

Summary Report

TS 9184 Testing of Wood Glue Squeeze Out Removal Techniques

This is a summary report of the Testing of Wood Glue Squeeze Out Removal Techniques. The Construction Technical Service Group received a request from Bob Behnke the Technical Service Manager - Titebond Products of Franklin International to perform testing of the best technique to remove wood glue squeeze out to allow for wood staining without the glue affecting stain appearance.

Adhesive Glues:

- Titebond Original Wood Glue (Lot# A811140044)

Application Tool:

- Titebond Titebrush

Adhesive Remover:

- Titebond® Adhesive Remover Cleaning Wipes (Lot# 18717), Titebond Titebrush scraper and wet cotton rag.

Substrates:

- Walnut Wood boards

Wood Stain:

- Wipe on Penetrating Oil-based Wood Stain (Minwax True Black 274: SKU 2742670051)

Wood Finish:

- Wipe on Satin Polyurethane (Minwax Wipe-On Poly-Clear Satin: SKU 2742640910)

Executive Summary

Discussion

All of the wood glue squeeze out removal techniques allowed for wood staining without the glue affecting stain appearance. Method 4 ranked #1. The wiping of the glue with a wet cotton cloth removed the glue without sanding. A one minute sanding time was implemented prior to wood staining and finishing of this method. In future testing, the use of fluorescence dye and a black light would enhance the subjective observations of any remaining dried glue. See Appendix "A" for photos for each of the wood glue squeeze out removal methods.

See Table 1 below for test results and rankings.

Ranking & Results of Wood Glue Squeeze Out Removal Techniques			
Rank	Method	Sanding Time per Foot	Observations
#1	Method 4: Wiped the glue with a wet cotton cloth to remove the glue by straight wiping surface. The wet cotton cloth was soaked in water, removed dripping wet then rung out until the water stops dripping. Wiping continued until all wet glue is removed from the surface. Sanded after 24 hours.	No sanding required for removing the glue.	A large amount of water thinned the glue for easier removal and soaked the surface of the wood which raised the grain. Rinsed the cloth twice with a 3 minute removal time of the wet glue.
#2	Method 3: Left the glue squeeze out to dry for 20 minutes before scraping with a Titebond Titebrush tapered end then sanded after 24 hours.	1 minute	Sanded easily. Some glue was left on the surface after the tapered tool scraping.
#3	Method 5: Wipe the glue with a wet cotton cloth in a rolling motion. Wiping will continue until all wet glue is removed from the surface. Then sand after 24 hours.	2 minutes	A slow wiping process (16 minutes). 18 rolls of the cloth and then some of the glue dried on the surface.
#4	Method 2: Left the glue squeeze out to dry fully, then scraped off excess with a sharp chisel before sanding.	5 minutes	The glue did not peel off but came off in chunks and pulled off wood fibers. Difficult to remove the dried glue without gouging the wood.
#5	Method 1: Left the glue squeeze out to dry fully before sanding.	8 minutes	Sanded easily but gradually.
#6	Method 6: Wiped the glue with Titebond Adhesive Remover in a rolling motion. Wiping continued until all wet glue is removed from the surface. Then sanded after 24 hours.	10 minutes	A very slow wiping process (20 minutes). 16 rolls of the cloth and then some of the glue dried on the surface. Oil from the wipes was left on the surface of the wood which was removed after the removal of the glue.

Wood Glue Remove Testing

4/4 walnut boards were freshly planed and cut to 0.75 thick x 6.125 inches wide x 24 inches long then the boards were cut on a table saw lengthwise to produce two pieces that are 3 inches wide x 24 inches long matching the grain. The glue was applied to both sides of the 0.75 inch thick faces of two walnut boards that were cut lengthwise using a Titebond Titebrush for even coverage. The two walnut boards were immediately hand pressed into the glue line using a slight back and forth motion to ensure wetting of both surfaces, achieving glue squeeze out and creating a joint*. Joints were clamped in a press with 200 psi of pressure overnight and allowed to dry at RTH (75°F, 45% RH) for 24 hours. After drying, the joints were wiped with

mineral spirits to assess the cleanliness of the surface for staining. Allowed the mineral spirits to dry then begin sanding (see Sanding Method below). Then sanded a 12 inch length of the glue joint for a fixed period of time (to be determined for each sanding method). When the sanding was completed on each piece, it was wiped with mineral spirits again to assess the stainability of the surface. Continued the sanding time periods until the surface was clean enough to accept the stain (subjective inspection and evaluation). Applied a wood stain and finish to the boards. Recorded the sanding time required for each squeeze out method. Generated photos of each wood glue removal process and any subjective observations.

