

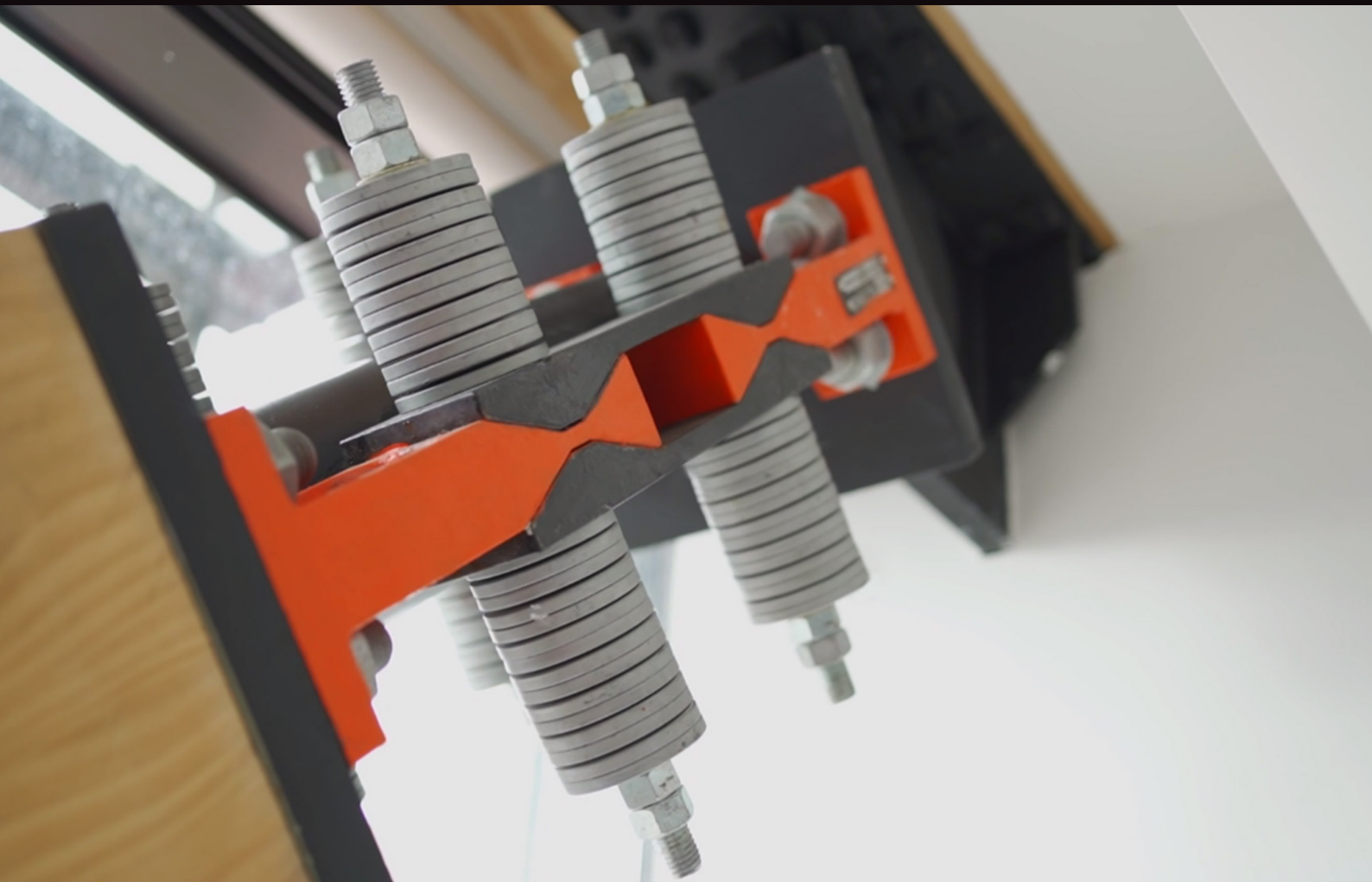


TECTONUS
RESILIENT SEISMIC SOLUTIONS

PRODUCT CATALOGUE

STRUCTURAL DIVISION | USA

CUTTING EDGE SEISMIC PROTECTION TECHNOLOGY



REVOLUTIONARY SEISMIC PROTECTION

TECTONUS

A FUTURE MORE RESILIENT

Tectonus offers next generation seismic connections that significantly improve the performance of earthquake-prone buildings. Unlike traditional systems, Tectonus focuses on providing a system that does NOT need repair or replacement following an event - providing long term structural protection.

