

Log Building NEWS

Reprint Edition

The International Log Builders Association is pleased to provide you with this free reprint from our newsletter, Log Building News #36. The ILBA is a not-for-profit, educational association dedicated to furthering the craft of log home construction. It publishes books, articles, Log Building News, and the Log Building Standards (the "building code" for log homes), and conducts annual conferences and workshops for log home customers and log home builders. Contact information for the ILBA is at the end of this article.

F-4 Tornado

By Hank Petit and Robert W. Chambers

This July a powerful tornado hit a log home that Hank Petit built in northern Wisconsin. There was surprisingly little damage to the log walls and log roof system.

A bit about the construction methods used. The home was built of partially-seasoned red pine, also called Norway pine, and features saddle notch corners and double-cut ("Beckedorf") long grooves. The building was not overscribed or underscribed, and had settled perhaps 1/2" in the year since it had been built. There is a loft floor for approximately half the building, supported with log floor joists.

Round, 1" diameter, hardwood dowels were used in 1" holes—the dowels were never long enough to key more than 2 courses of logs to each other. The top log on each wall was also lag-bolted to the course below with 1/2" diameter lag screws in lengths ranging from 10" to 16".

Square (lock) notches were used at the following locations: top plate logs, loft floor joists. Doors and windows have 2x4 keys (splines) set into the endgrain of logs at these openings.

On top of the log purlins and ridge, Hank airnailed carsiding T&G, and then on top of this he toe-nailed



2x12 common rafters to the purlins with 4" and 6" pole barn (ring shank) nails. At the ridge, the common rafters were overlapped and spiked to each other and to the ridge log. OSB sheathing was used as the roof deck for shingles.

The tornado hit almost exactly after the building had been finished. It was an "F-4" class which means 1/4 mile diameter at the base, with sustained winds of 150 to 200 mph (250 to 330 kph). The strongest tornadoes are F-5. All trees in the area were uprooted, broken off, or stripped of all limbs.

The house sustained damage as follows. The roof sheathing was stripped off the rafters, and many rafters were stripped from the purlins, with the worst damage on the gable end that was hit first by the tornado. Ceiling boards (3/4" T&G car siding) was stripped off the 4-foot gable overhang. Windows and skylights were broken.

The log roof system was not measurably affected: the gable frame walls were still plumb. It was not possible to measure whether the roof had racked in plane (did the building still have 90° corners?), but there were not indications to indicate any problems with the log roof systems.



At door and window openings, the logs had been twisted clockwise (viewed from the top), and the openings the logs stepped out 1/8" to 1/4" per round. Every layer of logs moved, right down to the bottom sill logs. Door openings had about 2" out of plumb from top to bottom.

But the log walls from the door headers up to the plate logs seemed to have moved as a unit—these 3 rounds of logs had not noticeably slid along one another.

There was a branch found that had been trapped in the groove, not driven into it, so there is evidence that at least that log, and perhaps more, had been lifted up enough to let that branch in, and then settled down again.

To straighten the building (rotated it back counterclockwise), Hank hired a semi-truck wrecker with a 40-ton winch, and parked it in a place where the winch cable could be fed in through a door opening, and around the top 3 rounds of logs. Tension was put on the winch, which was not enough to pull the building around by itself. But when the log walls were tapped with a backhoe bucket on the other wide, the jiggling, followed by some creaking brought the building right. Two days were spent, mostly rigging for the pull and removing both porch roofs on the eave sides (to give access to winching and tapping).



When the headers were pulled, even the islands of wood between a door and window followed with it.

Finally, just two of the openings had to be re-cut—their logs had not lined up again.

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