CMD

QUADREX Q_dx4

Full Scale Test Bench

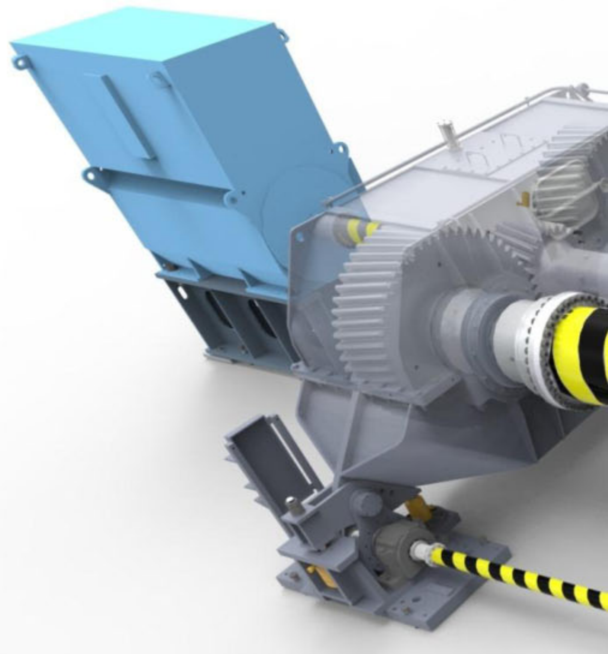
Full scale test bench

Application

Test an innovative drive to share power from a pinion to two wheels. Robustness and reliability are demonstrated for intensive uses. Quadrex QdX4 uses this technology to drive process up to 30MW power.

Technical data

Back-to-back principle is used on the test bench. This allows a high kinematic power compared to the motor power. Torque is managed by a specific coupling in house designed and made A specific system inputs pitch error into the kinematic and thus artificially introduces real working conditions.



Power

Motor power	1000kW
Variable speed	0 – 1250rpm
Max starting torque	20000N.m
Input torque range	up to 450000N.m

Lubrication

Lubricant	ISO VG 320cSt
Variable oil flow	180 - 360l/min
Heat exchanger	210kW
Filtration	25µm

Temperature PLC regulation with a double exchange (oil/water and water/air)

Data acquisition

3 torque
2 pinion bending stress
7 tooth root stress
2 orbital motion
2 pitch error measurements
100 input channels for global parameters (temperatures, flow, pressure, displacements, vibrations, etc)
Synchronized sampling rate 1000Hz

Key figures

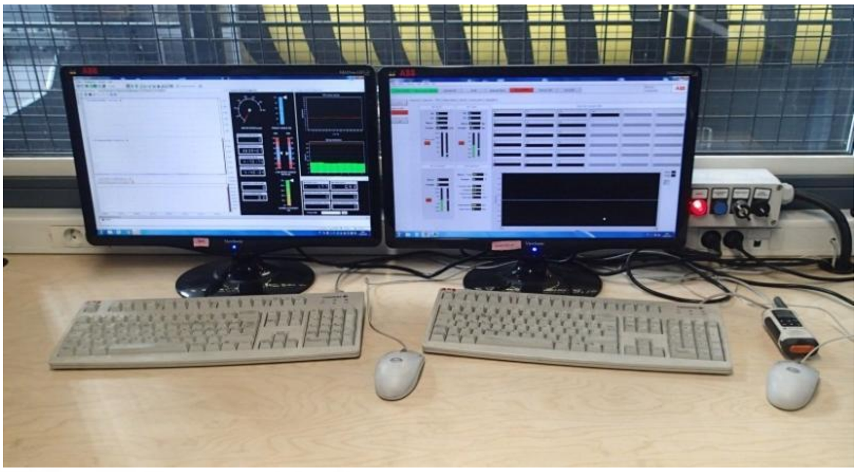
Project start in September 2011
1st test in April 2014
Global investment 2.2M€
Working hours 7 500h
600 cumulated hours of test (3 x10^6 cycles)