Earthquakes pose a great threat to social and economical welfare - costing society at every event. Traditional seismic systems often require costly post event maintenance or complete replacement following a seismic event - in some cases leaving the structure at risk for aftershocks whilst awaiting maintenance.

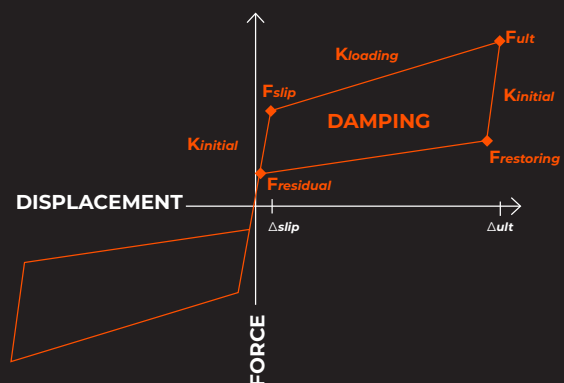
Through effective energy dissipation and self centring functionality of the Tectonus connections, structures are able to withstand earthquake sequences without replacement or structural repairs.

LIFE SAFETY | NO REPAIR OR REPLACEMENT | MINIMISE BUSINESS DISRUPTION

LIMITLESS POTENTIAL

The RSFJs compact and scalable configuration offers design freedom for any application.

The compact joint is exceptionally scalable and can be implemented in all types of projects of various materials and configurations.



