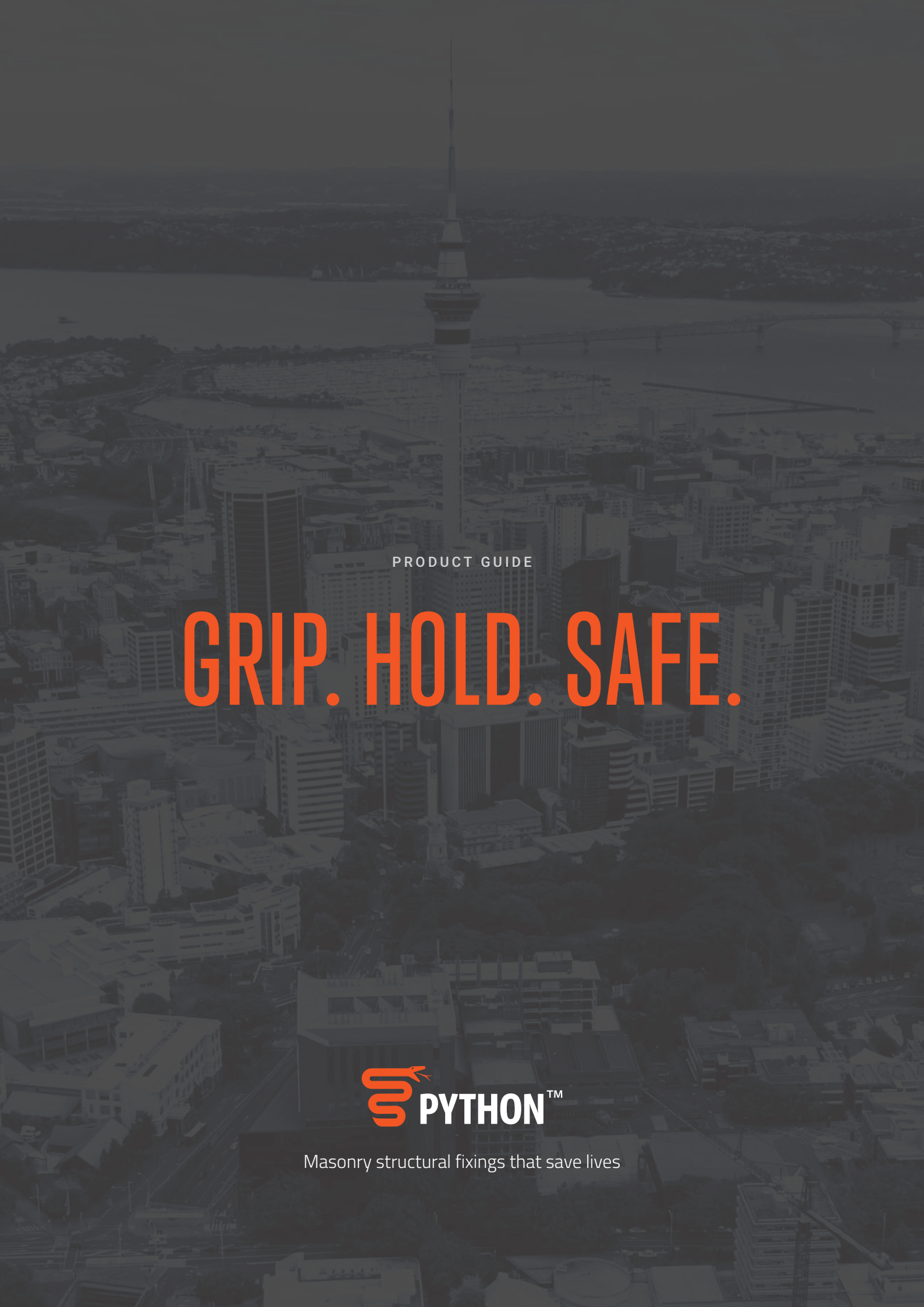


PRODUCT GUIDE

GRIP. HOLD. SAFE.

PYTHON™

Masonry structural fixings that save lives

CONTENTS

"Architect recommended PYTHON as the latest state-of-the-art innovation for strengthening masonry buildings! And it costed us 67% less than other solutions!"

MATT, ENTHUSIASTIC BUILDING OWNER

ABOUT PYTHON™

Our story started with helping the Canterbury Earthquake Royal Commission in assessing and collecting post-earthquake information on performance of all masonry buildings in the Christchurch area. This task soon became our passion - to engineer better products for brick and concrete masonry buildings and in doing so create a safer haven for people living and working in these buildings.

PYTHON Fixings engineered a highly innovative and fully tested range of products for all aspects of earthquake and retrofitting of buildings.
Clever innovation has demonstrated huge improvements in all technical areas, while radically reducing the time and cost of installation.

OVERVIEW

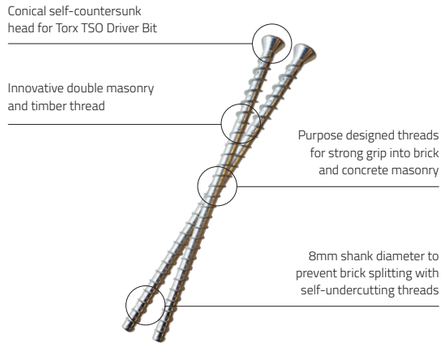
The PYTHON Fixings Range is a series of radical innovations. It has been comprehensively tested in seismic conditions for installing structural fixing onto masonry, and it is one of the fastest mechanical systems in the game. Proudly engineered in New Zealand and manufactured in Austria under strict procedures. A revolution in structural connections and masonry protection.

