



## **RACO electric actuators application in steel water construction - Weir flap actuation by means of electric cylinder with two integrated load measuring pins at the pivot pin reception.**

After the flood event on the Pfinz in the year 2016 deformations were detected at the weir system. During an examination of the building a very bad condition of the weir flap was determined. A repair of the weir flap was not possible because of the significantly higher requirements of the current instructions. So the old one-piece weir flap was replaced by 2 new flaps and a pillar in the middle of the weir. The advantage of the construction with two flaps is the more precise regulation of the level and in case of failure of a weir field - e.g. during a revision – the water level can be regulated with the second flap and the floodwater can be drained off.



Already during the project planning phase the company RACO has developed a concept for the drive engineering which included also the control of the electric cylinders. The two weir gates of the Stuhlmüllerwehr in the Pfinz-valley were designed as one-side driven so-called fish belly flaps.

The electric cylinder lifts and lowers the damper flap mounted on the bottom to the desired damming height in a precisely controllable manner. The electric cylinders are characterised by the very good connection to the control systems and they are also particularly eco-friendly because they are not operated with hydraulic oil as a medium. A contamination due to an oil leakage is thus excluded.



A built-in holding brake locks the RACO electric cylinders securely in their particular positions and thus also offers protection in the event of a power failure. In an emergency, a manual drive can be adapted for manual operation. According to the requirements of DIN 19704, the main drive/motor is automatically electrically blocked when the manual drive is activated. For manual operation of a weir flap, RACO also supplies a plug-in gear with self-locking handwheel, which can be flange-mounted to the motor shaft end behind the brake housing. Thus a mechanical brake release of the electric cylinder is inevitable.

The built-in electric cylinders of the RACO company type K1P11 realize a dynamic actuating force of 250,000 kN, hold 3 times the static load and have a maximum stroke of 2800 mm. The connection is made by means of gimbals suspension to the foundations.

Two load measuring pins for measuring the shear and tensile forces in the force flow are integrated in each of the locating pins of the gimbal mounting. With these load measuring pins it is possible to monitor the reaction forces or load distribution on the two bearing points and thus prevent an overload of the system. The force measuring device in thin-film technology is specially designed for the RACO electric cylinder and is suitable for measuring static and dynamic tensile and compressive forces. It is characterized by its high measuring accuracy. This is 2% of the measured value, i.e. for 10 tons there is a deviation of only 20kg! Thus the occurring force proportional tensile and compressive forces are reliably and precisely detected, even with fluctuating ambient temperatures.

The electric cylinders are equipped with high-precision RACO position sensors (type EPS), which, in addition to the properties of an absolute encoder, also provide an analog signal (4-20mA) as actual position value to the controller. The trendsetting technology from RACO enables the extension to the RACOMATIC®.

### **This makes your electric cylinder smart.**

With the **parametrization and diagnostic software** including RACOMATIC® Tool for Microsoft Windows, implementing and functional testing of your RACOMATIC® electric cylinder is made easy. The software makes it possible, for example, to set speeds and target positions and to define acceleration and deceleration ramps. To protect the mechanics of your plant, limit values such as maximum forces can be defined and an automatic overload cut-off can be programmed for emergencies.



**Would you like to learn more about our products? We will be happy to advise you.**

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