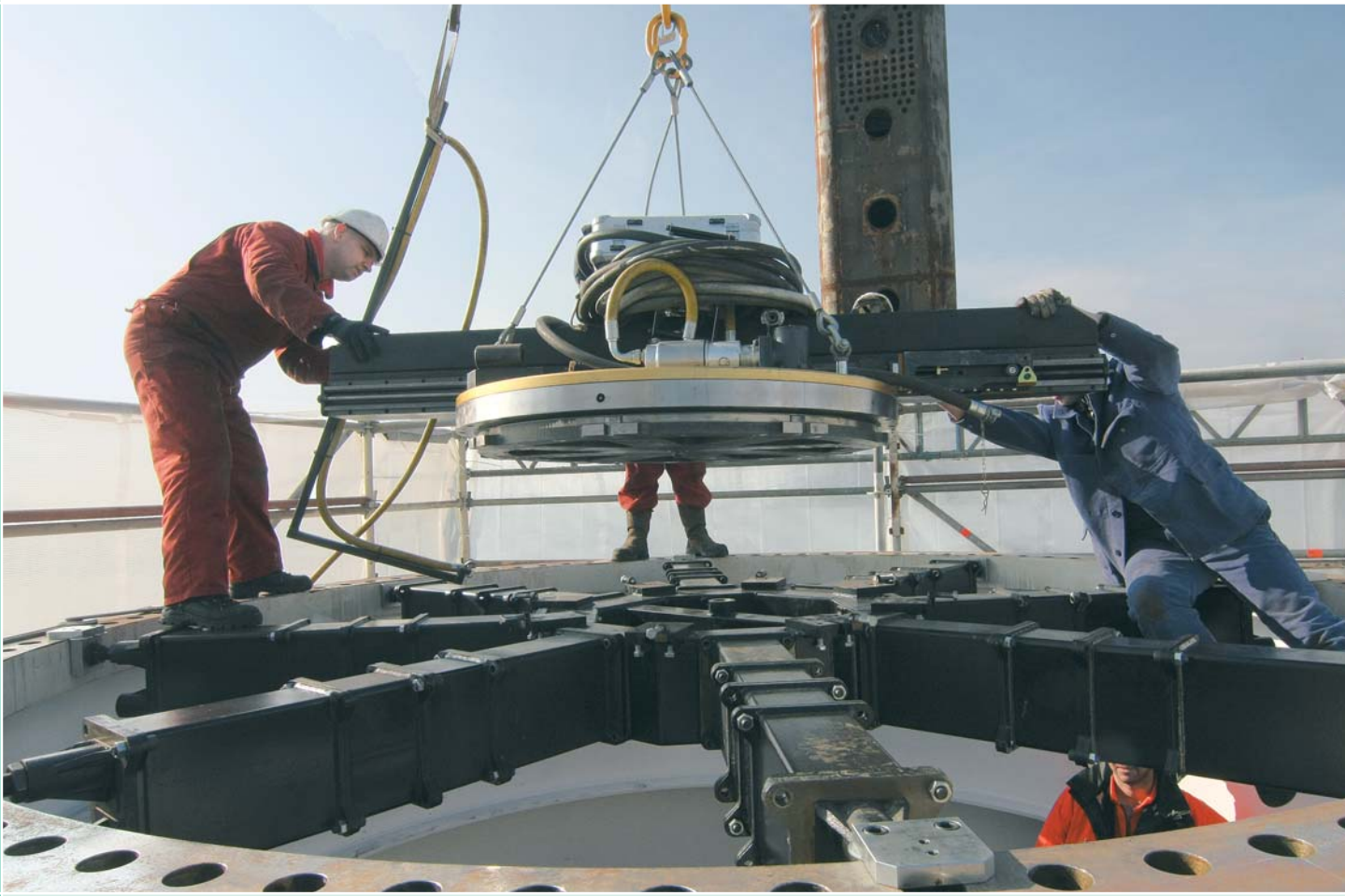
Laser Measurement Technology in the Windpower Industry



Status Pro has introduced a revolutionary new measurement system for flange measurement and component alignment in the wind power industry.

