

# Measuring Dynamic Movement

## Absolute Movement

### Absolute Movement

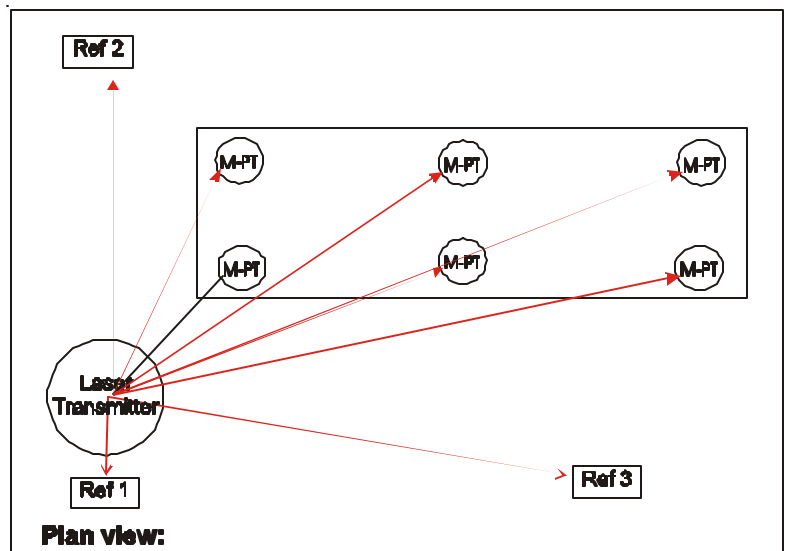
- ⊕ The actual dynamic change from unaffected benchmarks in an area.
- ⊕ Benchmarks usually form a plane of reference.
- ⊕ Building columns are often used.
- ⊕ Measurements are taken on the machine casing and show movement from the reference plane.
- ⊕ Could be used to identify casing distortions or movement of a standard during start up.

### The Process

- ⊕ The laser transmitter sweeps a flat horizontal plane.
- ⊕ A laser receiver measures the position of the laser within a 20mm aperture.
- ⊕ Measurement points are established on the machine casing.
- ⊕ Reference points are established in an unaffected area.
- ⊕ The laser transmitter is set up to the external references to establish a plane of reference.
- ⊕ Off-line measurements are taken at the measurement points.
- ⊕ Measurements are taken with then machine in operation.
- ⊕ The differences represent the absolute movement.



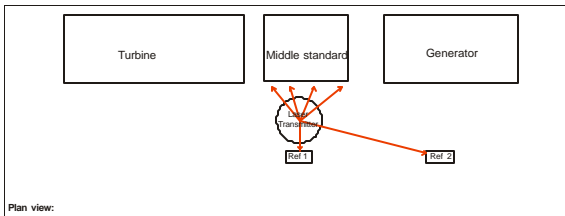
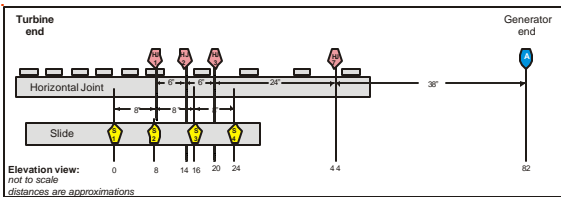
The laser transmitter sweeps a flat plane.