PYTHON MT
PYTHON C

PYTHON MT

Available in 160mm, 230mm, 340mm lengths

Different coating options to suit application



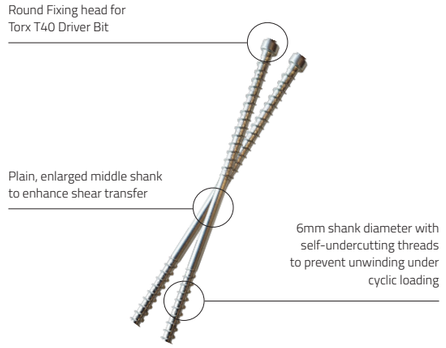
PYTHON MT APPLICATIONS

Structural fixing of elements onto brick and concrete masonry

PYTHON C

Available in 240mm lengths

Different coating options to suit application



PYTHON C APPLICATIONS

Strengthening and remediation of cavity and veneer masonry walls

OUR CLIENTS

wsp | OPUS
miyamoto. ENGINEERS & CONSTRUCTION CONSULTANTS
structex
Structure Design
THOMPSON CONSTRUCTION - ENGINEERING - PRECAST
THORNE DWYER STRUCTURES
Beca
CONSULTING ENGINEERS
BMC
MCL
Powell Fenwick
Mitchell Construction Ltd
DSTEVENS CONSTRUCTION. JOINERY. INTERIORS.
cubicon INTERIORS
calibre
ASPEC
CAPE
M M A MATTHEWS & MATTHEWS ARCHITECTS
MSC Consulting Engineers Civil & Structural
RENDERCON BUILDING MAINTENANCE
Holmes
GDC Consultants Ltd
FOSTER MAINTAIN
JACOBS
HANLON & PARTNERS Ltd.
Clendon Burns & Park Ltd CONSULTING CIVIL & STRUCTURAL ENGINEERS
aurecon
New Zealand consulting engineers Limited
proCONSULT STRUCTURAL ENGINEERING
PUKEKOHE BUILDERS LTD Commercial and Residential
SpencerHolmes engineers · surveyors · planners
HG HARRISON GRIERSON
QDC WORKS
spectrum Consulting Engineers
McKEE FEHL
PRENDOS. Intelligent Property Solutions
AIREY CONSULTANTS
Arrowsmith Builders Ltd Commercial Alterations & Maintenance Specialists
bpl GROUP
milward finlay lobb
resonant MULTI-DISCIPLINARY ENGINEERING & SURVEYING SERVICES
Q.C.C. QUAKE CONSTRUCTION CO. LTD
ARNOLD & JOHNSTONE
envivo
GREEN WAY
EDC
DTCE STRUCTURAL ENGINEERING
EQSTRUC
SILVESTER/CLARK CONSULTING ENGINEERS
HOVARE DESIGN
LIME WORKS
lewis bradford CONSULTING ENGINEERS
LEWIS & BARROW LTD Consulting Civil & Structural Engineers
LGE Structural & Civil Engineers
ach CONSULTING ENGINEERS
stratagroup CONSULTING ENGINEERS

STRONG HOLD TO BRICK AND CONCRETE MASONRY

PYTHON MT FIXINGS

PYTHON MT FIXINGS RANGE

APPLICATIONS

- Superior and reliable alternative to epoxy anchorages into masonry
- Connecting timber and steel members to brick and concrete masonry
- Remediation, restoration and remodelling of existing masonry buildings
- Starter studs for shotcrete/in-situ concrete overlay or foundations
- Earthquake retrofit - purposely designed and seismically tested
- Wide range of other applications

The radically innovative PYTHON MT range is specifically developed to provide high performance and reliable connections of structural steel and timber support systems to clay brick and concrete masonry. It also opens the way to apply innovative structural solutions that were previously considered impractical or too costly to implement.

Available in different lengths and durability protection options, the PYTHON MT family covers a wide range of masonry wall configurations and applications.

"Our client is pleasantly surprised at how well it went. Turns out being a cost-effective solution to an otherwise complicated problem"

MICHAEL, MY CONSULTING ENGINEERS LTD

DIAMETER	LENGTH
8mm	160mm
8mm	230mm
8mm	340mm

BENEFITS

Latest Technology	Access to innovative structural fixing to clay brick and concrete masonry. The most reliable and secure fixing available for seismic upgrading, ensuring safer buildings.
Significantly better safeguarding of lives	Threads purposely designed for clay brick and concrete masonry that grip and hold on.
Safe, more reliable and high quality	Foolproof, fully mechanical installation. No chemical adhesive, not reliant on adhesive quality of preparation.
Specialist technical support	Backed by global experts in masonry remediation and strengthening.
Reduces project cost	Easy, fast to install and requires minimum skill level. Over 3 times cheaper than typical chemical adhesive connection.
Comprehensively tested	The only mechanical connector system specifically rated for vintage brick masonry. Seismically tested following the principles of NZ and international testing protocols.

FEATURES

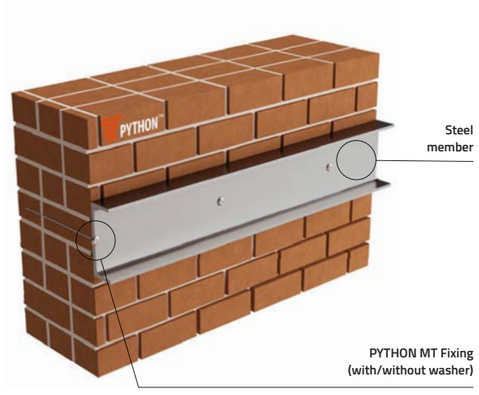
PYTHON MT TYPICAL APPLICATIONS

Schematics are for illustration purposes only. Specific engineering design will need to be carried out for each specific scenario. See **PYTHON Example Application Details Library** (www.pythonfixings.co.nz/details-library) for further details on the applications. Contact us to discuss how PYTHON suits your project.

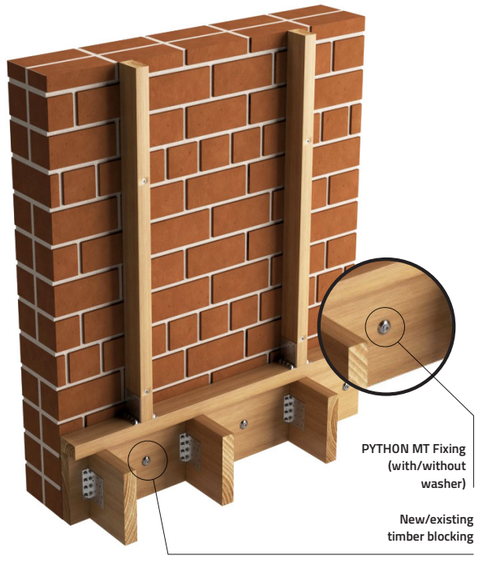
"Very easy and much quicker to install than epoxying threaded rods"