The unit combines the ease of use of a self leveling sweep laser T330 together with precision laser sensors R310.

The result is you have a very ease to handle measurement system which can rapidly produce precise results.

Status Pro
maschinenmesstechnik

The System components:

R310 BT

DU310

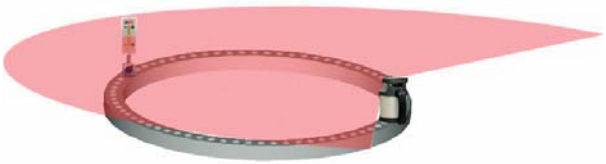
T330 Laser

The T330 Laser comprises of a sturdy housing which provides the mounting for a rotating, moveable Laser assembly head. The Laser can be controlled using the R310 Receiver and Infra-red, if required. The setting up of the Laser plane follows fully automatically. The R310 Receiver, with its 80mm measuring range displays the Laser values per LED and also transmits these values to the Display Unit in real-time. Data is transmitted from the R310 to the Display Unit via Blue-Tooth – no annoying cables on the site!
The R310 is available with an aluminium or a synthetic based plastic housing. Power supply for the R310 receiver and the T330 Laser is supplied using either batteries, rechargeable cells or using the supplied mains cable. Various mounting brackets and tripods are available.

A short film displaying the System "in action" can be viewed using the following link:
http://www.statuspro.com/index.php?catid=106.

Measuring flanges using a Laser

Flanges are essentially joint components and as such, they must be fabricated accordingly. This is a must if, for example, gaskets are to seal properly, or the joints are to be free of tension after assembly. Achieving perfect geometrical results, especially in the fabricating of tower sections is not an easy task; tension occurs throughout the welding process, which can lead to an uneven flange surface and ultimately to a less than satisfactory joint result. Being able to measure and react to these imperfections means being able to ensure a long and trouble free service life of the joint.
Up to date, measurements were made using straight-edges and feeler gauges. This method loses practicability with increasing flange diameter. As measurements with straight edges can only be carried out in "segments" of the flange, the results are displayed as short waviness and not of the flange as a whole.
A new method had to be found!



When using a Laser plane (rotating laser) it becomes possible to measure the whole flange against this reference plane. To enable this, the Laser is mounted on or next to the flange. The Laser projects the plane over the flange and through using the R310 Receiver, the distance between flange surface and Laser plane can be quickly measured and documented.

Various procedures can be used:

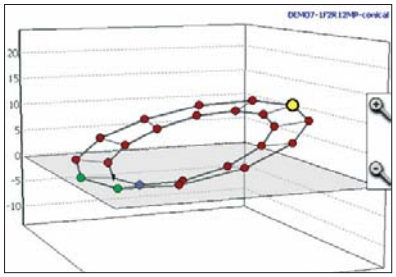
1. The Laser plane is set up using 3 points on the flange, in other words parallel to the flange
   – this method is time consuming and the result depends on which points are chosen
2. The laser plane is set up at an angle to the flange
   – this is much quicker but on the other hand, calculations are necessary to achieve correct results. Modern measurement systems achieve this on-site in real time whereas older systems require a separate PC.

Measurement preparations

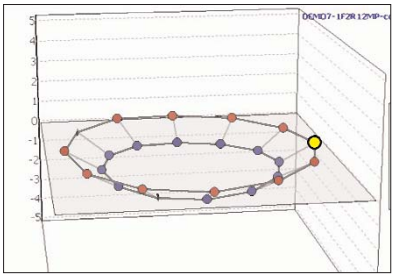
Status Pro endeavours to develop systems that are precise, quick and at the same time easy to use. To that end we usually use the second method and evaluate the results immediately.

Just place the Laser on the flange as shown and measure with the R310.. the order in which the points are to be measured can be freely chosen. A flange with 104 measurement points can be measured in around 25 minutes (including set-up).
The result is available 2D or 3D as preferred by the user.