*After the joints are clamped and glue squeeze out is achieved (as noted above) the following wood glue removal methods were tested:

1. Left the glue squeeze out to dry fully before sanding.
2. Left the glue squeeze out to dry fully, then scraped off excess with a sharp chisel before sanding.
3. Left the glue squeeze out to dry for 20 minutes before scraping with a Titebond Titebrush tapered end then sanded after 24 hours.
4. Wiped the glue with a wet cotton cloth to remove the glue by straight wiping surface. The wet cotton cloth was soaked in water, removed dripping wet then rung out until the water stops dripping.
5. Wipe the glue with a wet cotton cloth in a rolling motion. Wiping will continue until all wet glue is removed from the surface. Then sand after 24 hours.
6. Wiped the glue with Titebond Adhesive Remover in a rolling motion. Wiping continued until all wet glue is removed from the surface. Then sanded after 24 hours.



Cut walnut boards ready to glue.



Glue applied to both faces.



Clamping @ 200psi and achieving glue squeeze out, creating a joint.

Sanding Method

A random orbital sander (DeWalt model # DWE6423K) was used with 120 grit sanding disks (5 inch diameter VS Hook & Loop) and operated at full speed on setting #6. The sanding disks were cleaned as needed to continue removal of the wood/dried glue joint surface and replaced for each method. After the 24 hours of glue drying time, a five-pound weight was fixed on top of the sander (8 pounds total), switched on and placed onto the wood/dried glue surface for the determined time (begin for 1 minute and increase by 1 minute intervals) to remove the glue. The sander was moved along a 12 inch length of the glue joint during this timeframe without additional pressure on the sander.



Random orbital sander setup

See below: Appendix “A” for photos for each of the wood glue squeeze out removal methods.

If you have any questions or require further testing, please feel free to contact me.

Thank you,

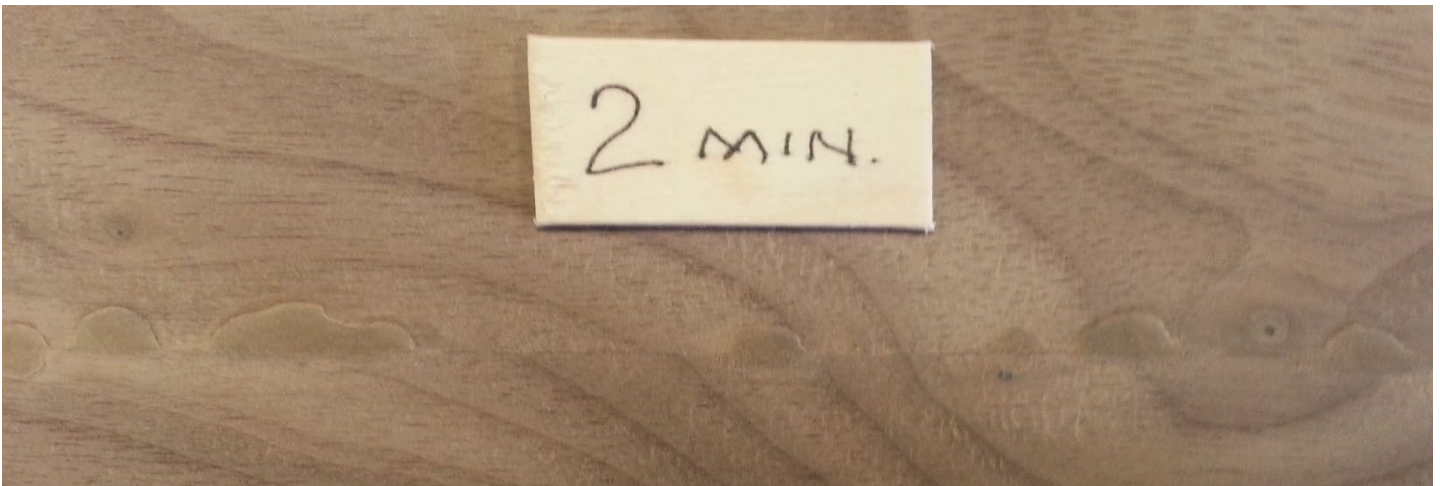
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Appendix “A”