COLE, BERTHELSEN BUILDERS

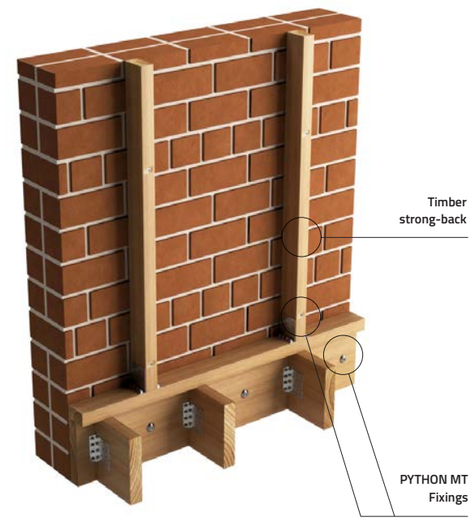
A \ Vertical/horizontal steel element connection to masonry



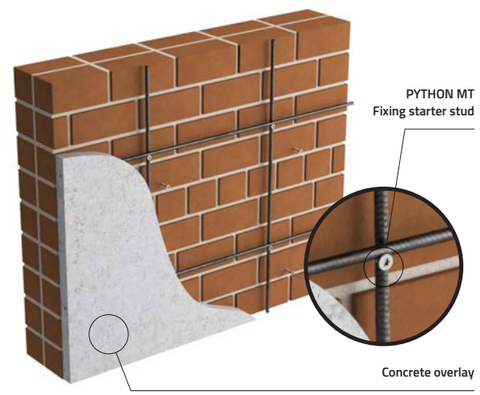
B \ Floor/roof to masonry wall connection



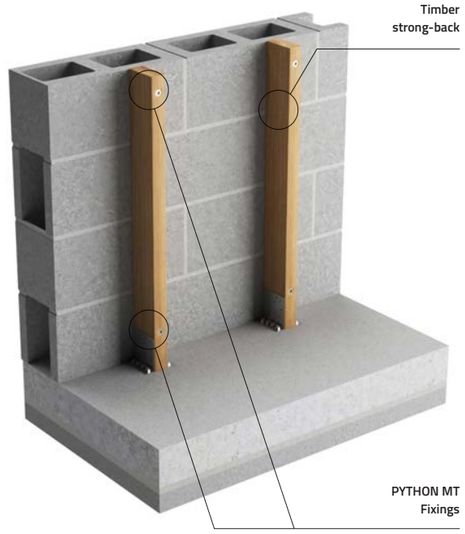
C \ Steel/timber strong-back to masonry wall connection



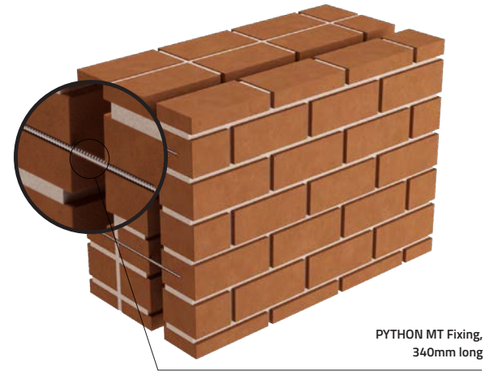
D \ Starter studs for shotcrete/in-situ concrete overlay



E \ Steel/timber strong-back to concrete masonry connection



F \ Connecting 2+1 cavity masonry walls from 2 leaf side



PYTHON MT FIXINGS RANGE DATA

TECHNICAL DESIGN DATA

Substrate	Min Substrate compressive strength (MPa)	Min Embedment (mm)	Min edge distance (mm)	Tested Tension Capacity (kN) [2]	Tested Shear Capacity (kN) [2]
Substrate Test Data [1]					
Clay Brick, Soft	15	85	30	10	6
		140	30	10	10
Clay Brick, Medium	25	85	30	10	8
		140	30	20	10
Clay Brick, Stiff	35	85	30	20	8
		140	30	20	10
Concrete Masonry, Unfilled	17.5	30	50	3.5	6
		30+10 [7]	50	6	9
Concrete Masonry, Filled	17.5 (CMU Shell) 12.5 (Fill)	50	50	10	8
		100	50	20	8
Aerated Concrete Units	-	160	30	7.5	*[9]
Vintage Concrete	15	85	30	15	*[9]
Concrete, Post Installed [5,8]	30	50	30	20	10
Concrete, Case In-situ [5,6]	30	50	30	20	10
Timber, with PYTHON washer	MSG8	45 [4]	22.5 (Perpendicular to Grain) 65 (Parallel to Grain)	15 [11]	8 [10]
Timber, without PYTHON washer		45 [4]		4 [11]	10 [10]
		90 [5]		10 [11]	
Oamaru Stone / Limestone	6	100	70	10	5
		160		20	6

Retrofit Test Data [3]				Characteristic Tension Capacity (kN)	Characteristic Shear Capacity (kN)
Timber Strongbacks to Brick Masonry Wall	MSG8 (Timber) 25 (Clay Bricks)	90 (Timber) [5,12] 140 (Clay Bricks)	22.5 (Timber) 30 (Clay Bricks)	10	8

1. For testing methodology, data, and technical support, please contact us on 0800 PYTHON or at info@pythonfixings.co.nz
2. "Tested Capacity" values have been developed through monotonic and cyclic testing of PYTHON MT Fixings in the corresponding substrate following the principles of AS/NZS2699.1. Strength reduction factors accounting for the testing datas coefficient of varience have been applied.
3. Retrofit test specifications:
   - Characteristic Strength calculated following AS/NZS2699.2.
   - Tests were performed with 90x45 MSG8 timber, minimum thickness of 45mm with 22.5mm edge distance, 90mm embedment
   - Tensile properties based upon AS/NZS2699.2 Cyclic Tension Testing
   - Shear properties based upon AS/NZS2699.2 Displacement Controlled Cyclic Shear Testing
   - Cyclic Tension and Cyclic Shear testing to ICC ES AC106 have been performed
4. Timber tested capacities are for the scenario in which the timber is connected to the larger threaded portion (nearest the head) of the PYTHON MT fixing
5. Concrete fixing group effects are to be accounted for by the design engineer in accordance with NZS3101
6. "Concrete, Case In-situ" testing data is for use when the PYTHON MT fixing is being used as a starter bar or shear stud. Embedment depths shall be taken from the top of the fixings' head.
7. "30 + 10" embedment represents fixings being installed through the first shell (30mm) and 10mm into the far shell
8. For embedment depths of > 50mm in high strength concrete above 40MPa, installation may require a 9mm pilot hole. A strength reduction factor of 0.5 should be applied to the provided tested capacities where a 9mm pilot hole is used.
9. For shear capacities in Aerated and Vintage Concrete please contact us on 0800 PYTHON or at info@pythonfixings.co.nz
10. Shear values in timber are for fixings under double shear. For single shear capacities in timber please contact us on 0800 PYTHON or at info@pythonfixings.co.nz
11. For the scenario in which the head of the PYTHON MT fixing is loaded into the timber.
12. Timber embedment may be reduced to 45mm if PYTHON washers are used.
13. For any variations from the above specifications, including installation into mortar joints, embedment depths or substrate compressive strengths less than the minimum specified, please contact us on 0800 PYTHON or at info@pythonfixings.co.nz
14. To organise on-site proof testing for your project contact us on 0800 PYTHON or at info@pythonfixings.co.nz