ADVANTAGES

EFFECTIVELY DISSIPATES ENERGY

SELF-CENTRING

CONTINUED DAMAGE AVOIDANCE

NO POST EVENT MAINTENANCE REQUIRED

APPLICABLE TO ALL TYPES OF BUILDINGS

COST-EFFECTIVE

RETROFIT

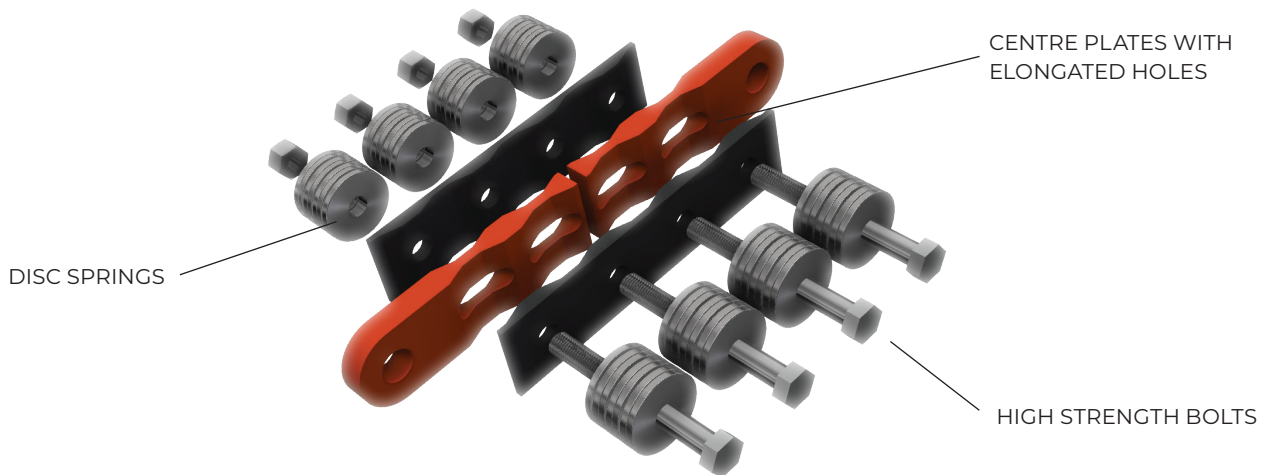
COMPACT

EASY IMPLEMENTATION

STRUCTURAL HEALTH MONITORING

THE RSFJ TECHNOLOGY

The Resilient Slip Friction Joint (RSFJ) consists of 2 outer plates and 2 centre plates with elongated holes. The outer cap plates and the centre slotted plates are grooved and clamped together with high strength bolts and disc springs.



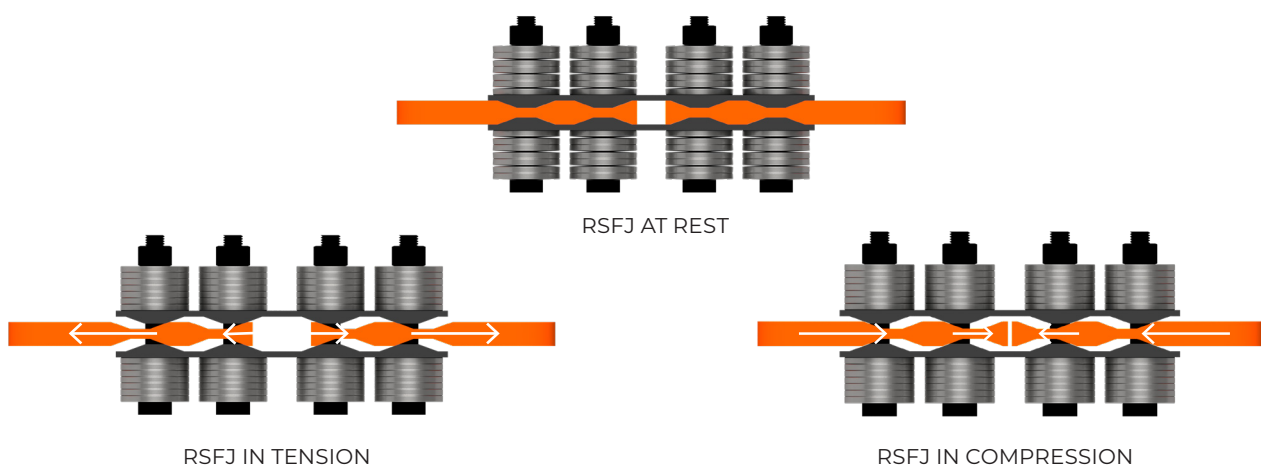
KEY CHARACTERISTICS OF THE RSFJ

- Bolts only work in tension
- Cap plate can't "jump" the ridge
- At F_{ult} , disc springs are fully flattened
- Gap in centre allows for compression deformation
- All parts remain within their elastic range up to F_{ult}
- RSFJ returns to its original "rest" position every time

HOW IT WORKS

When the applied joint force overcomes the frictional resistance between the sloped bearing surfaces, the centre slotted plates start to slide and energy will be dissipated through friction during cycles of sliding.

The patented shape of the plate ridges along with the use of disc springs and high strength bolts provide the desirable self-centring characteristic. The angle of the grooves is designed such that at the time of unloading, the reversing force induced by the elastically compacted disc springs is larger than the friction force acting between the facing surfaces. Therefore, the system is recentred upon unloading.



DESIGN WITH EASE

The RSFJ can be easily integrated in the structural analysis and design softwares ETABS or SAP2000. It allows the designer to accurately calibrate the parameters according to the requirements of the project. In ETABS or SAP2000, the RSFJ load displacement behaviour can be easily modelled by choosing the "Damper-Friction Spring" type link element.

Refer to the RSFJ Structural Modelling Guide for more information.