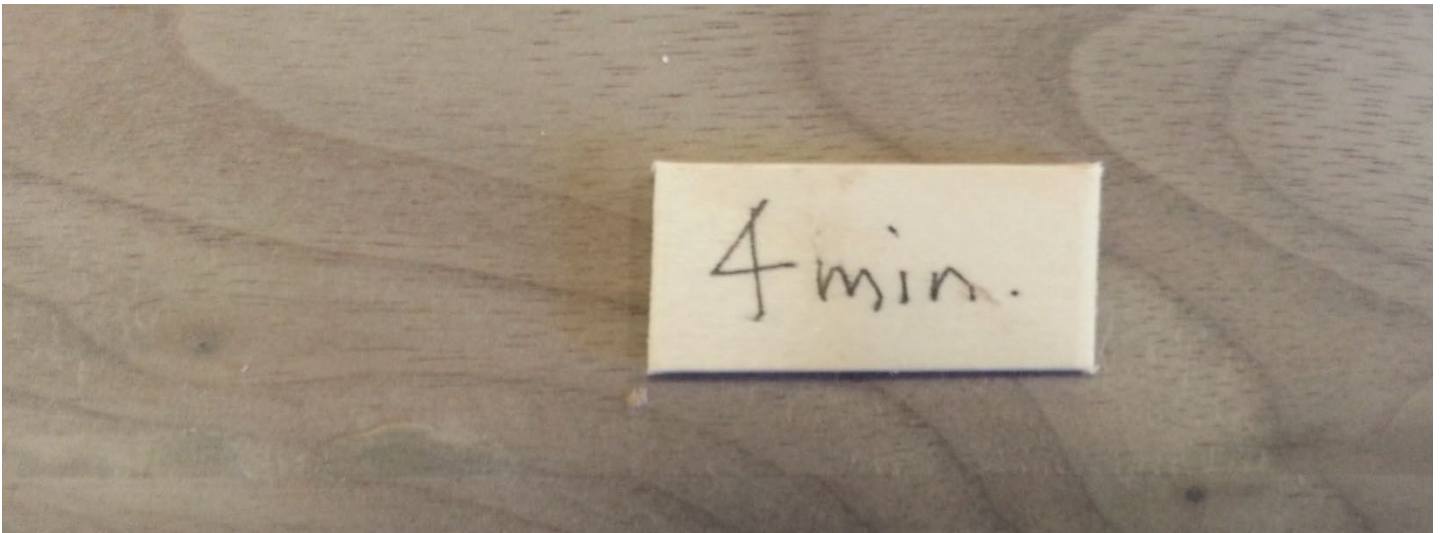
Method 1: Left the glue squeeze out to dry fully before sanding.



