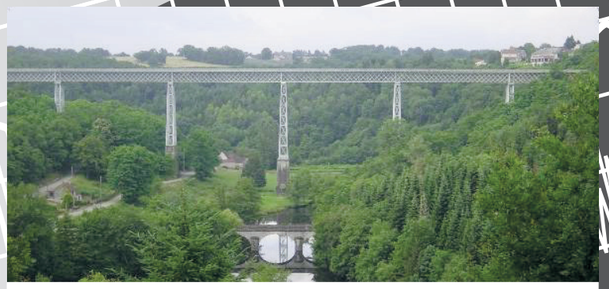
JARRET STRUCTURES

SHOCK TRANSMISSION UNITS



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www.jarretstructures.com

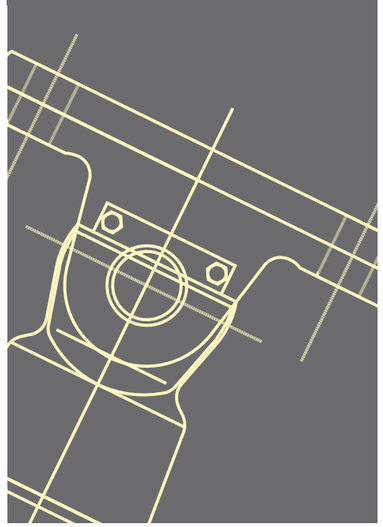
51151 Celeste - Shelby Township, MI 48315 - USA
Tel: 586-566-4725 ; Fax: 212-918-1611 or 586-566-1665
E-mail: fvandenbulke@jarretstructures.com

Shock Transmission Units

A shock transmission unit (STU) is designed to be connected between bridge structure components to form a rigid link under dynamic loads induced by forces such as vehicle braking and earthquakes. At the same time, the structure will be able to move freely under slowly applied loads such as temperature and creep shrinkage.

The unit is connected between elements of bridge structures at expansion joints, or near the bearings between the superstructure and the substructure.

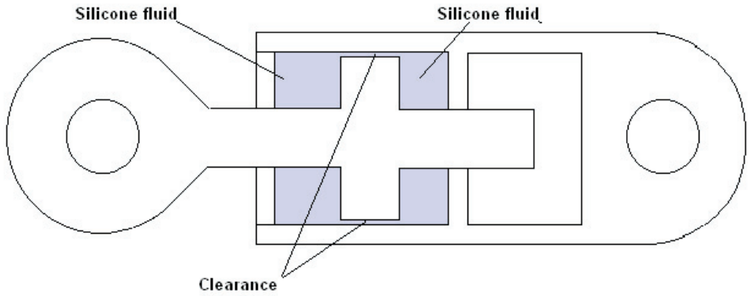
The use of STU's allows the load sharing of a suddenly applied force.



Working Principle

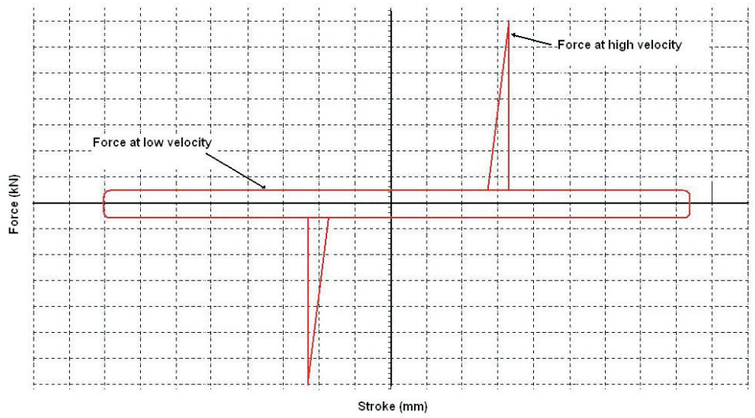
Shock transmission units work on the principle that rapid passage of a viscous fluid through a narrow gap, orifice or port generates high resistance, while slow passage at low velocity generates only minor resistance. An STU should block the deck of a bridge during a quick motion and behave like a spring with a very high stiffness. At the same time, the STU should deliver a low reaction force during the slow displacements of thermal expansion or contraction of the deck.

JARRET STRUCTURES' STU is made with a steel reservoir, with a piston rod sliding through it. On the piston rod there is a fixed head, which in effect separates the reservoir into two chambers. When the unit is filled with silicone fluid, the pressure is the same in both chambers.

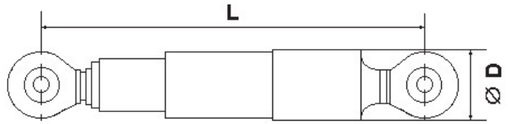


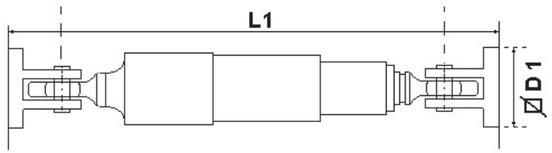
Performance

The graph below shows the performance generated by an STU at low velocity, and during a dynamic event at high velocity. The JARRET STRUCTURES dampers are velocity dependant.



Dimension of Units



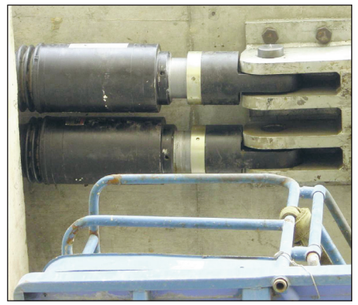


Unit	L (mm)	L1 (mm)	D (mm)	D1 (mm)	Stroke (mm)	RM (KN)
AB50-100	450	540	60	110	100	50
AB100-100	490	610	90	110	100	100
AB150-100	620	740	115	144	100	150
AB300-100	720	860	155	176	100	300
AB500-100	800	1000	180	210	100	500
AB750-100	860	1110	230	280	100	750
AB1000-100	930	1200	250	340	100	1000
AB1250-100	1000	1300	280	340	100	1250
AB1500-100	1050	1350	310	340	100	1500
AB2000-100	1150	1470	430	360	100	2000
AB2500-100	1250	1660	440	460	100	2500
AB3000-100	1350	1760	450	460	100	3000

L = total length , at mid stroke, for S = 100 mm or +/-50 mm
For S < or > 100 mm, L = L + 2.5 (S - 100) All dimensions are subject to modification.

Temperature and Aging

A variation of the outside temperature, which can range from -55°C to + 80°C, does not change the amount of energy dissipated per cycle. There is no aging of the silicone fluid. The JARRET STRUCTURES units have been tested in very severe environmental conditions, including fire.



Where an STU Can Be Applied

STU's can be used for both steel and concrete structures. STU's can be used on cable stayed and suspension bridges to eliminate large displacements of the deck during an earthquake. STU's can be used for elevated light rail structures as well as in bridge parapets to share collision forces through an expansion joint. For other civil engineering structures such as buildings, STU's can provide additional rigidity in the frame structure. STU'S can also be used to strengthen adjacent buildings during a seismic event.

The retrofit of existing steel truss railway bridges with STU's can allow heavier trains (increased weight per axle) and take the increased braking forces without a change to the substructure. STU's can be made to strengthen supporting piers which have been found inadequate due to increase in traction and braking forces, or which have sustained damage caused by corrosion.

Installation

The installation of STU's does not require special skills and, unlike other strengthening methods for piers, can be carried out without closing a bridge to traffic. An installation manual will be provided.

Maintenance

JARRET STRUCTURES Shock Transmission Units are maintenance free. A regular visual inspection can be done on a periodic basis in order to check the corrosion protection system.