TENSION ONLY BRACES

— RSFJ-TBRACE

ADVANTAGES

- › Self-centring & NO post event maintenance
- › Can be installed in parallel to increase the capacity
- › Arrives on site ready for installation
- › Installation can be carried out by a 2 person team
- › Length of diagonal brace can be adjusted for site imperfections
- › NO out of plane buckling

APPLICATIONS

New and retrofit projects, and can be implemented to all types of buildings;

Steel, timber, concrete, or a hybrid of any.

- › Multi story
- › Industrial applications
- › Industrial pallet racks



PIN END CONNECTION



DESIGN SPECIFICATIONS

125 KIPS + CAPACITY

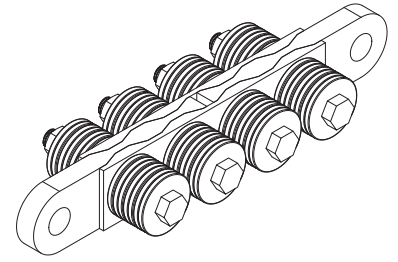
Tectonus units can be designed to meet any targeted capacity and deflection. The standard range units can be applied in multiples in a modular pattern to achieve larger capacities.

MODELLING GUIDES

Refer to Structural Modelling & Design Guide for recommended design procedure. More information and support is available on request.

PROJECT SUPPORT

Tectonus offers support for detailed design and analysis with a range of options.



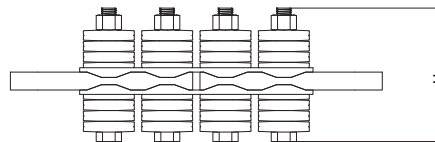
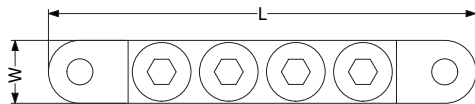
STANDARD PRODUCT RANGE

Product Code	F_{ult} (comparable to ULS) [kips]	F_{slip} [kips]	$F_{restoring}$ [kips]	$F_{residual}$ [kips]	Deflection Limit	Δ_{ult} (comparable to ULS) [inch]
Category A 15% TO 20% HYSTERESIS DAMPING						
RSFJ-TH4-200	50	25	7.6	3.8	S, M, L, X	S (up to 1 inch) M (1 inch to 2 inches) L (2 inches to 3 inches) X (3 inches to 4 inches)
RSFJ-TH4-250	60	30	17.3	8.7	S, M, L	
RSFJ-TH4-300	70	35	26.3	13.2	S, M	
RSFJ-TH6-350	80	40	21.1	10.6	S, M, L, X	
RSFJ-TH6-400	90	45	30.6	15.3	S, M, L	
RSFJ-TH6-450	100	50	39.6	19.8	S, M	
Unit capacity of 125 kips or more is easily achievable.						
Category B 10% TO 15% HYSTERESIS DAMPING						
RSFJ-TH2-200	50	25	21.6	10.8	S, M, L	S (up to 1 inch) M (1 inch to 2 inches) L (2 inches to 3 inches) X (3 inches to 4 inches)
RSFJ-TH2-250	60	30	29.4	14.7	S, M	
RSFJ-TH2-300	70	35	30.6	15.3	S	
RSFJ-TH4-350	80	40	35.1	17.5	S, M, L	
RSFJ-TH4-400	90	45	43.4	21.7	S, M	
RSFJ-TH4-450	100	50	51.3	25.6	S	

TENSION ONLY BRACE

Units above 100 kips is easily achievable. Installing units in multiples can also bring desired larger capacity.

- Joints are designed to provide deflection with self-centring even beyond Δ_{ult} (as a secondary fuse) with $\Delta_{max} = 1.5 \Delta_{ult}$ and an overstrength factor of 1.35
- Given the slight non linearity at the joint slip stage, the F_{slip} is determined as the intersect of the straight lines matching the initial and second stiffness of the flag-shaped curve.
- Δ_{slip} (comparable to SLS) is kept to be about 1/32" to 1/16" for 2-bolt to 6-bolt RSFJs, respectively (excluding the deflection resulting from the attachments such as pins, brackets and anchor bolts).



