

> Synthetic Segment

The steel segment is in the shape of a box, and generally has excellent economic efficiency in small-diameter tunnels; it is excellent in terms of load-bearing capacity, manufacturability and workability even in medium- and large-diameter tunnels. Therefore, it is often used in special areas such as rapid curves and openings that are difficult to apply concrete segments. Its advantages include uniform material, strength, good weldability and a relatively light weight, making it easier for machining or modification at the site.



AQCS & Industrial Equipment



References

- **Synthetic Segment;** Sendai Subway East-West Line: Shindera Cite, Japan (2011)
- **Steel Segment;** Hachioji Shield Work, Japan(2018)  
Tokyo Gaikaku B&F Ramp, Japan (2020)  
Toranomom Subway Station to Mori Building, Japan (2018)  
Hiroshima Expressway No.5, Japan (2020)

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Manufacturing Service

Dampers / Steel Work

Global Leader in Green Technology  
- People & Technology keeping our planet sustainable...

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KC Cottrell is providing manufacturing service not only industrial equipment but also all the steel work to all of our customers.

## Dampers

Dampers have a wide range of applications in manufacturing lines. For example, they are used to control the amount and direction of air flow in the duct line and to isolate toxic gases. Dampers come in a variety of forms depending on the application.

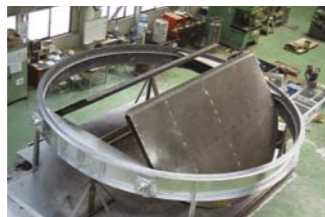
### Types of Dampers

KC Cottrell produces seven types of dampers: louver, guillotine, diverter, wafer(butterfly), poppet, radial vane, and stack damper. Depending on their operating method, dampers can be classified into isolation type and modulation type. They can also be categorized into zero leakage damper and low leakage damper depending on the allowed leakage rate.



#### Louver Dampers

- Control the amount of airflow into a duct
- Manual and automatic operation
- Can be used for operation at high speeds
- Applicable for low leakage and zero leakage



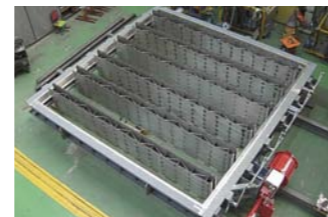
#### Stack Isolation Dampers

- Used in stacks
- Suitable for protecting equipment or blocking rain during downtime



#### Guillotine Dampers

- Suitable for intermittent operations
- A drawback is low operating speed
- Horizontal, vertical or lateral installation



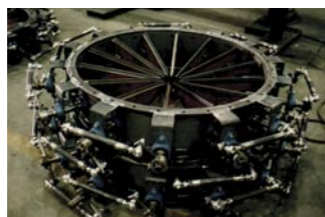
#### Tandem Dampers

- Zero Leakage Type that has similar function with Double Louver Dampers
- Decrease in cost due to lower damper size and weight



#### Diverter Dampers

- Main application is HRSG
- Flow rate inside the damper can be set to 45m/sec
- More economical than using two damper sets
- Operation possible at high temperatures



#### Radial Vane Dampers

- Installed before or after the fan
- Used for speed and flow rate control



#### Wafer Dampers

- Mainly used in circular duct lines
- Economical and appropriate for low pressure conditions
- Double & single wafer are available depending on the leakage rate



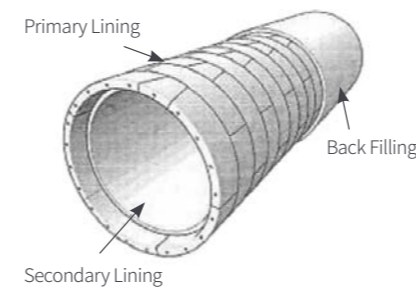
#### PoPPet Dampers

- Used for explosion prevention in times of emergency in production lines
- Applicable for high speed operation

## Steel Work

Steel Work is the creation of steel structures by cutting, bending, and assembling processes. It is a value-added process involving the creation of machines, parts, and structures from various steel materials.

### Segment



The shield method, which is the mainstream of the tunnel construction method of the city, has made remarkable progress since it was first introduced in Japan at the Ouhamami Line construction project in 1920. The scope of the shield method is the tunnels of sewerage, power, communication, gas, underground waterways, railroads, roads, etc. The materials required for the shield method are segments, and the products manufactured by our company are steel segment and synthetic segment(Exterior is steel segment and interior is filled with cement along with rebar).

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#### Rectangular Steel Segment(Passenger Tunnel from a Subway Station to Basement of a Building)



#### Round Steel Segment(Tunnel for Highway)