Durability	Exposure categories (AS/NZS 2699.1 and AS 3700)
Zinc-Nickel coated	R0 to R4, Mild, Moderate, Marine and Severe Marine

Refer to **PYTHON Durability Guide** for more information.

PYTHON MT PRODUCT RANGE

Product Code	Description	Shank Ø (mm)	Total Length (mm)	a (mm)	b (mm)	Material	Finish
PMT8160Z	PYTHON MT Fixing 8mm x 160mm	8	160	70	90	Steel	Zinc Nickel
PMT8230Z	PYTHON MT Fixing 8mm x 230mm	8	230	70	160	Steel	Zinc Nickel
PMT8340Z	PYTHON MT Fixing 8mm x 340mm	8	340	70	270	Steel	Zinc Nickel
PMT8XXXZ	Custom Length PYTHON MT Fixing 8mm x XXXmm	8	XXX	45	-	Steel	Zinc Nickel

Custom lengths and colours available on request. Contact us on 0800 PYTHON or at info@pythonfixings.co.nz for more information.

PYTHON MT INSTALLATION PROCESS

TYPICAL PYTHON MT

Structural Timber Installation

1 Mark location of fixing installation at least 30mm from brick edge.

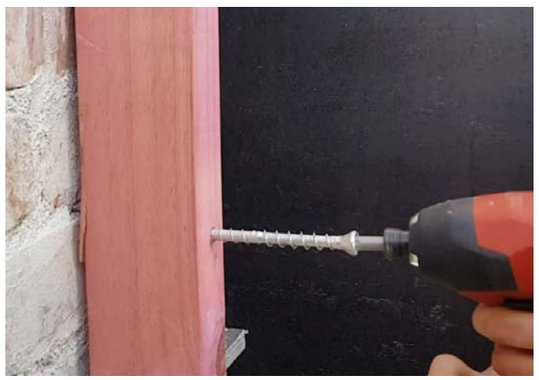
0 SEC

2 Drill 8mm diameter hole through timber member.

3 Drill 8mm diameter hole using a 250mm (or 385mm) long drill bit and a low impact drill.

4 Use a Torx T50 bit with a low impact driver for fast and smooth installation.

5 Position PYTHON MT Fixing into the pre-drilled hole.



6 Countersink the fixing head for smooth finish. Job done!

54 SEC

STRONG HOLD TO MASONRY CAVITY-WALLS

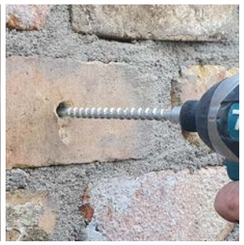
PYTHON C FIXINGS

PYTHON C FIXINGS RANGE

APPLICATIONS

- Structural interconnection of masonry cavity walls
- Remediation of existing cavity wall ties and veneer ties
- Earthquake strengthening - purposely designed and seismically tested
- Wide range of other applications

A considerable proportion of existing masonry buildings are cavity or veneer construction where wall leaves are separated by an air cavity. PYTHON has developed a state of the art, ductile PYTHON C cavity fixings system. PYTHON C Fixings effectively integrate cavity wall layers together, creating composite action and enabling more efficient engineering designs. PYTHON C is also an elegant solution to connect brick veneers to concrete or timber framing whether for new construction, upgrading, or remediation of corroded ties. Available in different durability protection options, the PYTHON C family covers a wide range of applications.



"A lot faster and much more reliable installation than any other product on the market! This is now a go to solution for us"

WELLINGTON BASED PROJECT MANAGER

DIAMETER	LENGTH
6mm	240mm

BENEFITS

Latest Technology

Significantly better safeguarding of lives

Safe, more reliable and high quality

Specialist technical support

Reduces project cost

Comprehensively tested

FEATURES

Transfers shear between wall leaves, allowing design engineers to fully integrate cavity walls and making designs more efficient.

Purpose designed threads for reliable and high performance fixing into clay brick and concrete masonry.

Low impact installation, friendly to the wall substrate.
No bending or snapping of ties during installation.
No unwinding and no compromise on public safety.

Backed by global experts in masonry remediation and strengthening.

Foolproof fast installation that requires minimal supervision, skill level and standard tools.

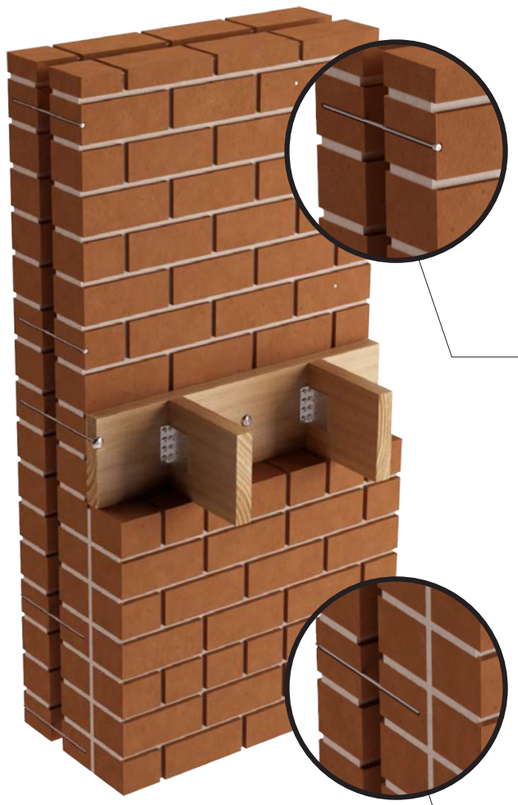
Seismically tested following the principles of NZ and international testing protocols.