DIMENSIONS

The dimensions of the RSFJ units depend on the demand deflection. To support the application of RSFJs in a wide range of brace sizes, the units are provided up to 4 different ranges of deflections:

PRODUCT	NO. OF BOLTS (N_b)	L (INCH)	W (INCH)	H (INCH)
RSFJ-TH2	2	$2N_b \ell + 8$	4 inches	$4\ell + 3$
RSFJ-TH4	4			
RSFJ-TH6	6			

S = up to 1 inch L = 2 inches to 3 inches
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TENSION & COMPRESSION BRACE

RSFJ-BRACE

ADVANTAGES

- › Self-centring & NO post event maintenance
- › Can be installed in parallel to increase the capacity
- › Arrives on site ready for installation
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- › Length of diagonal brace can be adjusted for site imperfections
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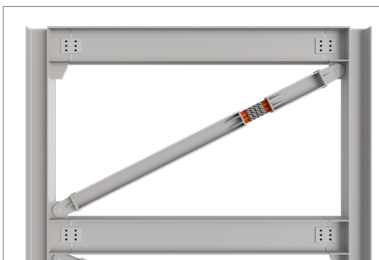
APPLICATIONS

New and retrofit projects, and can be implemented to all types of buildings;

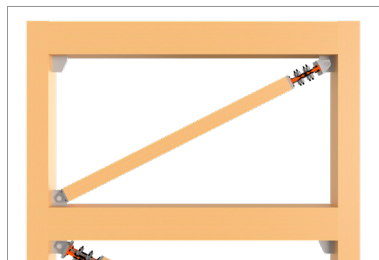
Steel, timber, concrete, or a hybrid of any.

- › Multi story
- › Industrial applications
- › Industrial pallet racks

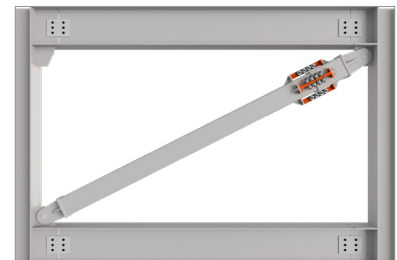
VERSION 1



VERSION 2



VERSION 3



DESIGN SPECIFICATIONS

125 KIPS + CAPACITY

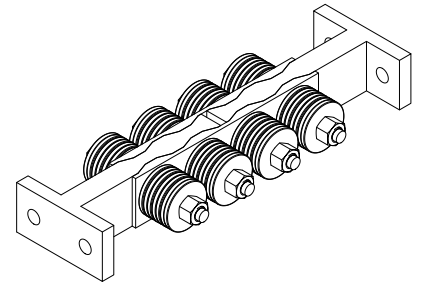
Tectonus units can be designed to meet any targeted capacity and deflection. The standard range units can be applied in multiples in a modular pattern to achieve larger capacities.

MODELLING GUIDES

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PROJECT SUPPORT

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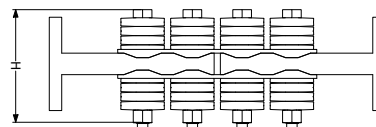
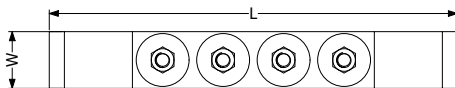
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RSFJ-BH4-300	70	35	26.3	13.2	S, M		
RSFJ-BH6-350	80	40	21.1	10.6	S, M, L, X		
RSFJ-BH6-400	90	45	30.6	15.3	S, M, L		
RSFJ-BH6-450	100	50	39.6	19.8	S, M		
Unit capacity of 125 kips or more is easily achievable							
Category B 10% TO 15 % HYSTERESIS DAMPING							
RSFJ-BH2-200	50	25	21.6	10.8	S, M, L		
RSFJ-BH2-250	60	30	29.4	14.7	S, M		
RSFJ-BH2-300	70	35	30.6	15.3	S		
RSFJ-BH4-350	80	40	35.1	17.5	S, M, L		
RSFJ-BH4-400	90	45	43.4	21.7	S, M		
RSFJ-BH4-450	100	50	51.3	25.6	S		

