

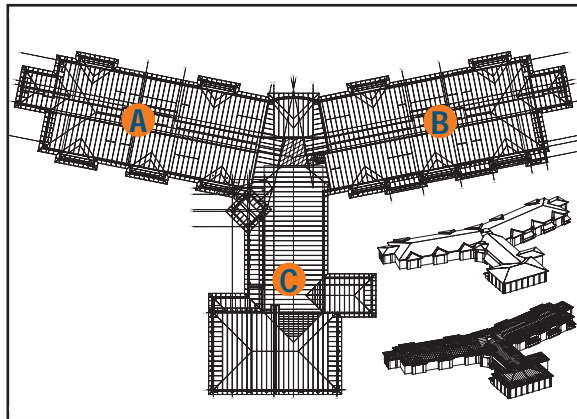
Cold-Formed Steel

Helps Achieve LEED

by Libby Maurer

Score two points with LEED and cold-formed steel!

What does it take to earn two points toward LEED certification? Cold-formed steel trusses.



For one public school in Madison, WI, the cold-formed steel (CFS) roof system supplied by Cascade Mfg Co is helping the project achieve Silver LEED certification. Linden Park Elementary school, which belongs to the Madison Metropolitan School District, is one of the very first in the state to seek LEED certification—part of a growing national trend for public schools and other government buildings to comply with green building standards.

There is good news for component manufacturers whose customers are adopting “green building” practices in order to achieve energy efficient structures and utilize materials harvested or made from sustainable processes. Knowing how to leverage the materials used to make your products—whether wood or steel—as those that contribute to a building’s sustainable design will work to your ultimate advantage.

What It Takes to LEED

The LEED category for new or remodeled public school construction requires 37 to 43 points for attaining Silver certification. In order to hit 37, Linden Park Elementary School also incorporated the following elements:

- Fly ash as a concrete binder
- Underground geo-thermal heating and cooling system
- Day lighting concepts through solar panels
- Storm water run off through the infiltration areas, or rain gardens

Designing Linden Park

In order to break the project into tangible sections for scheduling purposes, Linden Park Elementary was divided into three Areas: A, B and C. (This also helped to speed up the approval of the drawings.) Area A was further broken down into sections A1 and A2, that connect the main two wings of the building. Area B was a mirror image of Area A. Area C is another wing that encases the gymnasium and library. (See diagram above.)

Cascade’s Dean Lessei began his career at the company designing both wood and steel, but takes special interest in the challenge of cold-formed steel design. “It seems like there is always something new happening with steel design. It’s a newer product, so it allows for more creativity,” he said. Lessei and designer Charles Kies were the sole technicians for this job.

Lessei said designing the section where Areas A, B and C converged was extremely challenging. With multiple truss profiles coming together at the same place, Lessei and architect Mark Wershay used trial and error to design creative bearing solutions to get the trusses to work in those sections. Additionally, they had to make sure there was enough space for duct and mechanical work. “It was a team effort through the design process,” Lessei said.

It was also a trial to get a special tower over Area C to blend into the roof line. “[The tower] is intended to be a classroom, and it has a higher elevation than A and C. So we had to do a lot of adjusting pitches to blend the lines into the other Areas and achieve the aesthetic they were looking for,” Lessei said.

In Area C, Lessei had to communicate with the basketball backboard vendor to figure out how much additional load capacity was needed for the long-span trusses framing the gym. A folding partition that would eventually transfer load to the roof trusses also presented a big challenge in Area C.

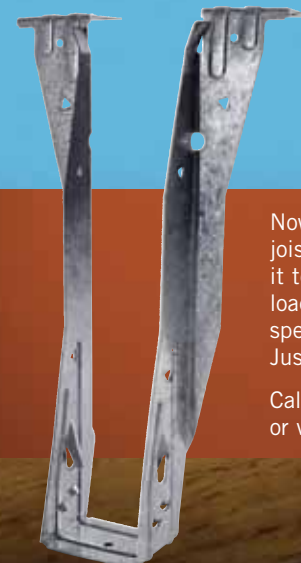
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at a glance

- Becoming certified under a green building standard is a growing national trend for public schools and other government buildings.
- Under the U.S. Green Building Council’s LEED, using CFS trusses can earn one or two points for a project under credits 4.1 and 4.2.
- Verifying that CFS supplied for a job qualifies for LEED points is not tedious for CMs.



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A series of solar panels added to the roof profile in Area B after Lessei completed the truss layout earned additional LEED points for the school. "When they were added, I re-ran the load distribution to make sure the existing design could support the added panels," he said. In the end, the addition did not impact the original design, although Lessei says an add-on like this is something to expect on LEED projects. "If the load designed into those trusses wouldn't have been adequate for the panel additions, I would have had to redesign the trusses in the affected area. Those panels were needed for the certification," he said.

