

ANMELDUNG | SCHUTZ | VERWERTUNG



## Focus Sectors

- Civil engineering & Architecture
- Bridge construction

## Project Key Words

- Suspension bridge
- Wind-induced vibration
- Stabilization against flutter
- Passive damper
- No moving mechanical parts

## Development Status

- Numerical simulation
- Wind-tunnel tests

## Patent Procedure Status

- PCT Application filed

## Chances for Cooperation

- Licensing
- Patent Sale
- R&D Cooperation

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## New device for damping vibrations in long-span suspension bridges

### Innovation and Customer Benefit

Bridges need to be designed against wind-induced vibrations such as buffeting and flutter. In long-span suspension bridges, this requirement leads to the need for structural strengthening and hence a substantial cost increase. Alternatively, the same goal can be reached by the new device in an innovative and cost-efficient manner.

Highlights of this new technology:

- High robustness
- Adaptability to local climate conditions
- Independence from mechanic/electronic control systems
- Low installation costs
- Significant increase of critical wind speed for flutter

### Possible Applications

The invention incorporates fixed wings that are firmly positioned at the sides of the bridge deck.

The number and location of the wings can be adapted to local wind conditions and placed only on the required sections of the structure.

Our technology allows an effective damping of wind-induced vibrations and flutter. This leads to a drastic increase of critical wind speed for flutter in the order of 30 %. Depending on the chosen arrangement of wings, the critical wind speed for torsional divergence can likewise be raised.

Since it is a passive system, reliability is high and the costs are low (approx. 4% of total construction costs).

### Technical Description

This invention is a passive damper with no movable parts. It requires no energy input or mechanical and electronic control devices.

The wings are mounted on transversely orientated support structures that are laterally attached to the bridge deck. Wings and support structures are light-weight components.

The increase in flutter speed is achieved by the aerodynamic damping and stiffness generated by the wings. This effect is particularly pronounced when the wings are placed with a large lateral eccentricity relative to the bridge deck.

The device is reliable and robust as it only depends on the wind forces and because multiple wings act independently of each other.

The wings can also be provided with movable elements (flaps or slats), also controlled only by the action of the wind, which enhances the efficiency of the device.

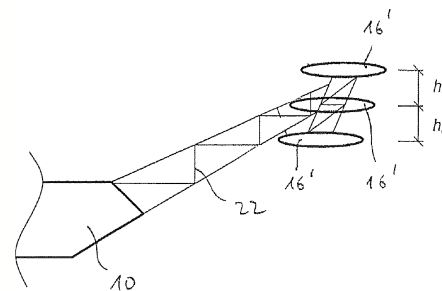


Fig. 1: Bridge fitted with an example configuration of the device (partial-cross sectional)