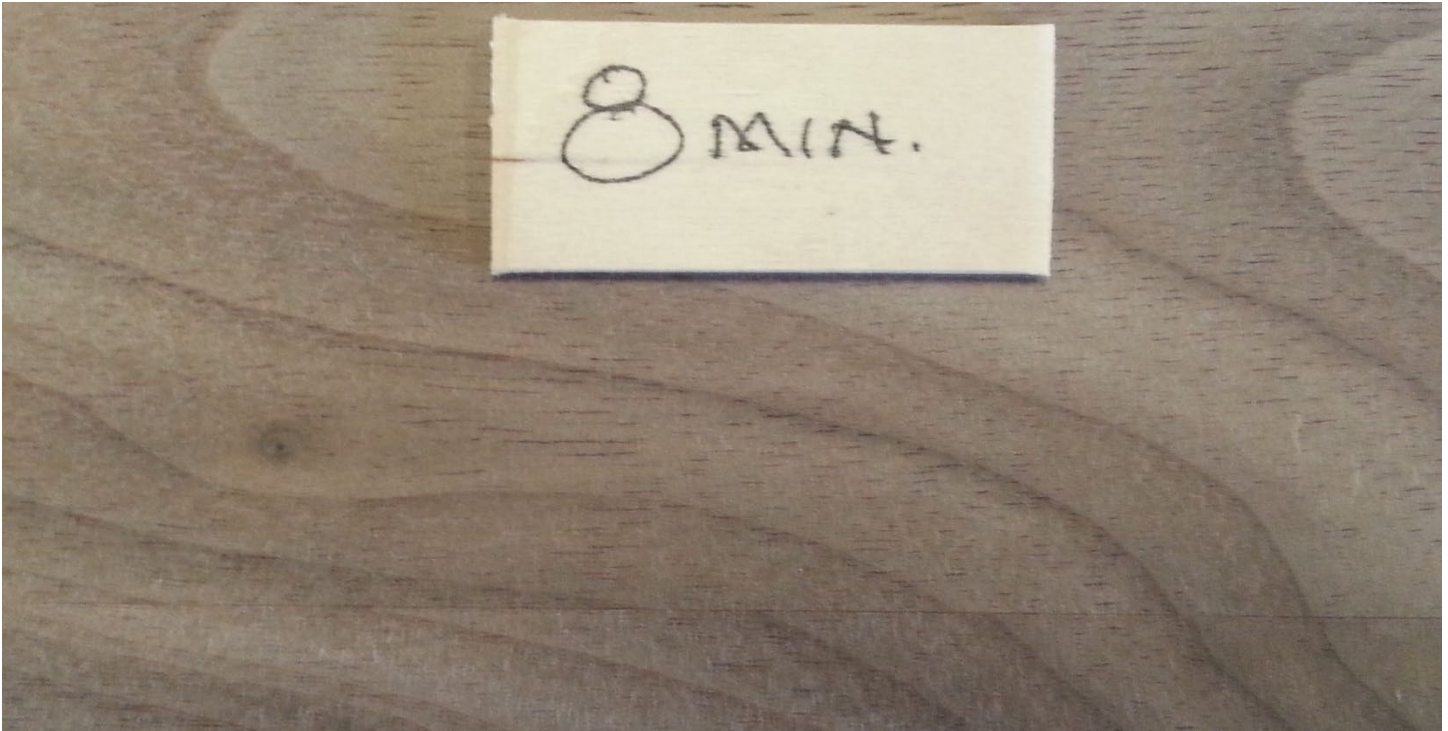
Dried squeeze out.



After 2 minutes of sanding.



After 4 minutes of sanding.



After 8 minutes of sanding.



After 8 minutes of sanding and wiped with mineral spirits. No glue was observed.



Stained and finished glue joint. No glue was observed.

Method 2: Left the glue squeeze out to dry fully, then scraped off excess with a sharp chisel before sanding.



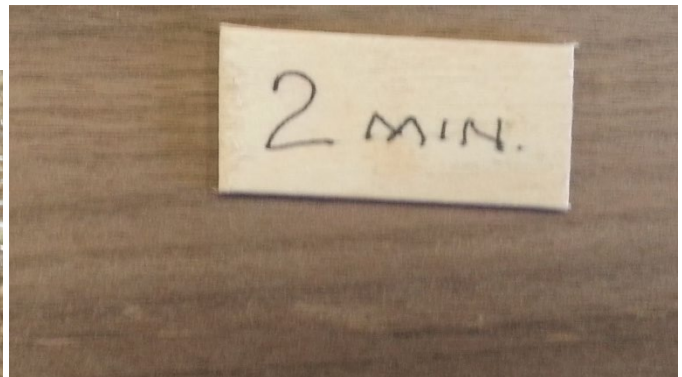
Scraping off excess glue with a sharp chisel.