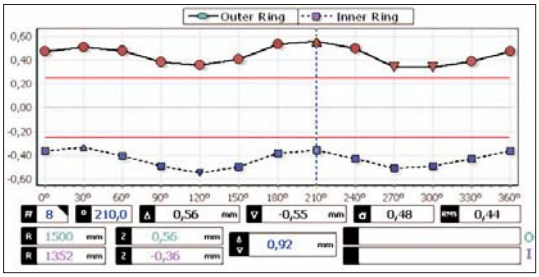
Results



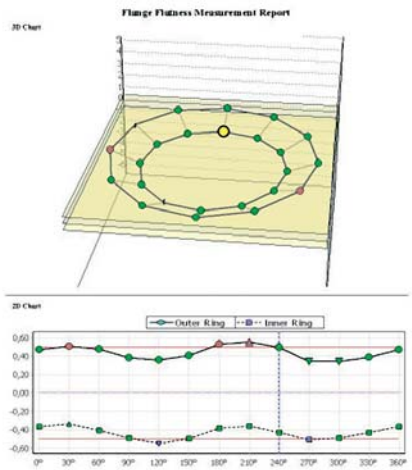
Raw-data

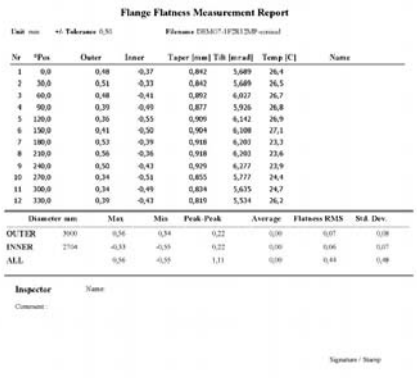


The same measurement „averaged"



2D view





A clear, easy to understand report in pdf. form is generated automatically. If required, the results can be exported into an existing Excel file or protocol, enabling comfortable evaluation at will.

If a problem arises during a measurement due to a burr or similar surface irregularity, the point can be freely edited.

Measurement of parallelism

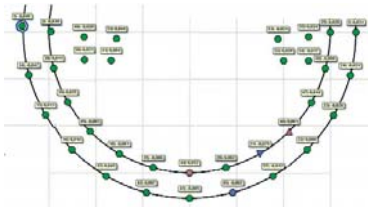
A further highlight: the system can be expanded to enable measurement of flange parallelism.
A second Receiver/Sensor is needed to achieve this; but when equipped, you are able to measure two flanges directly to each other in respect to parallelism. Report and documentation as with flatness.

Foundation measurement

As well as being able to measure „flanges“ the equipment can be used from the very start, to measure the foundations. A self-levelling function is incorporated into the T330 Laser (<0,025mm/m) enabling an exact nivellement of the foundation points.
Simply press the “level” button and the use the R310 Receiver to measure the points against the laser plane. The values are directly visible, the PC is unnecessary. Straight edges and spirit-levels are a thing of the past!

Measurement of the Axis

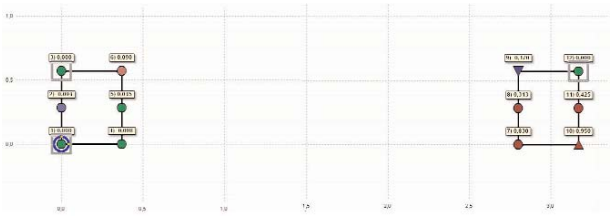
The axes as well as the blade flanges can be measured in the same way. The flanges can be measured against each other, and if necessary be improved , avoiding tension during assembly.



Head Assembly

Thanks to the intuitive software, more complex arrangements can also be measured.
The picture shows the measurement of a rotor head asembly.

Baseframe measurements



Base frames are also welded constructions and are prone to distortion through the heat process. With the system we are able to measure and document all the mounting surfaces and consoles to each other in respect to flatness (Motor consoles, Gearbox consoles etc.). Ease of assembly and a long service life are assured when the base frame is flat and even.

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