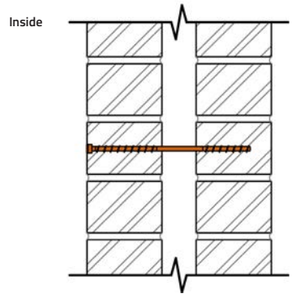
PYTHON C TYPICAL APPLICATIONS

Schematics are for illustration purposes only. Specific engineering design will need to be carried out for each specific scenario. See **PYTHON Example Application Details Library** (www.pythonfixings.co.nz/details-library) for further details on the applications. Contact us to discuss how PYTHON suits your project.

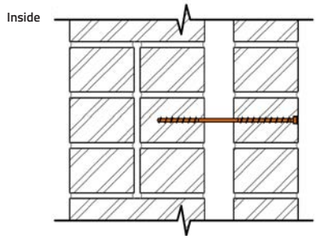
"PYTHON introduced us to a simple yet robust solution for retrofitting our URM Building Projects"

SEAN, HANLON AND PARTNERS LTD

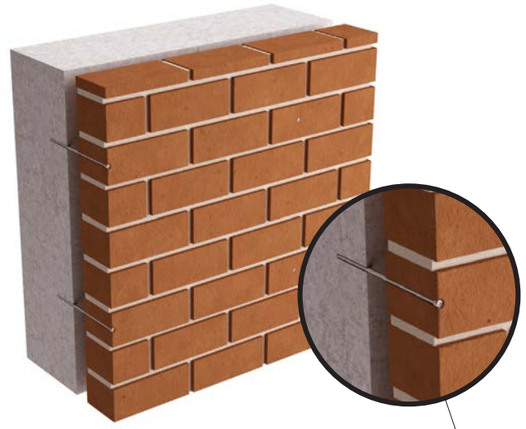


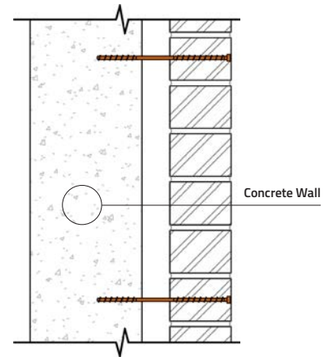


G Tying 1 + 1 cavity masonry wall

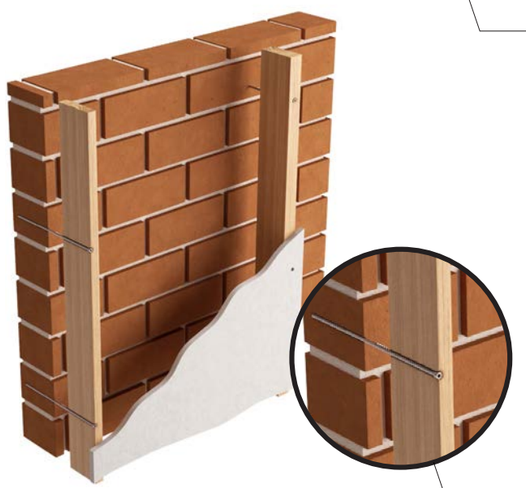


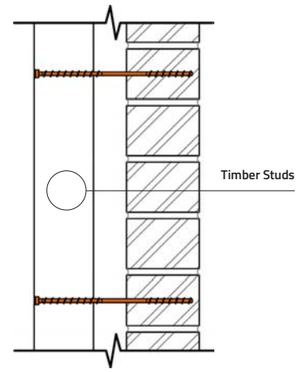
H Tying 2 + 1 cavity masonry wall





I Tying brick veneer onto concrete wall





J Connecting timber stud to brick veneer (and vice versa)

PYTHON C FIXINGS RANGE DATA

TECHNICAL DESIGN DATA

Substrate	Min Substrate compressive strength (MPa)	Min Embedment (mm)	Min edge distance (mm)	Tested Tension Capacity5 (kN) [3]	Tested Shear Capacity5 (kN) [3]
Substrate Test Data [1]					
Clay Brick, Soft	15	70	30	5	1
Clay Brick, Medium	25	70	30	10	1.5
Clay Brick, Stiff	35	70	30	15	1.5
Oamaru Stone / Limestone	6	70	70	5	* [7]
Concrete, Post Installed	30	70	30	15	1.5
Timber, Parallel to Grain	MSG8	70	50	5	1.5 [5]
Retrofit Test Data [4]				Acceptance Criteria Tension Capacity (kN)	Acceptance Criteria Shear Capacity (kN)
Brick Masonry Cavity Wall Ties [2,4]	25MPa (Clay Bricks)	70	30	10	1.5

1. For testing methodology, data, and technical support, please contact us on 0800 PYTHON or at info@pythonfixings.co.nz
2. With PYTHON C fixings installed at 460mm horizontal and 400mm vertical centres, a brick cavity wall can be assessed out-of-plane as a single rigid body or equivilant solid wall. For technical data and support please contact us at info@pythonfixings.co.nz or on 0800 PYTHON
3. "Tested Capacity" values have been developed through monotonic and cyclic testing of PYTHON C Fixings in the corresponding substrate following the principles of AS/NZS2699.1. Strength reduction factors accounting for the testing datas coefficient of varience have been applied.
4. Retrofit test specifications:
   "Acceptance Criteria Load" based on the principle of strength criteria set out by ICC ES AC 106
   Tensile properties based upon ICC ES AC 106 Cyclic Tension Testing
   Shear properties based upon ICC ES AC 106 Cyclic Shear Testing
   Monotonic Tension and Monotonic Shear testing to ICC ES AC 106 and AS/NZS2699.1 have been performed
5. Shear values in timber are for fixings under single shear, parallel to grain
6. To organise on-site proof testing for your project contact us on 0800 PYTHON or at info@pythonfixings.co.nz
7. For shear capacities in Oamaru Stone please contact us on 0800 PYTHON or at info@pythonfixings.co.nz
8. For any variations from the above specifications, including installation into mortar joints and embedment depths or substrate compressive strengths less than the minimum specified, please contact us on 0800 PYTHON or at info@pythonfixings.co.nz

Durability	Exposure categories (AS/NZS 2699.1 and AS 3700)
Zinc-Nickel coated	R0 to R4, Mild, Moderate, Marine and Severe Marine

Refer to **PYTHON Durability Guide** for more information.