# Absolute Dynamic Movement

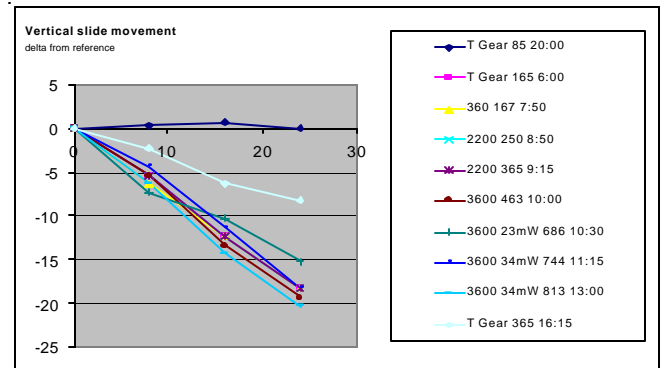
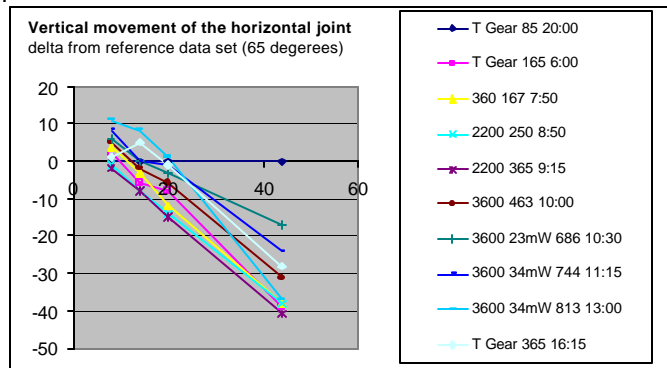
## Absolute Dynamic Movement Example

- ⊕ Power utility is experiencing repeated bearing failure on middle standard.
- ⊕ The problem started when the plant from continuous operation to daily cycling.
- ⊕ Suspected problem was dynamic movement between slide mechanism and the standard.
- ⊕ A line of reference was established on building columns.
- ⊕ Measurements were taken on the horizontal joint and at the slide below it.



## Absolute Dynamic Movement Findings

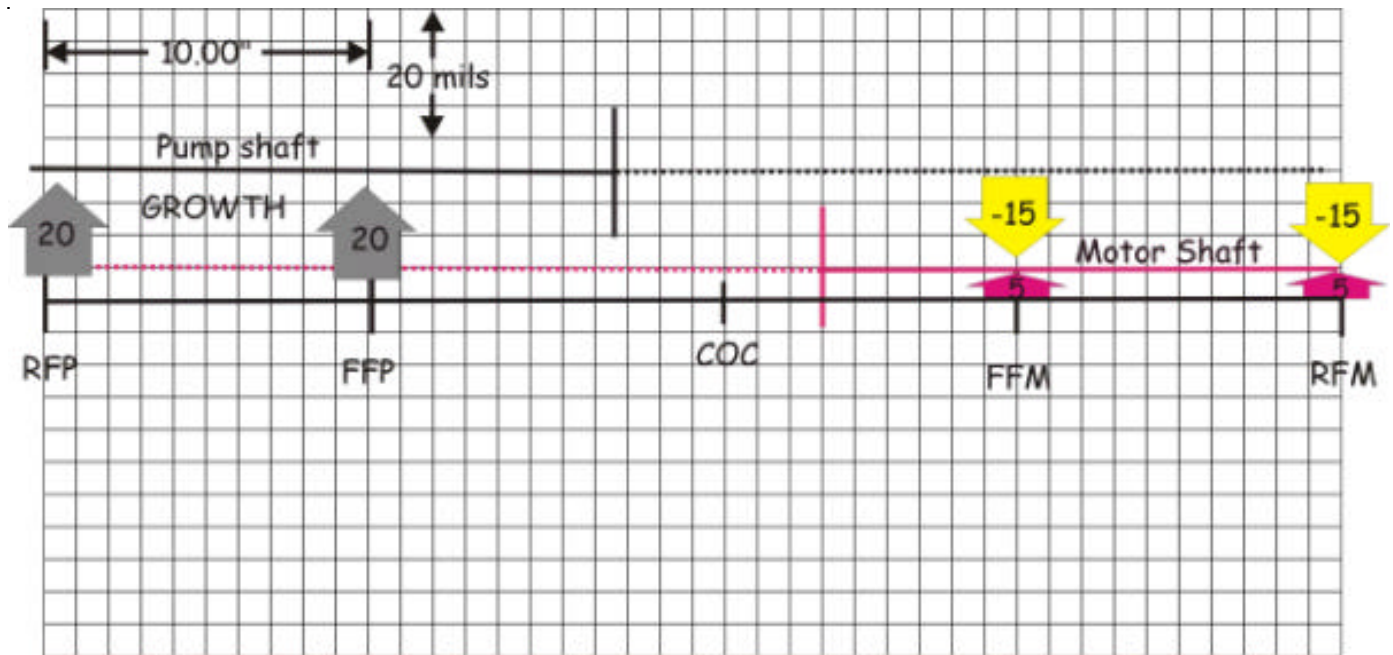
- ⊕ The horizontal joint and the slide were dynamically moving in a like way (vertical axis).
- ⊕ The slide was not working properly.
- ⊕ The entire pedestal was "tipping" as the turbine rotor expanded and contracted.



