



New School Building Hardened Against the Wind

Full Mitigation Best Practice Story

Fond du Lac County, Wisconsin

Oakfield, WI - A few years back, in Oakfield, Wisconsin, fund-raising T-shirts were printed with the motto: "There's no place like Oakfield," rewording Dorothy's feelings about her tornado experience in *The Wizard of Oz*. The T-shirts were designed after a tornado roared through the small community in July of 1996, demolishing nearly half the town.



The middle school was one of the 180 structures destroyed or damaged by the tornado. Community residents could also now say, "There's no middle school like the new Oakfield Middle School." With "hardened" interior walls and the roof bolted to wall supports, the school building is now constructed to endure twice the wind force than most other Wisconsin schools. It was designed to withstand 150-mph winds, as compared to the 88-mph wind load required by Wisconsin building code for public buildings.

"From the destruction of that July day, the community of Oakfield built a school to be proud of, and one that provides a greater sense of security for those who experienced the devastation of the tornado," said Joe Heinzelman, Superintendent of Oakfield School District.

Just minutes after sirens signaled its coming, the tornado slammed through the middle of Oakfield, destroying 44 homes, two churches and the middle school. It also razed a majority of the village's mature oak trees, 1800 of them, for which the village was named back in 1847. Authorities estimated Oakfield suffered \$50 million in damages.

When a disaster is federally declared, as it was after the Oakfield tornado, mitigation funds are activated through the Hazard Mitigation Grant Program (HMGP). These funds are available to communities for prevention of future disaster damage. In consultation with staff at Wisconsin Emergency Management (WEM), the Oakfield school administration learned that HMGP funds could be used to build a more wind-resistant structure.

"Strengthening the school building was very important to our community," said Heinzelman. "Just to assure people that we have a building that could withstand destructive winds like we experienced and it could become a community shelter in a similar circumstance. It could also become the command center in case other buildings were destroyed. We learned how important that was with the last storm."

The construction technique of "hardening" the walls of the new Middle School included the placement of reinforcing steel in the masonry walls to provide for the additional wind load requirements. The roof structure was changed from steel to a masonry pre-cast concrete roof, and the roof was welded to plates embedded into the walls, placed at double the normal rate, to tie the roof into the structure more securely.

The cost of the improvements to the building totaled \$207,260. FEMA contributed \$151,662 through HMGP, the state WEM provided \$25,277, and the local match was \$25,277.

With the funding in place and the building designs completed, an aggressive construction schedule was begun to ensure that no student would miss out on the middle school experience. By January of 1998, after attending classes in temporary classrooms for 18 months, students had a school building they could call their own.

Fortunately, the walls and roof of the Oakfield Middle School have not been put to a wind test. Along with the village getting a new middle school, homes and the two churches were rebuilt where the tornado had created a swath of destruction. And sales of those fund-raising T-shirts helped raise enough money to plant more than a thousand oak trees so the community could still live up to its name.

Activity/Project Location

Geographical Area: **Single County in a State**

FEMA Region: **Region V**

State: **Wisconsin**

County: **Fond du Lac County**

City/Community: **Oakfield**

Key Activity/Project Information

Sector: **Public**

Hazard Type: **Tornado**

Activity/Project Type: **Acquisition/Buyouts**

Structure Type: **Concrete, Reinforced**

Activity/Project Start Date: **07/1996**

Activity/Project End Date: **01/1998**

Funding Source: **Hazard Mitigation Grant Program (HMGP)**

Activity/Project Economic Analysis

Cost: **\$207,260.00 (Actual)**

Activity/Project Disaster Information

Mitigation Resulted From Federal
Disaster? **No**

Value Tested By Disaster? **No**

Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: <http://emergencymanagement.wi.gov/>

Reference URL 2: <http://www.fema.gov/government/grant/hmgp/index.shtm>

Main Points

- With "hardened" interior walls and the roof bolted to wall supports, the school building is now constructed to endure twice the wind force than most other Wisconsin schools.
- When a disaster is federally declared, as it was after the Oakfield tornado, mitigation funds are activated through the Hazard Mitigation Grant Program (HMGP). These funds are available to communities for prevention of future disaster damage.
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Tornado in Oakfield roared through community



Oakfield Middle School after the "hardening"



Half the structures in Oakfield were damaged by the tornado