

Heli-Tie™ Helical Ties Stitch and Stabilize Unreinforced Masonry Walls at Quebec Pulp and Paper Mill



PROJECT INFORMATION

Project

Rayonier Advanced Materials Pulp and Paper Mill in Temiscaming, Quebec

Project Category

Restoration and Retrofit

Project Owner

Rayonier Advanced Materials

Application

Repairing and stabilizing unreinforced masonry (URM) walls

Simpson Strong-Tie Products

Heli-Tie helical wall ties; Heli-Tie helical stitching ties; Simpson Strong-Tie FX-263 rapid-hardening repair mortar

BACKGROUND Aging walls at global pulp-manufacturing plant call for repair, stabilization

As the world's largest and busiest manufacturer of dissolving pulps, Rayonier Advanced Materials could ill afford to let a day of lost productivity — let alone a shutdown for lengthy retrofit — disrupt their production. The company has grown immensely since its founding in 1926 as the Rainier Pulp & Paper Company in Washington State, and it continues to expand into new markets almost a century later while maintaining a high level of operations with sustainability as a core value.

Recently, it became clear that Rayonier's hundred-year-old pulp and paper mill in Temiscaming, Quebec, was deteriorating. Vertical cracks were opening in parts of the masonry, and some URM walls showed signs of destabilization. Specifically, at least one of the unreinforced, multiwythe brick walls of the digester building displayed growing separation between its wythes.

THE CHALLENGE

Plant owner needed to maintain business during repair

For the mill to continue functioning at a high level of productivity, the three-story URM walls of the digester building needed repair or replacement. Demolition and new construction were one clear option, but more cost- and time-conscious solutions were preferable given the plant's incessant high output.



Unreinforced, multiwythe brick wall displayed significant cracking in need of repair.

CHALLENGE

Repair and stabilize unreinforced masonry brick walls without interrupting mill operations.

SOLUTION

Use Simpson Strong-Tie Heli-Tie wall and stitching ties to restore wall integrity and repair cracks, respectively.

RESULTS

Walls repaired and strengthened within three months, with no halt to client business; client requested similar treatment to other walls in near future.

THE SOLUTION Tie wall wythes together for stabilization; suture wall cracks and unreinforced mortar for additional strength



Installation of Heli-Tie™ ties required using a lift to reach heights of almost 120'

Rayonier's in-house engineer determined that the wythes could be adequately braced using Simpson Strong-Tie® Heli-Tie helical ties. Various lengths of the Heli-Tie would be required as a result of the inconsistency in brick wall thicknesses. Thicknesses ranged from two to four wythes in a single wall. Some of the walls on the building also reached 120' in height and 260' in length — all of which contributed to the scope and challenge of the project.

Looking to extend the life of the structure, the customer also decided to stitch the existing cracks, along with some uncracked areas whose location made them susceptible to stresses.

The entire process involved two main steps:

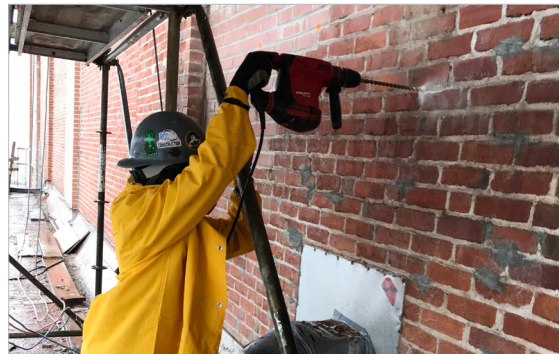
First, the multiwythe brick walls were stabilized by installing Heli-Tie helical wall ties spaced in the mortar joints every two bricks horizontally by every five bricks vertically, which corresponded to 17" o.c. horizontally by 12" o.c. vertically. This was done to tie the wythes together so as to mitigate their further separation.

URM walls were repointed at the Heli-Tie insertions to prevent moisture intrusion. Although the Heli-Tie wall ties are available in both Type 304 and Type 316 stainless steel, repointing is encouraged to prevent moisture intrusion and corrosion of rebar, where it may be present.

Second, the areas on the multiwythe brick walls that had vertical cracking were strengthened using Heli-Tie helical stitching ties. Installers used Simpson Strong-Tie® FX-263 rapid-hardening repair mortar along with other cementitious repair mortars to grout the 40"-long ties into the mortar joints after every fifth layer of brick (i.e., 12" apart vertically) in strategically chosen areas.

Products utilized in the retrofits:

- Over 11,300 5/8"-diameter Heli-Tie helical wall ties total (of varying lengths)
- Over 600 1/4" x 40" Heli-Tie helical stitching ties
- Simpson Strong-Tie FX-263 rapid-hardening repair mortar



Drilling holes for installation of Heli-Tie wall ties.

THE RESULTS Wall repaired and reinforced with Heli-Tie helical ties in three months without removing mill from service; repairs to additional walls ordered

The URM reinforcement spanned three months and — critically — allowed the plant to sustain its operations throughout the repair.

Rayonier expressed equal pleasure with the undistruptive solution and its results. As it happened, their engineers were so satisfied with the retrofit that they decided to have the other three walls of the digester building stabilized, repaired and strengthened using the same Simpson Strong-Tie products — granting the busy mill a whole new lease on life.



Repointed mortar on the face of the URM wall at Heli-Tie installation locations.

MORE INFO

For complete information regarding specific products suitable to your unique situation or condition, please visit strongtie.com/css or call your local Simpson Strong-Tie RPS Specialist at **(800) 999-5099**.