PYTHON C PRODUCT RANGE

Product Code	Description	Dia. (mm)	Length (mm)	Material	Finish
PC6240Z	PYTHON C Fixing, 6mm x 240mm, Zinc Nickel Finish	6	240	Steel	Zinc Nickel

"PYTHON worked really well for our project, will keep advocating for these innovative products"

BOB, RJ HALL AND ASSOCIATES

PYTHON C INSTALLATION PROCESS

TYPICAL PYTHON C

Cavity Wall Tie Installation

1 Mark location of fixing installation within a brick. At least 30mm from brick edge.

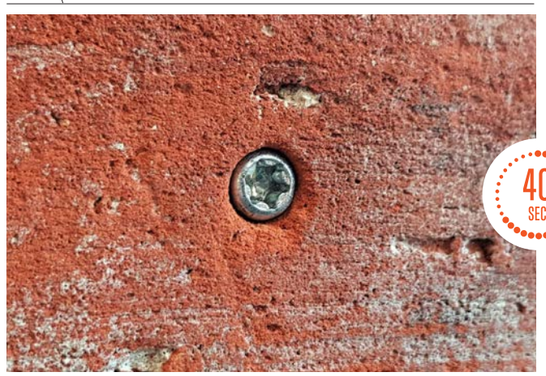
2 Drill 6mm diameter hole approx. 250mm in length using low impact drill.

3 To countersink the fixing head, drill 10mm diameter hole 7mm deep using low impact drill.

4 Position PYTHON C Fixing into the drilled hole.

5 Using a Torx T40 bit rotate fixing using a manual socket wrench (or similar) or for faster and smoother installation, use low impact driver.

6 Countersink the fixing head for smooth finish or cover with colour matching putty for invisible finish. Job done!



FIXINGS ACCESSORIES

Designed to maintain ease of use in the PYTHON system, we provide a range of product accessories to assist installers for a quick and hassle-free project completion where PYTHON MT and C Fixings are being used.

PYTHON FIXINGS ACCESSORIES

PYTHON C ACCESSORY

6mm Diameter Pilot Hole Drill Bit

PYTHON MT ACCESSORY

8mm Diameter Pilot Hole Drill Bit

Product Code	Product Description
PMTWASHER	Conical Washer for PYTHON MT
PBIT6250	6mm x 250mm soft-medium masonry pilot hole drill bit for PYTHON MT
PBIT8250	8mm x 250mm soft-medium masonry pilot hole drill bit for PYTHON MT
PBIT8385	8mm x 385mm soft-medium masonry pilot hole drill bit for PYTHON MT340
PTORX40	Torx T40 driver bit attachment for installing PYTHON C
PTORX50	Torx T50 driver bit attachment for installing PYTHON MT

Conical Washer for PYTHON MT

Torx T40 driver bit attachment for installing PYTHON C

Torx T50 driver bit attachment for installing PYTHON MT

ARCHITECTURE MEETS ENGINEERING

PYTHON MASONRY RETROFIT PLATES

PYTHON MASONRY RETROFIT PLATES

APPLICATIONS

- Robust connection between wall and floor/roof members
- Wall-to-wall cross-tie rods
- Securing canopy to masonry wall
- Combination of decorative and structural design

Inspired by the old European tradition of utilising decorative anchor plates for improving floor/roof to wall connections in masonry buildings, PYTHON Fixings have revisited that tradition and come up with an elegant design that best fits our new world, existing masonry.

"Finally some great looking plates to retrofit our heritage buildings"

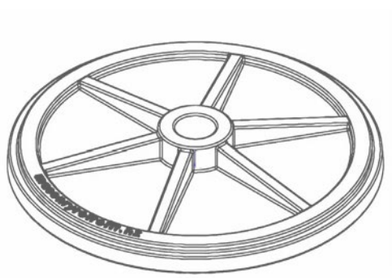
NEW ZEALAND HERITAGE ADVISOR

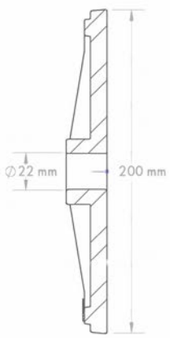
Product Code	Description
PPLATE	PYTHON Masonry Retrofit Plate, 200mm Diameter