The glue did not peel off but came off in chunks and pulled off wood fibers.



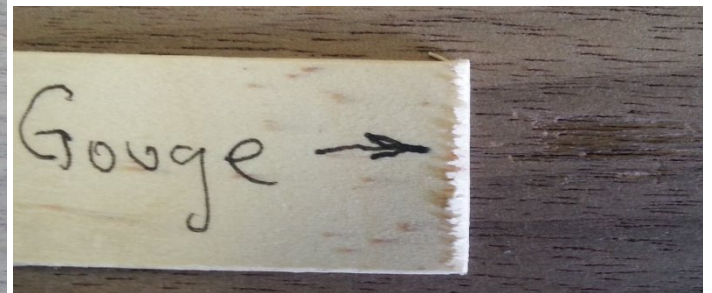
Wiped with mineral spirits showing dried glue.



After 2 minutes of sanding.



After 5 minutes of sanding.



Gouging the wood.

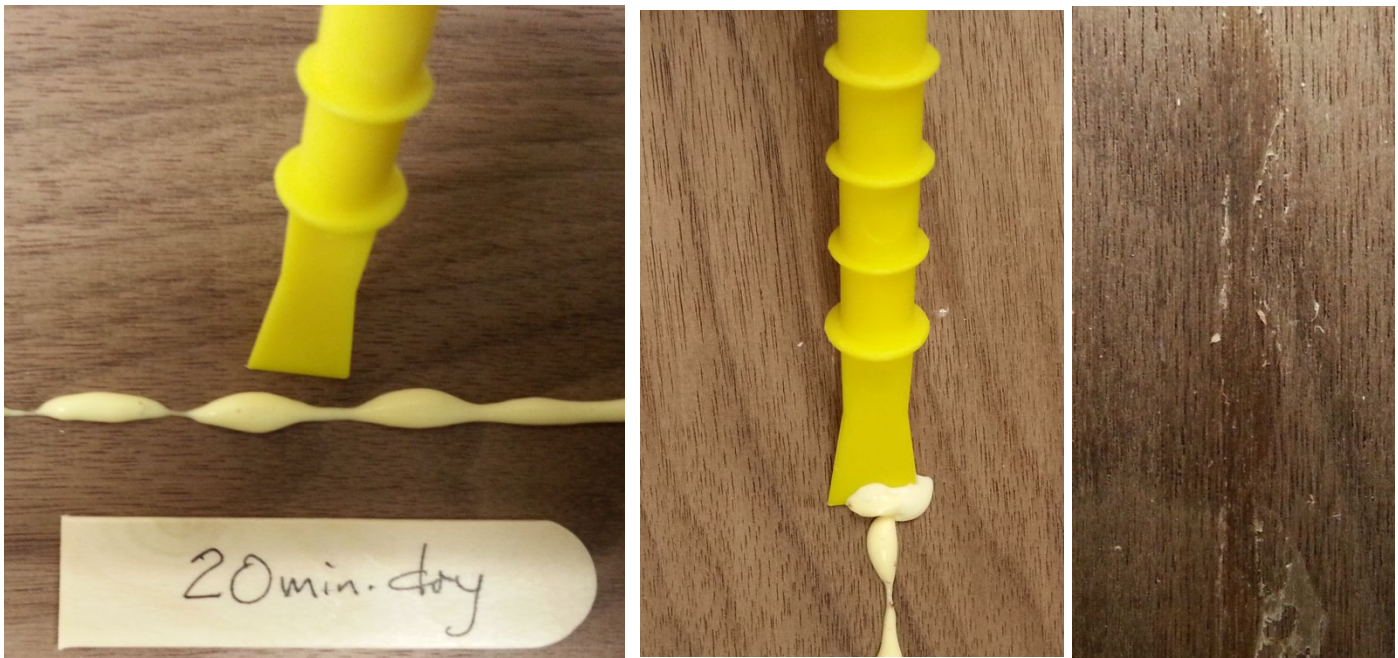


After 5 minutes of sanding and wiped with mineral spirits. No glue was observed.