TENSION & COMPRESSION BRACE

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SHEARWALLS & COLUMNS

— RSFJ-SHEARWALL

ADVANTAGES

- Self-centring
- No post event maintenance: Reduced costs when considering earthquake sequences
- Scalability: can be installed in groups to increase the capacity
- Arrives on site ready for installation (no secondary steps required)
- The pin and swivel bearing allow for +/- 5% rotation

APPLICATIONS

New and retrofit projects, and can be implemented to all types of buildings;

Steel, timber, concrete, or a hybrid of any.

- › Multi story
- › Industrial applications



DESIGN SPECIFICATIONS

125 KIPS + CAPACITY

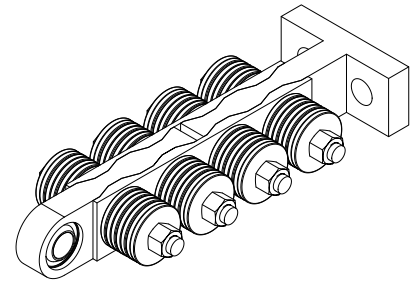
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MODELLING GUIDES

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PROJECT SUPPORT

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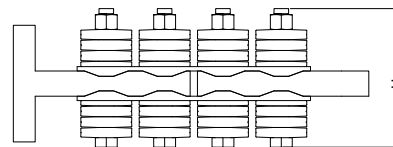
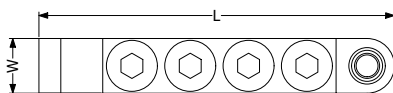


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RSFJ-SH4-250	60	30	17.3	8.7	S, M, L	
RSFJ-SH4-300	70	35	26.3	13.2	S, M	
RSFJ-SH6-350	80	40	21.1	10.6	S, M, L, X	
RSFJ-SH6-400	90	45	30.6	15.3	S, M, L	
RSFJ-SH6-450	100	50	39.6	19.8	S, M	
Unit capacity of 125 kips or more is easily achievable						
Category B 10% TO 15 % HYSTERESIS DAMPING						
RSFJ-SH2-200	50	25	21.6	10.8	S, M, L	S (up to 1 inch) M (1 inch to 2 inches) L (2 inches to 3 inches) X (3 inches to 4 inches)
RSFJ-SH2-250	60	30	29.4	14.7	S, M	
RSFJ-SH2-300	70	35	30.6	15.3	S	
RSFJ-SH4-350	80	40	35.1	17.5	S, M, L	
RSFJ-SH4-400	90	45	43.4	21.7	S, M	
RSFJ-SH4-450	100	50	51.3	25.6	S	

Units above 100 kips is easily achievable. Installing units in multiples can also bring desired larger capacity.

