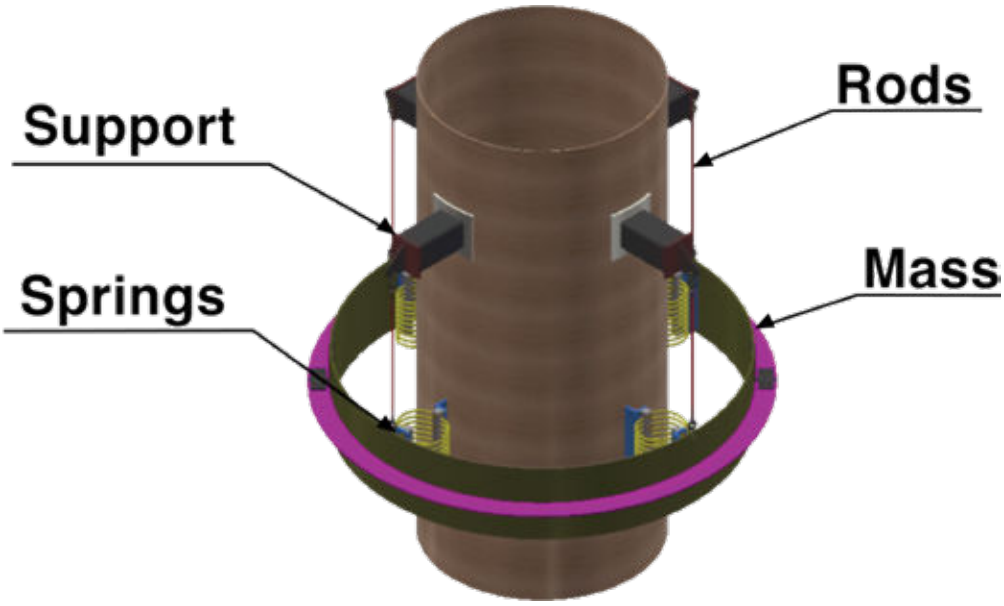
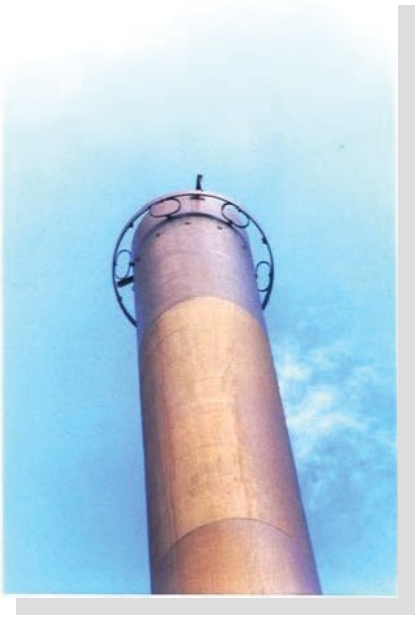
Tuned Mass Damper

For Stacks

MECA Enterprises Inc.

The Tuned Mass Dampers (**TMD's**) utilize mass to provide the damping. The dampers are "**tuned**" to the natural frequency of the stack so that they are most effective at or near the natural frequency of the stack. The Tuned Mass Damper consists of a cylindrical ring of steel mass, which is suspended by cables. The ring is larger than the diameter of the stack and is separated from the stack with wire rope coil springs.





Advantages

1) All **Mechanical** Parts
2) No problem with **high temperatures**
3) Inspected from grade with **Binoculars**
4) Provides **large** structural damping

Disadvantages

1) Ideally will be full **360 Degrees**
2) Needs to be **near top** of stack
3) Cannot serve **dual** purpose (i.e. platform)
4) Sometimes **interferes** with ladders, platforms and piping

Can we place it lower on the stack for easier access?

The Tuned Mass Damper (TMD) is most effective if it is placed where the mode shape is highest, and for a typical stack that is going to be at the **very top** of the stack. The lower on the stack the TMD is placed the **less efficient** it becomes, and it is required to be a **larger** mass as a result. At some point the mode shape will just be too low and the TMD becomes ineffective.

Does the TMD require maintenance?

The TMD is made from **stainless** parts that are robust and provide good resistance to corrosion; however, the most likely component to fail are the wire rope springs which do flex and can fatigue over time. It's difficult to estimate with any accuracy how long the spring will last, but some TMD's have been in service for **decades** without any issues.

How can the TMD be inspected?

The most likely problem would be with the wire rope springs. These might be visible from grade using **binoculars** or they can be viewed more closely with a **drone**.

Can the Stack be lifted with the TMD in place?

It is possible to **lift** the stack with the TMD **installed**, if provisions have been made to block the springs and protect them during lifting. Once the stack is vertical, then the blocking needs to be removed to allow the springs to function. This is explained in more detail in our installation manual.

What if we have a Ladder or Piping on outside of stack?

In the case of piping, depending upon the size and quantity it may be possible to route the piping on the **inside** of the **annular gap** between the stack shell and TMD mass. If this is not feasible, another option is to **notch** the mass to allow a ladder and/or piping to pass through the TMD.