

DAMPERS FOR CABLE STAYED BRIDGES – PROTECT YOUR STAY CABLES

With the increasing length of cable stayed bridges, efficient dampers are more and more required to prevent vibrations of the cable stays and stabilizing the bridge girder. Dellner Dampers have developed efficient viscous dampers (also called hydraulic dampers) to solve this problem. In co-operation with our customers, we supply customised solutions for each bridge.

WHY USE THE VISCOUS DAMPER FROM DELLNER?

The purpose of the cable damper is to reduce loads during vibrations of a cable and provide damping that will protect the stay cable and structure from fatigue damage. The advantage of using Dellner viscous dampers compared to other damping technologies, e.g. friction and rubber dampers, is that they start to work at very low amplitude vibrations without any threshold effect that can be seen on friction and rubber type dampers. Viscous dampers are efficient over the whole spectrum, from low to high amplitude vibrations. The damping of small vibrations is especially important to reduce the fatigue and improve the endurance of the cables.

With the increasing length of cables it is apparent that vibrations can occur. The trigger for vibrations can be traffic load and weather conditions. Weather conditions are often the main reason, such as a combination of wind and rain or snow that creates vortex around the cables that initiate the vibrations. It is important that the dampers have the correct tuning so the response force is optimal to damp out the vibrations quickly. All Dellner stay cable dampers are tuned to match each individual bridge – Dellner Dampers always supplies a 100% customised solution to your bridge project.

WORKING PRINCIPLE OF THE DAMPERS

The damper is a twin tube viscous telescopic damper. The required damping force is generated by viscous losses when oil is being forced through a calibrated flow restriction and transforms the vibration energy into heat that is then dissipated. All of our cable dampers provide equal damping forces in both directions (compression and extension). The inner cylinder contains only oil while the reservoir between the housing and the cylinder contains oil and air.



Cross section showing the working principle of the Dellner Dampers Stay Cable dampers.



Our dampers range from very short to extra long

YOU DECIDE - THE DAMPER WE SUPPLY IS ADAPTED TO YOUR DEMANDS

With experience we have learned that every bridge project is unique and the demands can vary. Factors that will influence what we supply can be:

- Your type of damping system, an internal or external damping system – According to this we adapt the damper diameter, length and stroke to fit your system. Also level of corrosion protection is influenced. Dampers in an internal damping system have a less challenging environment compared to the external system where the dampers are fully exposed to harsh environment.
- Required corrosion protection level – We can deliver powder coating or epoxy coating to marine standard ISO EN 12944 C5M. The type of the piston rod material is also chosen with regards to demands on corrosion resistance.
- Your ways of mounting the dampers – The bearings will be adapted to fit your system.
- The required size of the damper – Damper lengths from 355 mm up to 4.5 m.
- Damping characteristics are always adapted to your bridge.

LONG LASTING LIFETIME

With combined experience and testing Dellner Dampers have developed dampers with long lasting lifetime, >20-30 years with correct maintenance. Our experience is based on more than 20 bridge projects all around the world and the dampers have been subjected to fatigue, corrosion and extreme temperature tests.

- Fatigue tests. Typically a 2 million cycles test where no significant change in maximum or minimum load of the damper could be registered.
- Corrosion test. Typically a 500h accelerated corrosion test, carried out on both our powder and epoxy coated dampers.
- Extreme temperature tests. The operational function of the dampers have also been tested at different temperatures from -40°C to +60°C.

All the tests above may be adapted to your needs if your bridge project requires testing of the dampers prior to the delivery.

QUALITY

Dellner Dampers are working according to EN ISO 9001 and we have a welding certificate EN-15085. Before delivery, all dampers are individually tested to ensure they fulfil the stipulated damping characteristics as per your specification and the result is recorded in a force-displacement diagram. The diagram is stored at Dellner Dampers.

TRUSTED SUPPLIER TO ALL MAJOR STAY CABLE SYSTEM MANUFACTURERS

Our viscous dampers are used by well-known suppliers of stay cable systems at locations worldwide. Ask for our reference list if you would like to know about the projects we have already supplied to.



The Rion-Antirion Bridge in Greece is one of more than 20 bridges where we supplied Stay Cable Dampers

(The Rion-Antirion stay cable system is supplied by Fressinet)

Type	Diameter with dust cover	Diameter without dust cover	Max forces	Damping characteristic without blow off $v_{max}=0.1$ m/s	Blow off	Damping characteristic with blow off
45	80 mm	70 mm	12 kN	5 - 120 kN / m / s	2 - 12 kN	20 - 250 kN/m/s
62	95 / 102 mm	89 mm	30 kN	5 - 300 kN / m / s	2 - 30 kN	20 - 4000 kN/m/s
62 HD	102 mm	95 mm	45 kN	5 - 450 kN / m / s	2 - 45 kN	20 - 8000 kN/m/s
80	120 mm	108 mm	55 kN	10 - 550 kN / m / s	4 - 55 kN	10 - 10 000 kN/m/s
80 HD	120 mm	108 mm	100 kN	10 - 1000 kN / m / s	10 - 100 kN	10 - 10 000 kN/m/s

*No lengths of the dampers have been stated in the table since they depend on the required stroke length.

If the above doesn't suit your needs – don't worry – just ask us