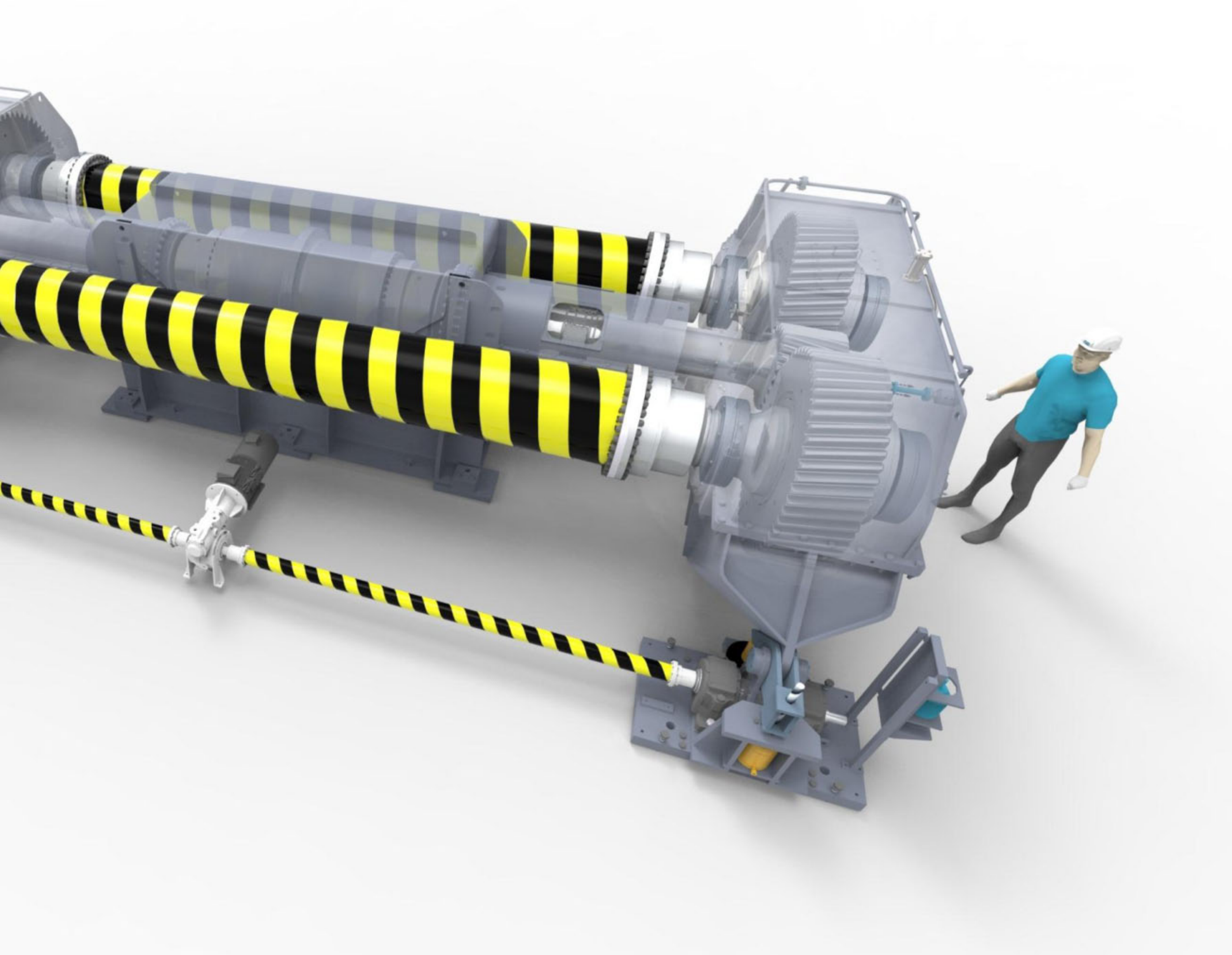
Test Data Example

Input parameters

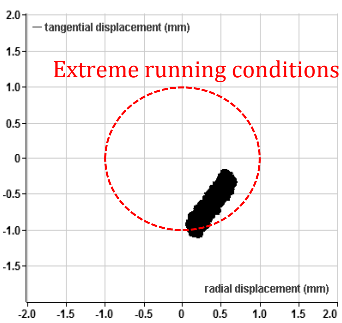
Power	12 000kW
Motor speed	330rpm
Torque	347 000N.m