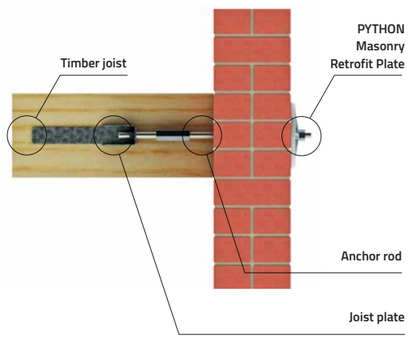
BENEFITS

FEATURES

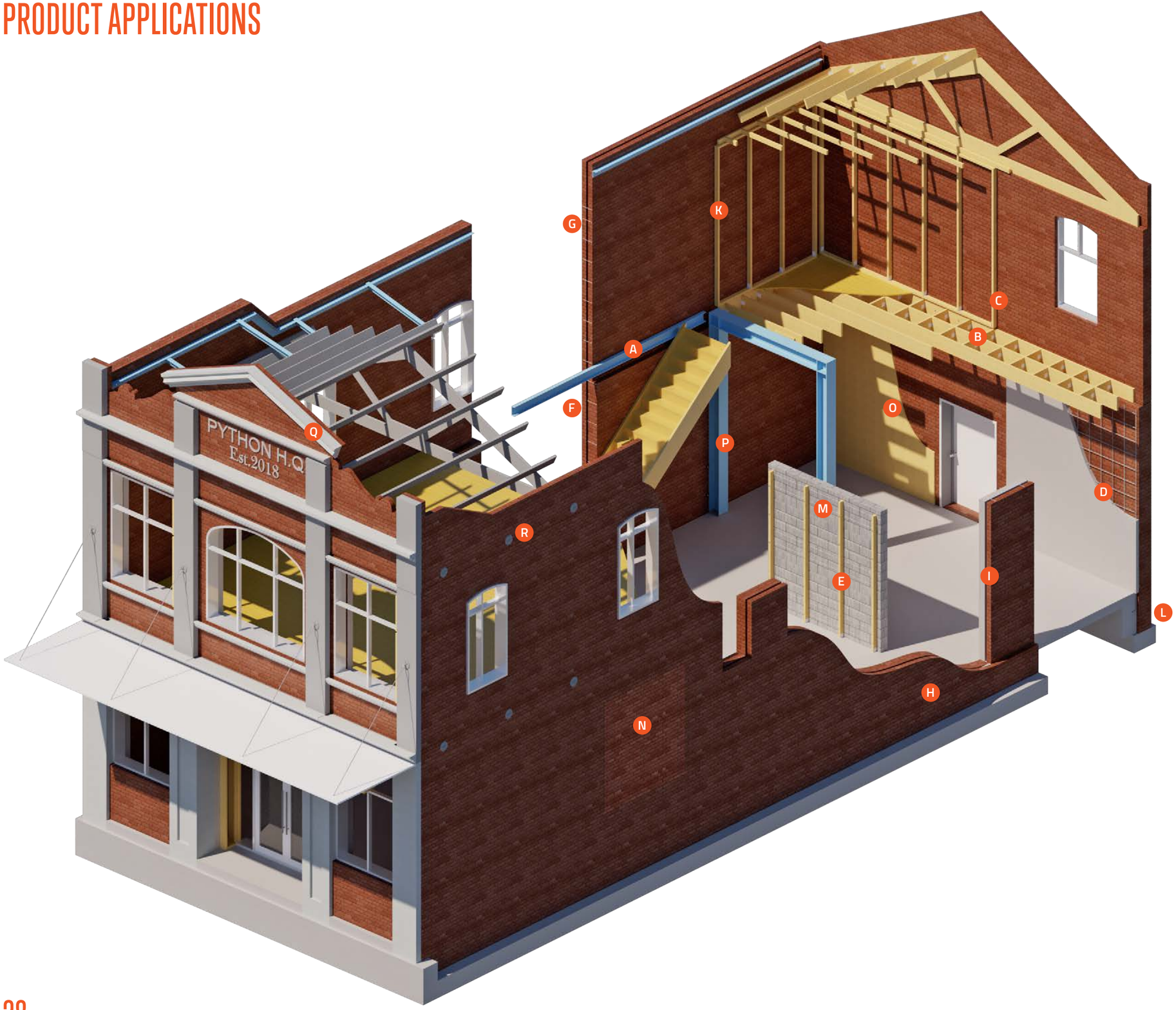
Readily Accessible	Off-the shelf, no long lead times to fabricate.
Cost Effective	No costly custom tooling/moulding.
Aesthetically Pleasing	Elegant designs along the lines of traditional pattress plates.
Significant Performance Improvement	3-way bending load in excess of 250kN. Made of 500/7 Grade SG Iron for combined strength and ductility.







PRODUCT APPLICATIONS

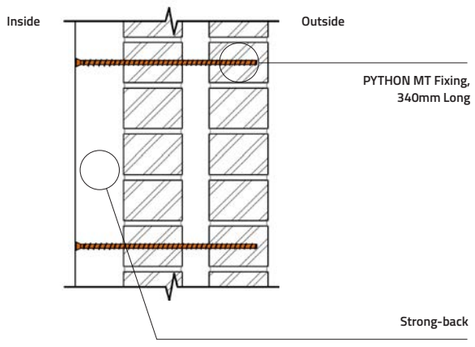


The applications shown herein are for illustration purposes and do not replace engineering calculations. For more details on these applications refer to the **'PYTHON Example Application Details Library'.** (www.pythonfixings.co.nz/details-library)

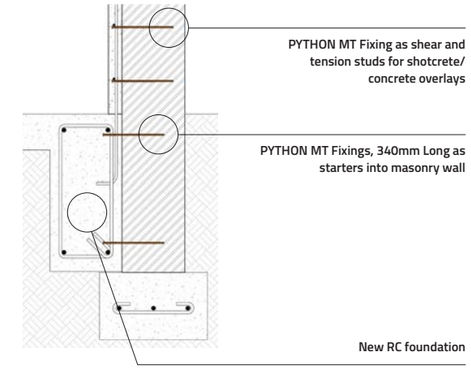
A	Vertical/horizontal steel element connection to masonry
B	Floor/roof to masonry wall connection
C	Steel/timber strong-back to brick masonry connection
D	Starter studs for shotcrete/in-situ concrete overlay
E	Steel/timber strong-back to concrete masonry connection
F	Connecting 2+1 cavity masonry walls from 2 leaf side
G	Tying 1 + 1 cavity masonry wall
H	Tying 2 + 1 cavity masonry wall
I	Tying brick veneer onto concrete wall
K	1 + 1 Cavity masonry wall with timber strong-back
L	Starter dowel connection for new foundation of masonry building
M	Floor connection to concrete masonry wall
N	Continuation tie for new brick infill of existing window
O	Connecting plywood / CLT overlay to masonry wall
P	Steel frames/strong-back fixing onto masonry
Q	Securing capping stones and ornamental features
R	PYTHON masonry retrofit plate connection

OTHER PYTHON APPLICATION EXAMPLES

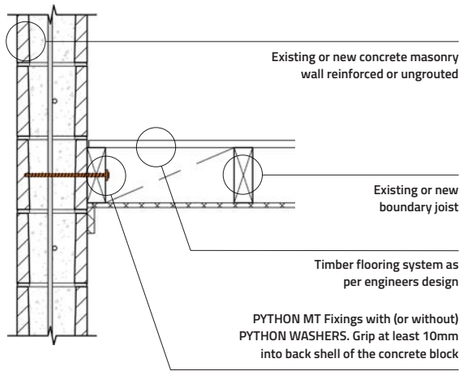
K 1 + 1 Cavity masonry wall with timber strong-back



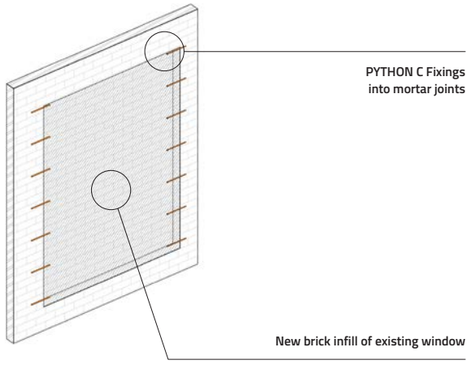
L Starter dowel connection for new foundation of masonry building