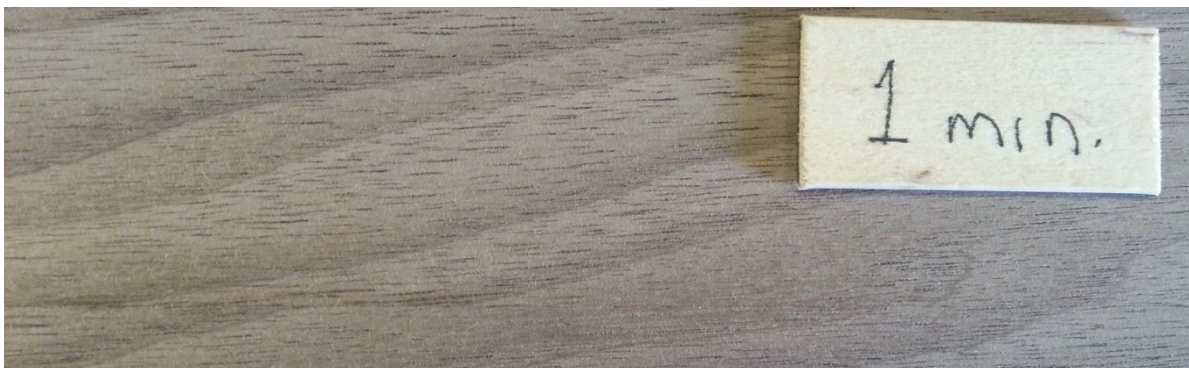


Stained and finished glue joint. No glue was observed.

Method 3: Left the glue squeeze out to dry for 20 minutes before scraping with a Titebond Titebrush tapered end then sanded after 24 hours.



Scraping with a Titebond Titebrush tapered end.



After 1 minute of sanding.



After 1 minute of sanding and wiped with mineral spirits. No glue was observed



Stained and finished glue joint. No glue was observed.

Method 4: Wiped the glue with a wet cotton cloth to remove the glue by straight wiping surface. The wet cotton cloth was soaked in water, removed dripping wet then rung out until the water stops dripping.



Wiped the glue with a wet cotton cloth to remove the glue by straight wiping surface.



Wiped the surface until the glue was removed.



After the water was dried, and then wiped with mineral spirits. No glue was observed.



Stained and finished glue joint. No glue was observed.

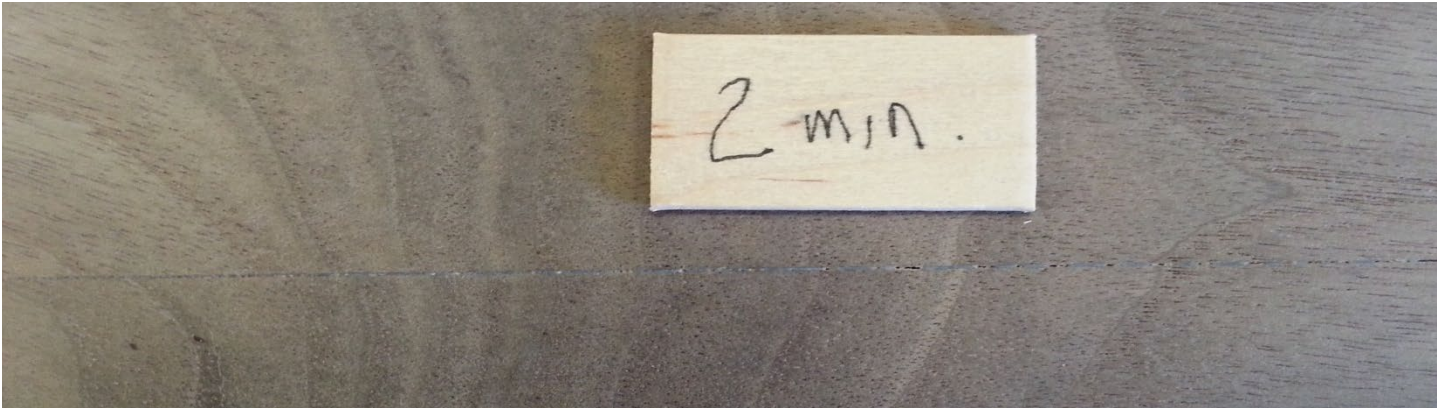
Method 5: Wipe the glue with a wet cotton cloth in a rolling motion. Wiping will continue until all wet glue is removed from the surface. Then sand after 24 hours.