John Murray from Wall-tech, the interior and exterior metal installation subcontractor for the job, said, "Dean blew us away. He knew the project inside and out."

New Product, New Opportunities

According to Murray, the creative opportunities that CFS components offer is precisely why his company has chosen to take on jobs featuring CFS framing. Though Murray says few jobs in the area are specing CFS components, his company expects to establish a niche as the product grows in acceptance. "We realize there is a huge opportunity for us with this product, because it allows us to offer one more installation service," he affirmed. "Many of the GCs we work with like that we perform more services than the typical framing/installation company."

Murray pointed out that the learning curve for setting the structure's frame with this "new" product was a snap for Wall-tech's 5-man crew: one crane operator, two on ladders setting trusses, one full-time permanent bracer and one rigger. Steve Wade, Wall-tech's on-site supervisor, says Cascade's design makes installing steel trusses easy. "[The components] are dimensioned well." He said for this project, everything

Cascade supplied fit—meaning there was no reason to stop framing or make adjustments in the materials as supplied.

What It Takes to LEED

With more and more commercial construction projects like Linden Park Elementary going green, cold-formed steel is a natural choice. ITW TrusSteel's national marketing director Dave Goodwin said, "It's an attractive framing option for many builders not only because of its inherent fire, insect and mold resistance, but because steel is still the most recycled, and recyclable building material. Because of the LEED rating system, these two factors are of growing importance to both designers and building owners."

Goodwin noted that the recycled content in steel and its recyclability are two very different things. Recycled content, he said, measures how much of the new component—a CFS truss, for instance—is made from recycled materials. Recyclability, on the other hand, measures how much of that component can be recycled at the end of its lifetime.

Under the U.S. Green Building Council's LEED rating system, the use of cold-formed steel trusses can contribute to earning one or two points for a project, says Goodwin. Credits 4.1 and 4.2 within LEED's Materials & Resources (MR) section for New Construction apply to materials with recycled content, such as cold-formed steel.

Credit 4.1 (1 point)—specifies that the sum of post-consumer recycled content plus ½ of the pre-consumer content constitutes at least 10 percent of the total value of the materials in the project (based on cost).

Credit 4.2 (1 point)—specifies that the sum of post-consumer recycled content plus ½ of the pre-consumer content constitutes at least 20 percent of the total value of the materials in the project (based on cost).

It's not just you; these descriptions are far from straightforward! But LEED realizes this and provides a formula for you

to determine whether your product meets the 10 or 20 percent recycled content noted in the definitions above. Imagine you're building CFS trusses from roll-formed steel that contains about 30 percent post-consumer steel and 10 percent pre-consumer steel. The total value of the trusses you're supplying is \$10,000. You would use this formula to determine the total dollar value of recycled content for the CFS trusses.

$$[30\% + 1/2(10\%)] \times \$10,000 = \$3500$$

This final number, \$3500, is then added to the other recycled materials in the building to determine if the total value of all these products meets 10 or 20 percent of the total value of ALL materials in the project.

Confused? Not to worry. The good news is that component manufacturers won't have to do this math; that's a job for the architect. Just know that the use of CFS components contribute significantly to LEED points in the Materials & Resources section, thanks to its properties. "The percentage of recycled steel in CFS framing can vary by vendor, but generally it will be high enough so that the contribution of CFS toward attaining MR 4.1 or 4.2 points will be significant," explained Goodwin.

Cascade has supplied CFS trusses for a handful of other jobs around the Midwest applying for LEED certification. The process for proving that cold-formed steel contributes to LEED points is not tedious. This is may point to the fact that chain-of-custody requirements do not apply to the steel industry (as they do for wood). In fact, Cascade says little paperwork or documentation is necessary. The component manufacturer must simply provide the dollar value of the components it has supplied as well as their total recycled content, which is given to them by the CFS vendor. Goodwin said this is because the steel industry has done an excellent job showing the public that steel is a highly recycled material.

Marketing Green

As you can see, it is easy to get lost in the numbers game that green building standards present. The bottom line both wood and steel component manufacturers should take away is that building components are inherently green. You, like the rest of the building products world, can use this to your advantage. "We cannot afford to forget the fact that 'being green' is not just an issue of planetary stewardship, it is also a competitive market situation," noted Goodwin. Especially since, he said, other building materials are actively improving the "green" value (and image) of their products.

Nearing the end of the construction phase, Linden Park is set to house about 700 students for the 2008-09 academic year. Cascade's portion of the work is complete, and they're eager to see the finished product. Murray and Wall-tech are extremely impressed with Cascade's work. "They really showed their true colors. They have depth," he said. "It was truly amazing." And two points toward LEED certification was icing on the cake. **SBC**

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