CINTEC
REINFORCEMENT SYSTEMS

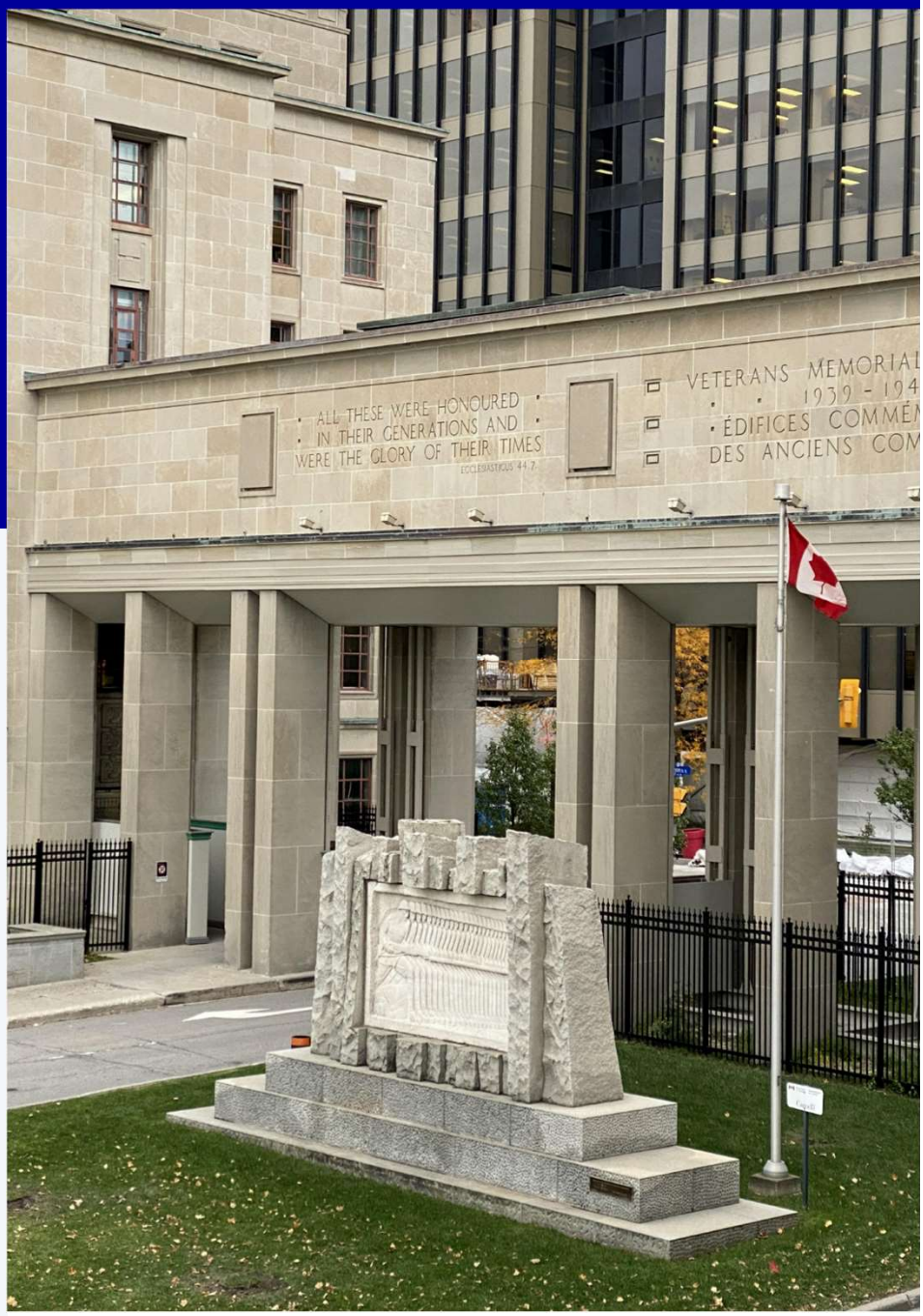
Case Study

Transforming from Historical Landmark to Seismic Stronghold:

Memorial Colonnade

Rehabilitation Project

Ottawa, ON



Project Highlights

Application:
Seismic retrofitting of a National Historic Monument

(See video)

The building has been vacant since 2008. It was vacant because it was in overall poor condition where safety issues needed to be addressed, and upgrades were needed before it could be used.

Completion date:
2024

The outcome:
Repairing and protecting the Memorial Colonnade.
Seismic upgrading to meet current building codes for earthquakes.