Pitch error **4x** working range 11m process

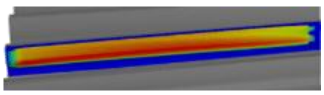




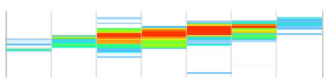
Pinion displacement



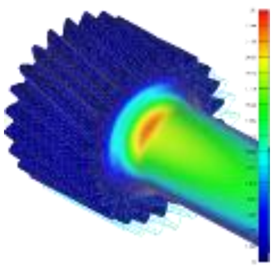
Tooth calculation



Tooth root measurement

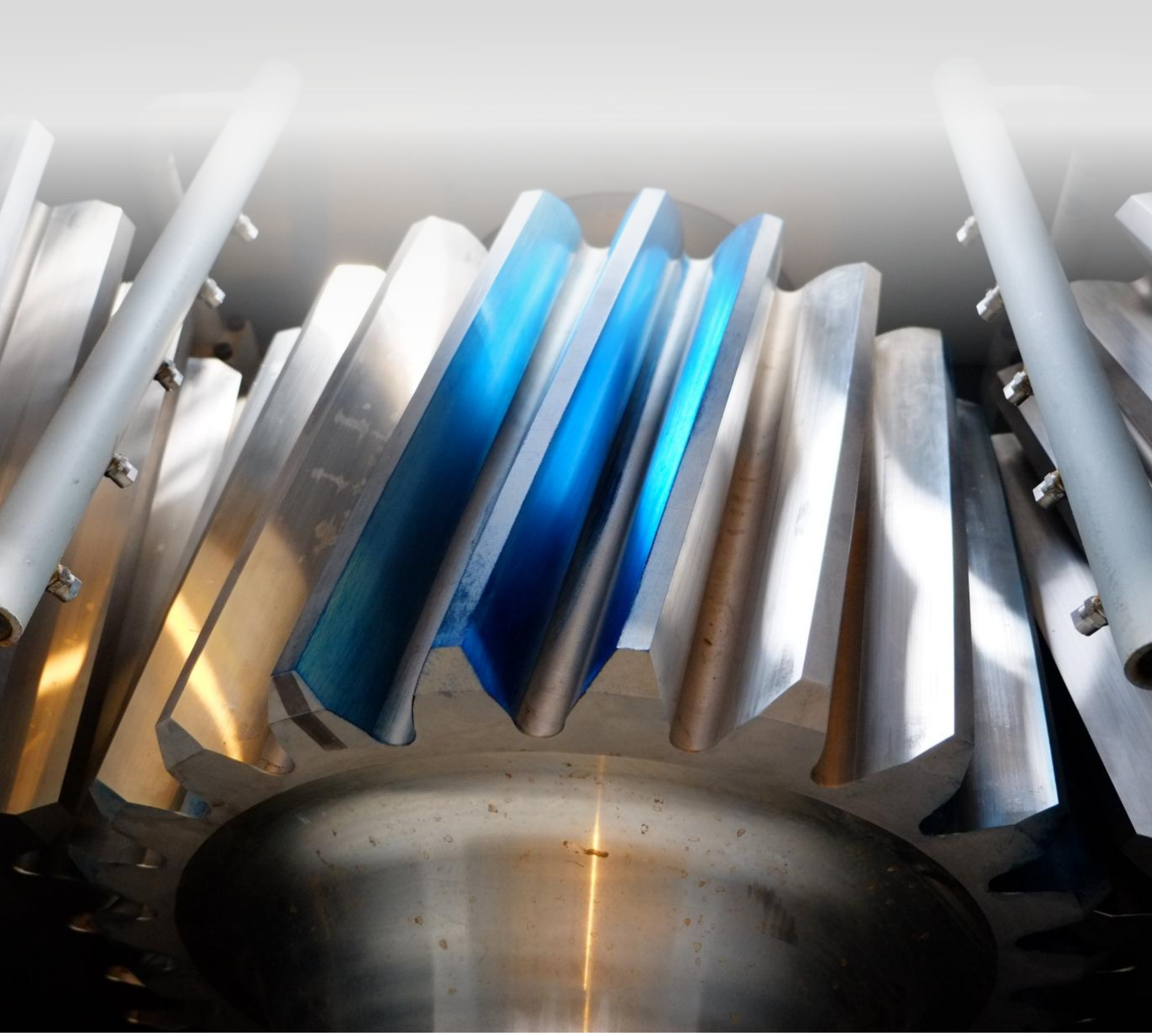


Bending calculation



Results

Global efficiency	99.3%
Unbalanced power	2%
Pinion bending stress	30MPa
Total pinion displacement	1.1mm
Distribution load on tooth	$K_{H\beta} = 1.2$



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