# Relative Dynamic Movement (OL2R)

## Relative Movement in Shaft Alignment

- ⊕ Relative movement is the dynamic movement two lines with respect to one another.
- ⊕ A motor shaft driving a pump shaft may have different thermal growth characteristics.
- ⊕ Therefore, it may be appropriate to purposely misalign the two shafts at an ambient state.
- ⊕ The absolute change may not be important, only the relational change.



The relative change at the motor is -15 (.015").

## How has Relative Movement Been Measured?

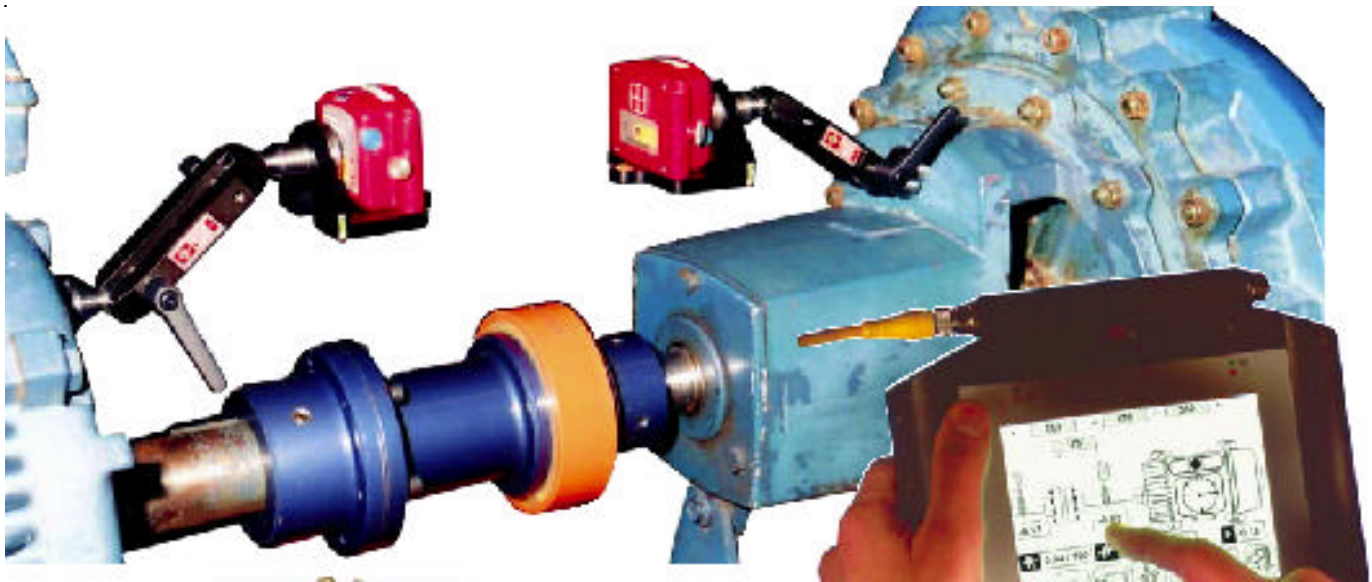
- ⊕ Manufacturer's calculations
- ⊕ Hot Checks.
- ⊕ Optics.
- ⊕ Special laser Systems.



# What New in Relative Movement Measurement?

## New OL2R Brackets (patent pending)

- ⊕ Uses an our standard laser shaft alignment system.
- ⊕ Affixed to machine casings, the brackets rotate creating independent shaft center lines.
- ⊕ The two bracket center lines are compared off-line and then again with the machine on-line.
- ⊕ The change of the two independent shafts determine the relative change of the machine shafts.



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