



West Memorial Building Heritage Materials Testing Results for Wood Panelling Dismantle

335 Wellington Street, Ottawa, Ontario



for

Major Crown Projects – Public Services and Procurement Canada
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INVESTIGATION 5: Wall Wood Panelling Dismantle Test

Site Visit Summary

A site visit was conducted on 27 October 2016 to observe the test removal of wood panelling by ARI contractors from two locations (room 5014 and room 5026) on the 5th floor of the WMB. The exercise was conducted in order to ensure that a methodology for removal can be established that will cause minimal damage to these fixed-removable heritage assets upon eventual rehabilitation of the building. Consultation between parties was ongoing and collaborative throughout the exercise and improvements or modifications to existing procedures were discussed and refined.

At the onset of disassembly of the full wall height wood panelling, it became apparent that the architectural woodwork installations are composed of both prefabricated assemblies (as is the case with the wall panels and backing frames) and assemblies built in the field, as is the case with the window blind pocket valence. As such, the complexity of disassembly is greater as all members of the blind pocket valence require separate removal in order to gain access to the panels. In contrast, the disassembly test for the oak wainscoting was fairly uncomplicated due to its simplified construction.

A second site visit was conducted on 3 November 2016 to observe the reinstallation of the wooden panelling by ARI contractors. Reinstallation of the wood wainscoting in Room 5014 was straightforward. Reinstallation of the full-height panelling and blind pocket assembly in Room 5026 was also straightforward, though the requirement for a specific order of operations became evident, and the necessity of proper component location mapping and labelling was also reinforced.

Test 5.1: Wood panelling (full wall height) dismantle test

Location: Room 5026

Date: 27 and 31 October 2016

Contractor: ARI

Construction

Panelling

Full wall height panelling consists of separate, prefabricated top and bottom veneer plywood panels divided by a solid oak chair rail (see *Figure 1*). The 11 mm thick oak-veneered plywood panels are attached to 28 mm thick softwood lumber backing frames with a combination of screws inserted through clearance holes in the backing frame and purchasing in the rear of panels, as well as by face-nailing with small finishing nails along plywood perimeters. Panel edges are trimmed with solid walnut square trims (19 mm wide x 11 mm thick) with a simple square profile that is face-nailed with finishing nails into the backing frame.

Panels are attached to furring strips by common nails driven through the exposed backing frame at panel edges (see *Figure 3*). Bottom panels butt directly against the marble baseboard at the bottom and are secured to the wall at the top edge by the chair rail, and by toe-nailing through backing frames into furring strips at either side. Top panels are toe-nailed through exposed backing frames along sides and are nailed along the exposed backing frame at the top into furring strips.



Figure 33: Full wall height wood panelling on interior face of the exterior wall with windows. (Photo: Heritage Conservation Directorate, 2016)



Figure 34: Cross-section of wall and window blind pocket assembly (wood cornice removed) (Photo: Heritage Conservation Directorate, 2016).



Figure 35: Rear of upper panel (removed) showing backing frame.

Furring Strip and Fibreboard Substructure

The rough, softwood lumber furring strips are planted onto a double layer of cellulose-based fiberboard sheet that may be present as a form of insulation. These two fibreboard sheets are attached to softwood lumber strapping frames that are attached to the terracotta wall through shims.

Cornice and Window Blind Pocket Assembly

On exterior walls with windows, the top of the backing frame is concealed by a window blind pocket/valence assembly. The window blind pocket consists of solid oak front and back fascias measuring 161 mm wide x 19 mm thick, and a 107 mm wide x 6 mm thick, oak-veneered plywood upper plate to which existing blind hardware is screwed. Solid oak blocks spanning the upper plate are installed as attachment points at joints in the front fascia. The upper plywood plate is face-nailed to a concealed, continuous blocking softwood lumber composite assembly consisting of a 1"x4" board nailed to a 2"x4" board that is nailed to the ceiling. Above windows, the back fascia of the blind pocket assembly is supported by a series of evenly spaced softwood blocks as there is no panelling in these areas.

A wood cornice consisting of a primary solid oak cove molding 65 mm wide x 41 mm thick, and a secondary, narrow oak cove molding measuring 18 mm wide x 15 mm thick, is planted on the front fascia of the window blind pocket assembly. On other walls with no windows, the top of the exposed backing frame is concealed directly by the wood cornice assembly. Cornices are fastened in place with finishing nails and corners are coped and adhered with a protein glue.