20 Cintec anchors of approximately +/-75' long

Owners:
Public Services and Procurement Canada
Structural Engineer: Adjeleian Allen Rubeli
Architect: Allward and Gouinlock (original), Regenerate 344
(Moriyama Teshima Architects + Kasian Architecture in Joint Venture)
General Contractor: EllisDon
Masonry Contractor: Atwill Morin

The History

The Memorial Colonnade links the East and West Memorial Buildings (classified as heritage buildings), and it was built between 1954 and 1958 to honor Canadians who served their country during the Second World War. These buildings were erected as the federal government's principal memorial to those killed during World War II.

Over the decades, the colonnade has faced challenges, including deterioration from environmental exposure and the increasing threat of seismic activity due to its geographic placement.

Recognizing the importance of preserving this historical structure, a **seismic reinforcement project** was initiated to enhance the building's structural integrity.

The Solution

The requirement was for seismic retrofitting of the columns.

Twenty Cintec anchors were installed full length of the columns, into the bedrock.

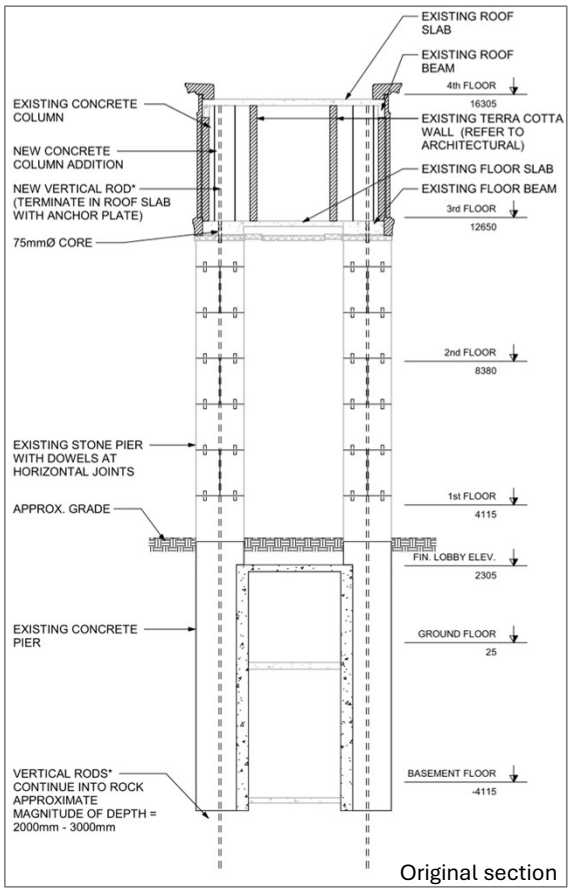
As determined, vertical anchors were to be a 1 3/4” diameter, reinforcing bar with overall anchor lengths of 65 feet (20 M) to 75 feet (24 M) long.

The anchors were fitted with a 4-inch (100 mm) sock and installed by use of a crane in drilled cored holes of matching diameter.

Placement was completed by the injection of Presstec© grout, **creating a strong attachment: both mechanical and adhesive.**

The successful implementation of the Cintec technology not only secured the future of the Memorial Colonnade but also set a precedent for **the use of innovative techniques in the conservation of historical architecture.**

Moving forward, it serves as a model for similar seismically vulnerable projects worldwide.