Wipe the glue with a wet cotton cloth in a rolling motion.



A slow wiping process (16 minutes). 18 rolls of the cloth and then some of the glue dried on the surface. Wood is water soaked and the grain is raised.



After 2 minutes of sanding and glue is removed.



Wiped with mineral spirits. No glue was observed



Stained and finished glue joint. No glue was observed.

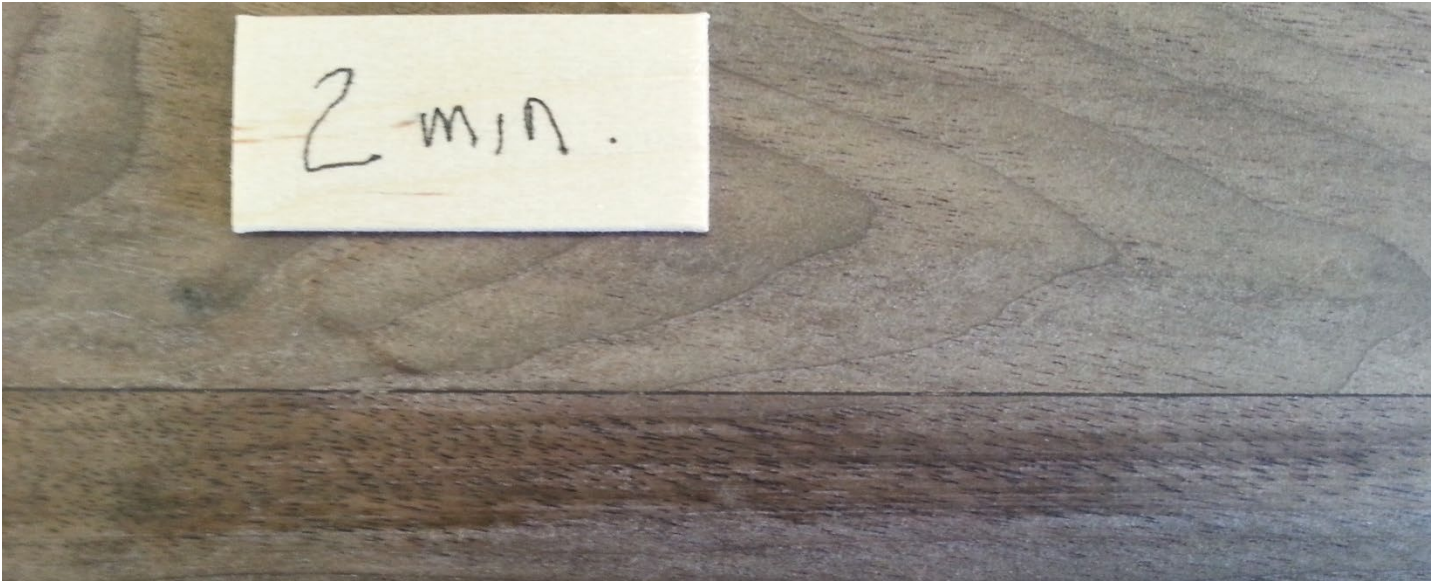
Method 5: Wiped the glue with Titebond Adhesive Remover in a rolling motion. Wiping continued until all wet glue is removed from the surface. Then sanded after 24 hours.



Wiped the glue with Titebond Adhesive Remover in a rolling motion.



A very slow wiping process (20 minutes). 16 rolls of the cloth and then some of the glue dried on the surface. Oil from the wipes was left on the surface of the wood.



After 2 minutes of sanding.



After 3.5 minutes of sanding.



After 10 minutes of sanding. Oil from the wipes that was left on the surface of the wood was removed after the removal of the glue.



Stained and finished glue joint. No glue was observed.