Disassembly

1. Comprehensive component mapping and labelling must occur before any disassembly begins. A master 'map' (either an overall photographic print or scaled architectural drawing, if available) should be used to capture the location of all components before any parts are removed. Maps should be composed separately for north, south, east and west walls of each room number (e.g. *Rm. 5026- North Wall*). Each separate component should then be physically, *legibly* labelled on the unfinished side (low tack painter's tape may be used) with a uniquely assigned number corresponding to the master map. A consistent system must also be used to designate the installed orientation of each part if orientation is ambiguous, and may be as simple as a directional arrow and compass point coding system.
2. Wood cornices should be detached first. The narrow secondary molding should be removed before the larger, primary molding. Disassembly should begin at a corner with an end that is coped rather than a run that is butted into the corner and therefore restrained by the mating coped component. Molding pullers or small pry bars custom-ground to zero-thickness should be used to gently lever the moldings away from the wall. Prying or levering directly against finished surfaces must be avoided. A putty knife or a thin, sacrificial piece of wood can be inserted between the pry bar and finished surfaces in order to protect finished surfaces from damage when levering against them. Prying should be conducted gradually down the length of each component to avoid inducing too much stress in one area and risking breakage. If glued corners do not open easily with prying, water can be injected into the corner of the joint with a syringe and allowed to stand for several minutes to soften the glue. Syringes are available at Lee Valley Tools:

<http://www.leevalley.com/en/wood/page.aspx?p=20003&cat=1,110,42967>



Figure 36: Rear of lower panel (removed) showing backing frame.



Figure 37: Cross section of window blind pocket assembly.
Note: cornice removed and front face partially pried away.
(photo: Heritage Conservation Directorate, 2016)

3. On exterior walls with windows, the window blind pocket should be disassembled following removal of the wood cornice. All existing blind hardware is removed first. The solid wood front fascia is carefully pried off. Blocks installed at joints are pried off next. The blind pocket upper plate is then pried off, followed by the continuous blocking.
4. The chair rail can be removed next following the procedure outlined above for the chair rail associated with the wood wainscoting ('Oak Panel Wainscoting- Disassembly Procedure' Steps 3-7).
5. The prefabricated radiator panels can be removed next. These panels must be removed to allow access to the sides of the bottom wall panels. Radiator panels are detached by unfastening the four brass screws that secure the panels to the radiator housings. Retain original brass screws for reinstallation.
6. Next, the top panel can be pried away from the furring strips at attachment points. This procedure requires two people: one to pry off the panel and one to support the panel as it is detached from the wall.

Note that while it is theoretically possible to pry the top panels away from the wall without removing the adjacent window side jamb panelling and square trims, reassembly will be greatly facilitated by removing these adjacent side jamb panels and corner moldings first. The sides of the top panel backing frames cannot be properly secured by toe-nailing without removal of these side jamb panels. While the test panel did not exhibit toe-nailing on the window-side edge, existing holes in the backing frame along this edge indicate that this edge was originally toe-nailed to furring strips. The choice may be made to take a less intrusive approach and avoid removing window side jamb panels, but this may affect the fit of the panels along the window edge.

7. Finally, the bottom panel is carefully pried away from furring strips at attachment points along the side edges and at the bottom edge.

8. Nails should be carefully removed from all components following disassembly.

Reinstallation

General recommendations

- New nails, either finishing nails or common nails depending on application, should be used to reinstall all previously nailed components.
 - It is recommended that new locations are chosen for nails (rather than using existing nail holes to reattach panels) in order to ensure fasteners have sufficient holding power.
 - Finishing nail heads must be set below the surface, filled and toned to match existing adjacent finish.
1. Bottom veneer plywood panels must be reinstalled first. Bottom panels register directly off the marble baseboard. The bottom panels should be face-nailed at the bottom edge as in the manner of original installation.
 2. The prefabricated radiator panels must be reinstalled next, before the chair rail is reinstalled. The original brass screws should be used to reattach these panels.
 3. The chair rail is reinstalled next. Note that anywhere a hollow bit screw extractor was used to free the chair rail due to seized or broken screws; the chair rail must be repaired beforehand by plugging holes and re-drilling clearance holes and countersink holes.
 - New, appropriately sized Robertson screws (rather than slotted screws) should be used to reinstall chair rails.
 - New face plugs must be reinstalled in chair rails, carefully flushed off, surface-prepared, toned if necessary to match the adjacent finish and coated with a stable, translucent coating to match existing sheen, i.e., 35° satin sheen.
 4. The top panel is reinstalled next and registers off the chair rail.
 5. The blocking originally installed above windows should be installed next (having been pried away from the back fascia of the blind pocket assembly in preparation for reinstallation). Their locations should be marked on the ceiling in order to ensure that the fasteners that fix the back fascia of the blind pocket assembly purchase into these blocks.
 6. The blind pocket assembly is reassembled next, beginning with reattachment of the back fascia with new finishing nails; then reinstallation of the continuous blocking with common nails; then reattachment of the blind pocket upper plate with finishing nails; reinstallation of the oak blocks at joint locations in the front fascia; and finally, reinstallation of the front fascia with new finishing nails.
 7. To complete the reinstallation, the wood cornice is reinstalled on the front fascia with new, appropriately sized finishing nails.

Test 5.2: Wainscoting (chair rail height) dismantle test

Location: Room 5014

Date: 27 October 2016

Contractor: ARI

Construction

Sections of oak-veneered, 12 mm thick plywood panels edge-joined by 10 mm wide x 2 mm thick splines and face-nailed to furring strips with finishing nails spaced approximately 100 mm apart across the top and bottom of each panel. The bottom edge of veneer plywood panels butt against the top edge of the marble baseboard and the top edges of the panels continue behind a solid oak, molded chair rail. At the bottom edge, the face nails are exposed but filled; at the top of panels the face nails are covered by the chair rail. The chair rail is attached to furring strips by means of slotted screws countersunk 7 mm beneath the show face, spaced approximately 300 mm apart and concealed by 10 mm wide solid oak face plugs.



