

TECHNICAL CASE STUDY



“THE PYTHON MT FIXINGS ARE UNBELIEVABLE...INSTALLATION IS SIGNIFICANTLY MORE TIME EFFICIENT”

JAMES, SITE MANAGER - RUCON CONSTRUCTION

THE STRUCTURE

Constructed with practices of its era, this mid-1900's **four-story URM building** boasts timber floors and brick cavity external walls. Deep timber joists are supported by external brick walls and intermediate timber columns.

However, seismic detailing falls short of modern standards, necessitating additional connections to bolster structural integrity. Originally, **brick cavity walls** offered thermal and moisture insulation but prove inadequate during seismic events. Given its size and weight, the building is **vulnerable to seismic** accelerations, necessitating the addition of structural load paths to meet modern seismic requirements in earthquake-prone areas.



THE SOLUTION

PYTHON Shear Studs

New Concrete Shear Walls

Given the size and seismic vulnerability of the four-story URM structure, **additional load paths** were necessary to channel seismic forces to the foundations. To address this, **new concrete shear walls** were installed in several bays, spanning the building's full height.

Epoxy anchors historically were used to connect such new concrete shear walls to the existing masonry. However, through innovation by PYTHON Fixings, the Engineer opted for **PYTHON MT** mechanical anchors as **concrete shear/tension studs**.

This choice resulted in a remarkable **5x faster installation** compared to traditional epoxy methods. The impact on both project timelines and labor costs was substantial, showcasing the efficiency and cost-effectiveness of this solution.



PYTHON MT Structural Connection

Wall-to-Diaphragm Connections

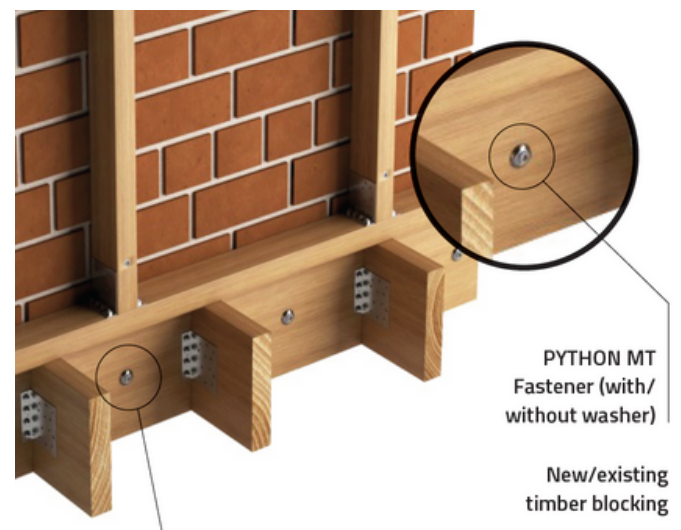
In original construction, lateral **wall-to-diaphragm connections** between flooring systems and URM walls were typically absent.

To enable the existing timber floor system to act as a structural diaphragms and laterally restrain the URM walls, the Engineer specified **PYTHON MT anchors** between the floor joists and URM walls.

This widely adopted solution offers several key benefits. As mechanical anchors, PYTHON MT connections are less susceptible to on-site workmanship issues, providing greater **confidence** in their performance and reducing the need for on-site testing by contractors.

Faster installation compared to traditional epoxy alternatives results in **66% cost reduction**.

The unique length of PYTHON MT anchors allowed for **integration of the external veneer into the connection**, creating a single, robust wall-to-diaphragm connection that ensures reliable lateral restraint for both the URM wall and external veneer.



PYTHON MT

Structural connections to brick, soft-stone and concrete masonry.

PYTHON C - Cavity Ties

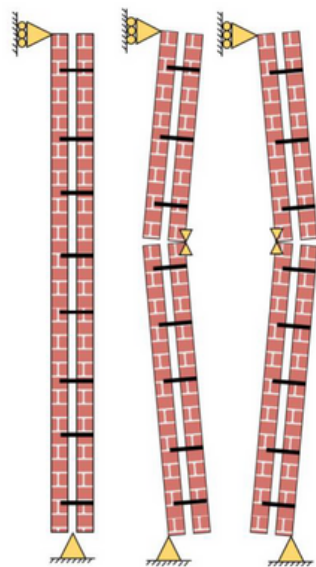
Cavity walls

Historic **brick cavity walls** offer excellent thermal and moisture insulation but often exhibit two structural deficiencies under seismic loading:

1. Degradation of original wall ties.
2. Inadequate out-of-plane capacity due to flexibility.

To address this, the Engineer implemented a solution using **PYTHON C semi-rigid cavity ties**. These ties replaced original corroded ones and facilitated composite behavior between the wall and external veneer, **increasing out-of-plane capacity 5x** and doubling displacement capacity.

This technique eliminates the need for additional internal structure, **reducing project costs** and preserving floor area, thereby enhancing the property's ongoing commercial value.



PYTHON C

Structural interconnection
of masonry cavity walls

PYTHON ENGINEERING & ON-SITE SUPPORT

At PYTHON Fixings, we understand the intricate needs of structural engineers when it comes to design and technical advice, structural detailing, and supply of trusted products. With our dedicated engineering team, we offer comprehensive **technical support** tailored to your project's engineering requirements.

Technical Engineering Support:

If you're navigating the **complexities of existing buildings** and working with variable masonry materials, we have the knowledge and expertise to guide you through the process.

On-Site Pre- and Post-Installation Quality Assurance Testing:

Ensuring the integrity and reliability of your structures is paramount. We offer thorough pre- and post-installation **quality assurance testing** conducted directly on-site. Our meticulous approach guarantees that your project meets the highest standards of safety and performance.

Trusted for Engineering Excellence:

With PYTHON Fixings, you can trust that you're partnering with **industry experts in masonry** and existing buildings. Our commitment to quality, reliability, and innovation ensures that your project receives the highest level of support and expertise.



YOUR NEXT PROJECT.

PYTHON Fixings' worldwide excellence makes your life easier with our expert knowledge, comprehensive technical support, and engineering design data ready to be used in your project!

Contact the Python Fixings team to discuss your next project

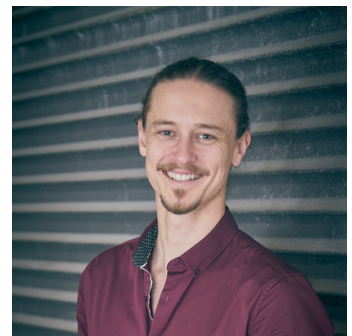
info@pythonfixings.com.au
1800 PYTHON

MEET THE TEAM



Kieran Bisacre-Peters

Engineering and Sales
kieran@pythonfixings.com.au
+61 489 948 846



Robert Hudson

Engineering and Sales
robert@pythonfixings.com.au
+61 480 096 738