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MOMENT RESISTING FRAME

RSFJ-MRF

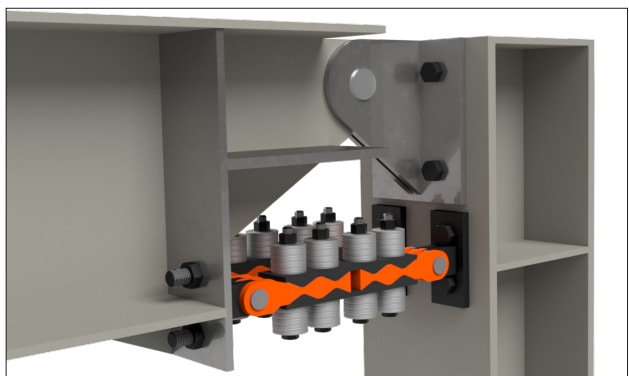
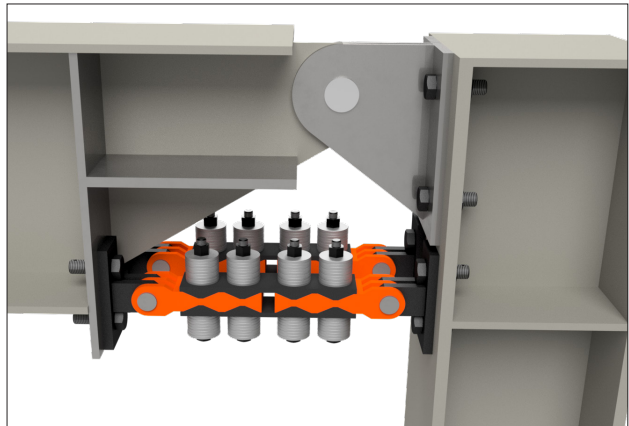
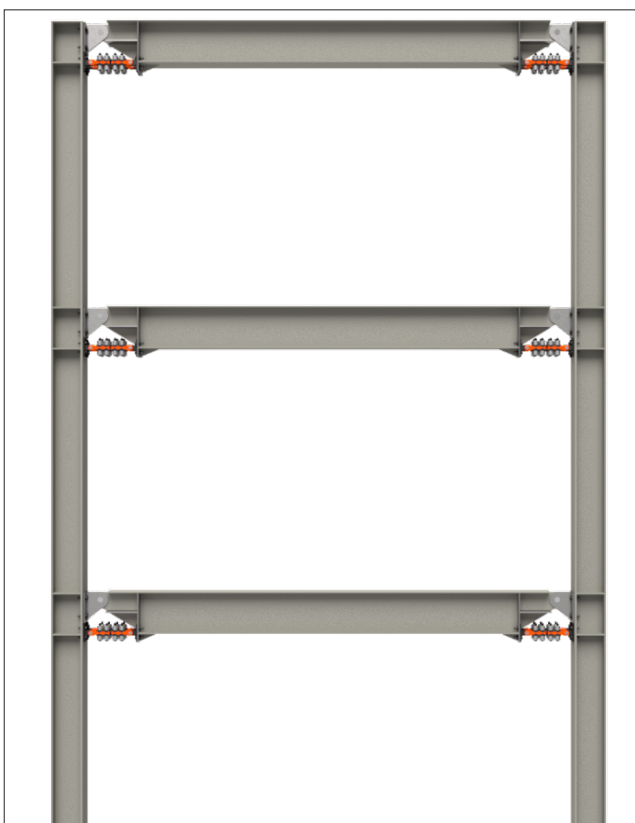
ADVANTAGES

- Self-centring
- No post event maintenance: Reduced costs when considering earthquake sequences
- Scalability: Can be installed as single unit or combined with others to increase the capacity
- Arrives on site ready for installation

APPLICATIONS

New and retrofit projects, and can be implemented to all types of buildings; steel, timber, concrete, or a hybrid of any.

- Multi story
- Portal frames



DESIGN SPECIFICATIONS

125 KIPS + CAPACITY

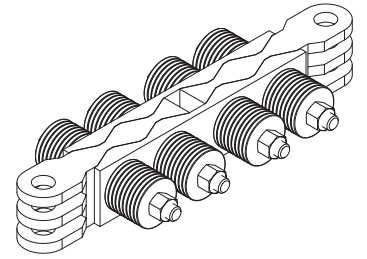
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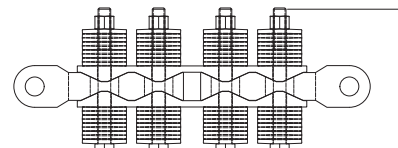
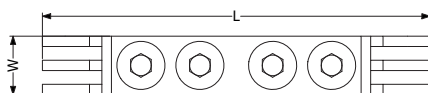


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CONTACT US

TECHNICAL SUPPORT & PROJECT ESTIMATES

0800 866 871

GENERAL / info@tectonus.com

SALES / sales@tectonus.com

TECHNICAL & DESIGN / technical@tectonus.com

The experienced engineering team at Tectonus is available to provide more details and assistance for RSFJ structural modelling upon request.



TECTONUS
RESILIENT SEISMIC SOLUTIONS