Figure 38: Example of wood wainscoting and chair rail (Room 5014).



Figure 39: Splined edge joint of panels and attachment to wall by face-nailing (chair rail removed).

Disassembly

1. Comprehensive component mapping and labelling must occur before any disassembly begins. A master 'map' (either an overall photographic print or scaled architectural drawing, if available) should be used to capture the location of all components before any parts are removed. Maps should be composed separately for north, south, east and west walls of each room number (e.g. *Rm. 5026- North Wall*). Each separate component should then be physically labelled (low tack painter's tape may be used) with a uniquely assigned number corresponding to the master map. A consistent system must also be used to designate the installed orientation of each part if orientation is ambiguous, and may be as simple as a directional arrow and compass point coding system.
2. A utility knife is used to carefully cut any paint, caulking or adhesive residue present that may bond the

chair rail to the wall surface along the back of the top edge.

3. A drift pin or short length of hardwood dowel no more than 8 mm (5/16") in diameter should be squarely and sharply tapped on the centre of the plug using a hammer to break the glue bond between the face plug and surrounding wood.
4. Wood face plugs are carefully drilled out to ensure that only the plug material is removed and the surrounding wood is not damaged. A regular 10 mm wide x 7 mm deep hole should remain and expose the original countersunk screw. **Care must be taken to drill only deep enough to just expose the head of the countersunk, slotted screw beneath the plug. The soft metal screw heads can be easily damaged if contacted by the drill bit, risking stripping of the slotted head and greatly complicating subsequent removal.**
 - An undersized pilot hole 3mm (1/8") in diameter should be drilled into the centre of the plug no more than 7 mm deep or until the countersunk screw is just visible. Drill bits of successively increasing diameter should then be used to continue to clear material from the centre of the hole until only a thin ring of the original face plug remains. A small (i.e. 1/4") gouge or chisel can be used to carefully pry out the remaining plug material, detaching the plug material at the bond line and ensuring that a crisp 10 mm (3/8") hole remains.
 - Attempts to remove face plugs by using a drill bit the exact size of the plug (10 mm or 3/8") must be avoided because of the risk of drilling off centre and creating an irregular, oversized hole.
5. After drilling out face plugs, countersunk slotted screws are then removed.
 - It is necessary to ensure that slots are carefully cleared of adhesive residue before attempting removal. This can be accomplished by using a pin vise or other appropriately sized small metal probe to clear residue from the slots while avoiding stripping.
 - It is critical that an appropriately sized flat head screwdriver is used to remove the screw. The blade and tip must be no more than 10 mm (3/8") wide and the thickness of the tip must correspond to the width of the slot exactly. If an appropriately sized screwdriver is not available, the tip of an oversized screwdriver should be custom-ground to fit the slot exactly. The use of oversized or undersized screwdriver tips risks stripping the screw head and complicating screw removal.
6. If any screws are seized, stripped, broken or otherwise unable to be removed with a screw driver, a conventional screw extractor can be used to remove the screw. If this is unsuccessful, a hollow bit screw extractor may be used to free the rail from around the seized screw by drilling through the entire material thickness. 3/8" hollow bit screw extractors are available from Highland Woodworking:
<http://www.highlandwoodworking.com/set3hollowscrewextractors.aspx>

If a hollow bit screw extractor is used, the remaining hole will require plugging, and a new countersink hole and clearance hole drilled.
7. Once all screws are removed from the chair rail, a moulding puller or thin pry bar custom-ground to "zero-thickness" should be used to pry the molding away from the wall. Prying or levering directly

against finished surfaces must be avoided. A putty knife or a thin, sacrificial piece of wood can be inserted between the pry bar and finished surface in order to protect the finished surface from damage when levering against it.

8. Once the chair rail is removed, the veneer plywood panels can be pried away from the wall using the procedure for prying described above. Ensure that panels are well-supported during removal to ensure that the splines joining the panels are not broken in the process.
9. All nails should be removed from components following disassembly.

Reinstallation

General recommendations

- New nails, either finishing nails or common nails depending on application, should be used to reinstall all previously nailed components.
 - It is recommended that new locations are chosen for nails (rather than using existing nail holes to reattach panels) in order to ensure fasteners have sufficient holding power.
 - Finishing nail heads must be set below the surface, filled and toned to match existing adjacent finish.
1. Veneer plywood panels are reinstalled by face-nailing into furring strips along the bottom edge and top-edge as per original installation, however, it is recommended that new locations are chosen for nails (rather than using existing nail holes to reattach panels) in order to ensure fasteners have sufficient holding power.
 2. The chair rail is reinstalled as per original installation, however, new, appropriately sized Robertson screws (rather than slotted screws) should be used for reinstallation.
 - New face plugs must be reinstalled in chair rails, carefully flushed off, surface-prepared, toned if necessary to match the adjacent finish and coated with a stable, translucent coating to match existing sheen, i.e., 35° satin sheen.