SUCCESS STORY

PRÜFTECHNIK

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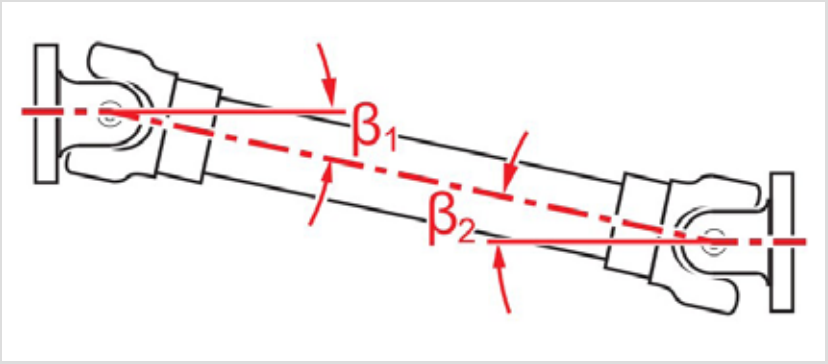
Industry > Manufacturing Application > Shaft alignment

CARDAN SHAFT MEASUREMENT IN CONFINED SPACES

At their site in Wilnsdorf, Germany, Winter Grün Makiertechnologie GmbH produces special machines for road marking. Trucks are also fitted with special installations and equipped according to customer requirements.

One of these special installations is a Unimog which is fitted with a high pressure water pump made by Hammelmann. With the help of highly specialized spraying tools, the water pressure of up to 2500 bar generated by this pump is used to remove rubber abrasion from runways at airports, to establish a defined traction on roadway surfaces or to remove roadway markings.

Unimog platform with the driver's cab raised. The high pressure pump is visible at the rear. (yellow housing)

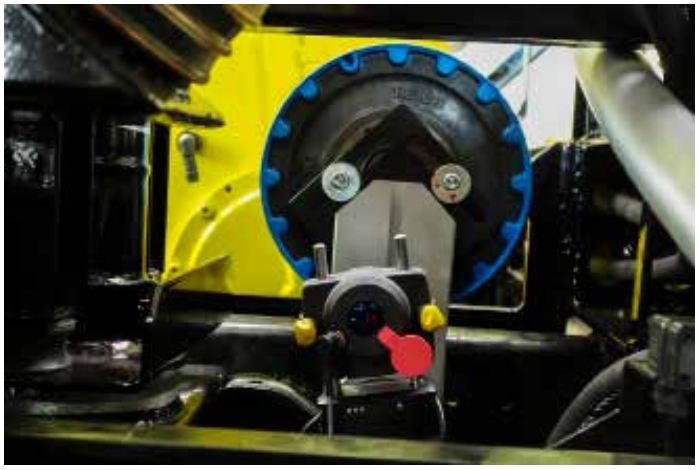


Objective of the alignment: Deflection angle $ß_1 = ß_2$

A cardan shaft is guided to the high pressure pump on the gearbox output side. This shaft then drives the high pressure pump depending on the speed.

Cardan shafts must only absorb minimal angular offsets! The deflection angle **ß** must be the same at both universal joints of the cardan shaft.

Laser set-up on the gearbox output shaft. The laser has already been set up to record the measurement values.

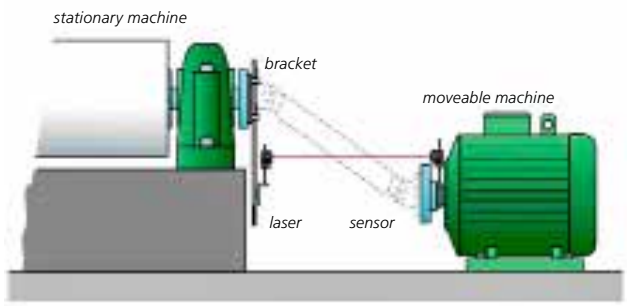


Receiver on the high pressure pump. The sensor head is mounted on a rotating bracket. Only the angular error is measured.

Output side of the gearbox for the auxiliary drive. The cramped conditions are clearly visible.

There are two methods for measuring the cardan shaft: one with the cardan shaft disassembled and one with the cardan shaft in place (in-situ).

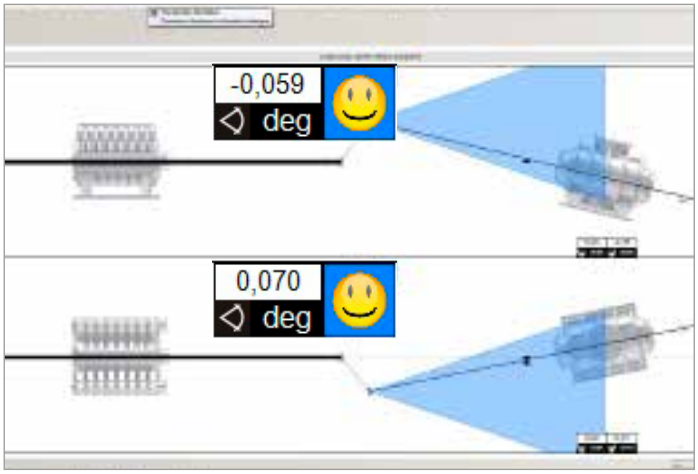
The first measurement check showed that measurement with the cardan shaft in place is not possible as the spatial conditions simply do not allow for the cardan shaft rotation bracket to be mounted and be rotated.
The measuring procedure involving the disassembly of the cardan shaft was thus the only option available. Removal of the cardan shaft in this configuration is done very quickly. The possibility of straightforward disassembly of multiple components was taken into account during Winter-Grün's design phase.



Standard illustration of a cardan shaft measurement showing the laser mounted on a rotating bracket on one side and the sensor on the motor shaft on the opposite side. Laser with holder and on the opposite side of the receiver, mounted on the motor shaft.

The laser is now positioned centrally on the gearbox output side. In this regard the laser must be placed exactly in the gap of the assembly so that the laser can map out a measuring angle of 90°. A smaller rotation range would be possible but this would significantly impair the accuracy of the measurement.

The Intelli-Point measuring procedure patented by PRUFTECHNIK is used to conduct the measurements. In this context, the laser and receiver (sensor) can not be mounted facing each other. An angle display with an additional pointer shows the congruence of the sensor and also checks whether the relative angular difference always remains the same.



Measurement results overview. The maximum alignment error is 0.2°. The unit is within the specified tolerances.

All measurements are repeated in order to rule out potential measurement errors. The measurement values are compared against each other using the measurement table. The measurement values are checked for potential discrepancies by means of quality analysis.

Conclusion:
Mr. Stefan Weigel of Winter-Grün, the initiator of the project is very satisfied with the results. Using this measuring procedure it is now very easy to measure potential errors or excessive strain on the body on-site and in a very straightforward manner. Subsequent corrections can also be carried out. The focus is now shifting towards even more demanding projects involving large trucks and new applications.

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