M Floor connection to concrete masonry wall



N Continuation tie for new brick infill of existing window

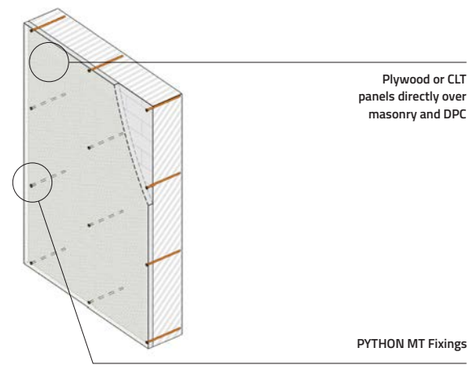


"We are pretty impressed with PYTHONs, super easy to install and fast delivery turnaround, no downtime onsite"

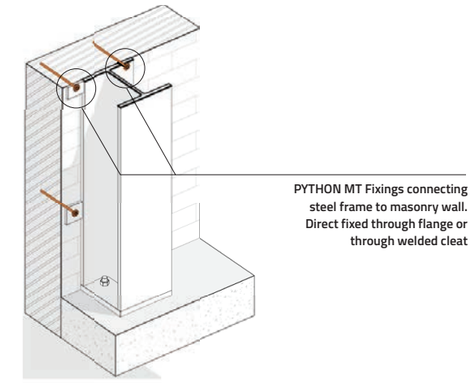
PETER, D STEVENS LTD BUILDING CONTRACTORS

Schematics are for illustration purposes only. Specific engineering design will need to be carried out for each specific scenario. See **PYTHON Example Application Details Library** (www.pythonfixings.co.nz/details-library) for further details on the applications. Contact us to discuss how PYTHON suits your project.

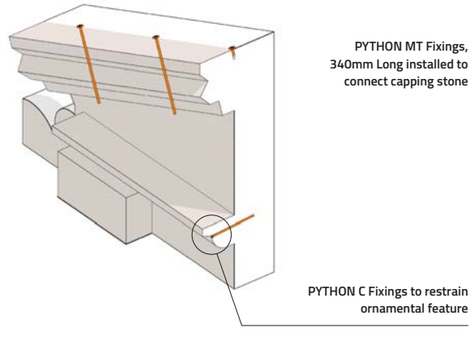
O Connecting plywood / CLT overlay to masonry wall



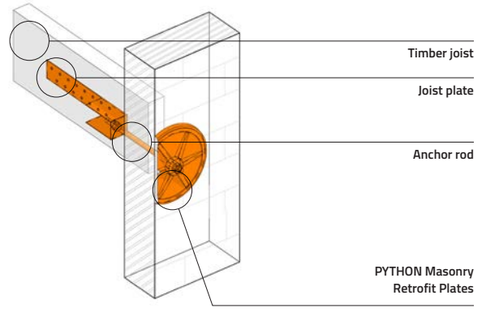
P Steel frames/strong-back fixing onto masonry



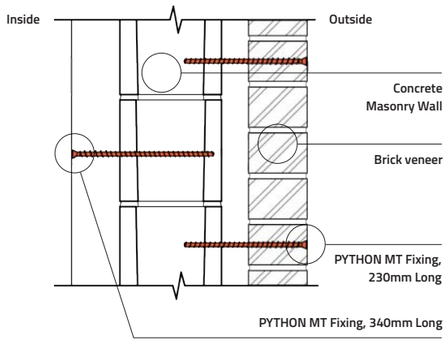
Q Securing capping stones and ornamental features



R PYTHON masonry retrofit plate connection

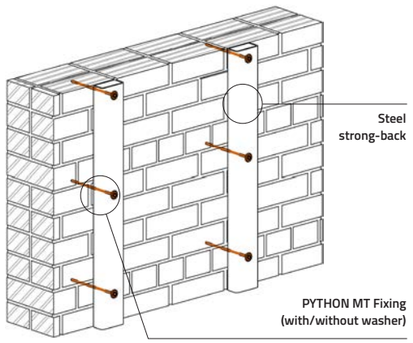


S Connecting strong-back – concrete masonry – brick veneer

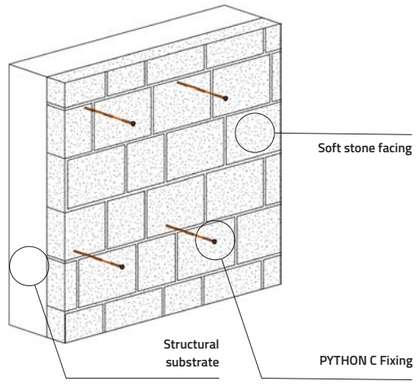


Schematics are for illustration purposes only. Specific engineering design will need to be carried out for each specific scenario. See **PYTHON Example Application Details Library** (www.pythonfixings.co.nz/details-library) for further details on the applications. Contact us to discuss how PYTHON suits your project.

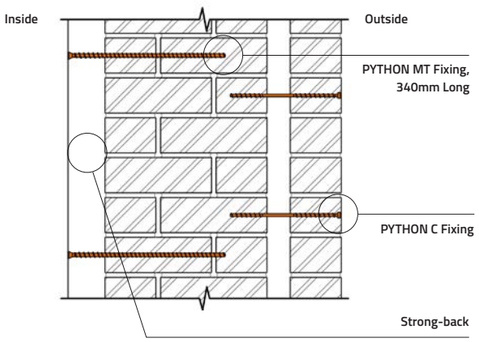
T Connecting steel SHS/strong-back to brick wall



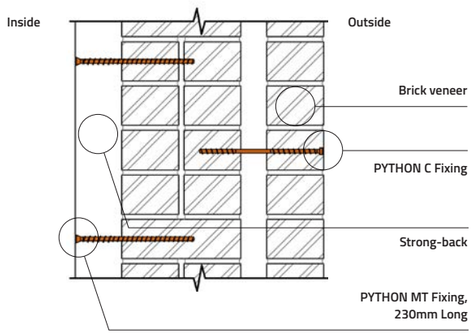
U Securing facade stone facing to structural wall



V Tying 3+1 cavity masonry wall



W 2 + 1 Cavity masonry wall with timber strong-back



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