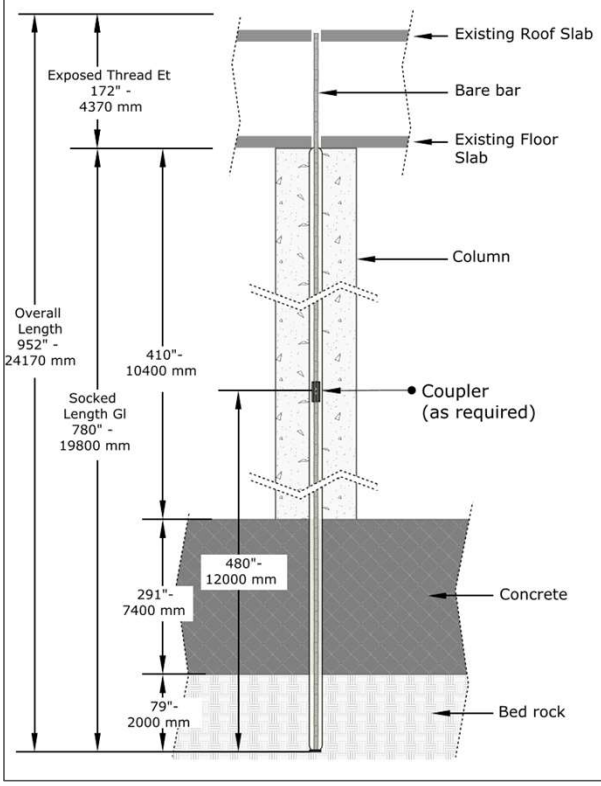


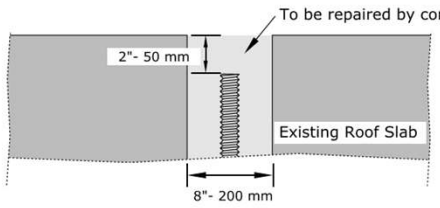
Original section

DRAWING

WMB Rehabilitation Colonnade
Stainless Steel 2304

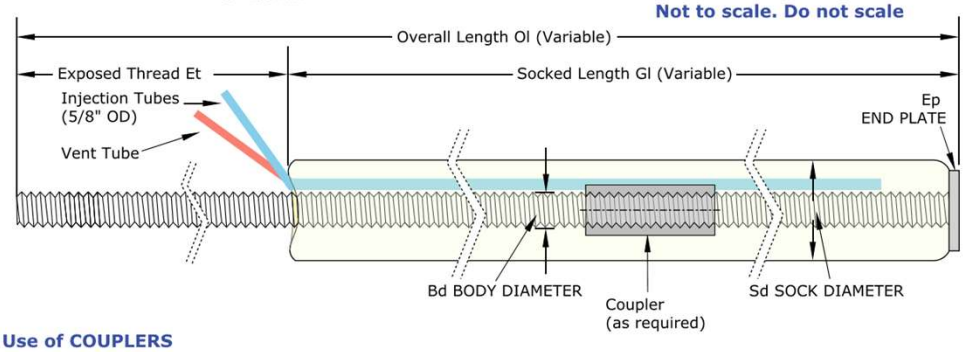
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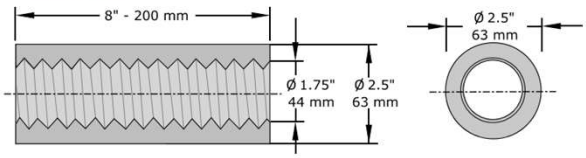


NOTE:
All stainless steel
SRT 1 3/4 ", #14 Duplex 2304 Gr75
Meets : ASTM 276
with a yield capacity of 75KSI
See letter provided in lieu of calculations (attached) per DWG S324
All dimensions to be confirmed onsite by contractor
Anchor length will be adjusted on site to suit core hole depth

Not to scale. Do not scale



Use of COUPLERS



* When anchor body (steel) length exceeds site clearance limitations, then a mechanical coupler is used to join the pieces. As **coupler capacity is equivalent or greater of steel capacity** that it is connecting and therefore a weak point in the anchor is **not** created.



Shop Drawing. Couplers were used to attached the bar pieces together to reach the required length of anchor

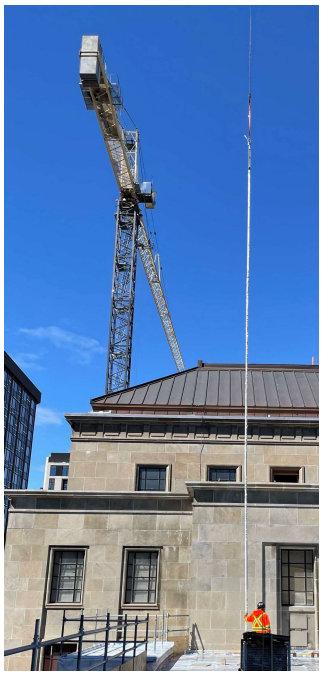
The Installation



On-site Anchor Assembling



Core Hole Drilling



Anchor Placement



Anchor Insertion



Grout Injection

Due to the length of the Cintec anchors and the importance of this historical structure, **on-site assembling** and **specialized drilling** were required and done by an expert contractor.

A crane was used to lift the anchors and install them in place, inserting them into the columns, from the roof of the Colonnade.



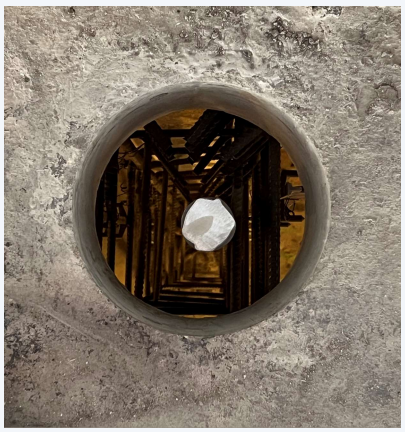




Structural dowels and rebar were installed within the formed and poured column

The Details





On the **left**, one of the couplers that were used to attach the bar pieces together, to reach the required length of anchor.
On the **right**, top view of the anchor and the column formwork, taken from the roof of the Colonnade.

