

## Let Engineers Be Engineers

BY GEOFF WEISENBERGER, LEED GA

As the LEED system continues to evolve, the role of the structural engineer is elevated.

**FOR MANY IN THE** construction industry, the LEED (Leadership in Energy and Environmental Design) program is the face of the green buildings movement, and many tend to think of it as a static thing. But it's not.

As a matter of fact, the next version of the system, LEED 2012, has already been through the first round of public comments. And it's worth noting that in the current draft, structural materials have been removed from two very prominent Materials and Resources credits.

While some engineers believe this diminishes the role of the structural engineer in sustainable design, AISC disagrees. In reality, this is an opportunity for the structural engineer to have a far greater impact without worrying about the specific details of a point-based system.

For example, the recently completed St. Vincent Mercy Medical Center in Toledo, Ohio, is a great example of the positive impact a structural engineer can have on a project. By substantially reducing material quantities, the designer not only reduced the cost of the project but also the embodied carbon. And since the design also minimized fabrication activity, the carbon reduction was even greater (more on this project later).

### Points Taken

So what are the changes in LEED that are creating this opportunity for engineers? There are three of them:

1. All projects must have a mandatory recycled content of 10%.
2. Structural materials have been removed from the Recycled Content credit.
3. They also have been removed from the Regional Materials credit.

Recycled Content has been a "slam-dunk" credit for any

building framed in structural steel, in that all domestically produced structural steel contains a very high percentage of recycled content. However, removing structural materials from this credit has multiple benefits. First, the current version of LEED 2012 includes a prerequisite mandating a minimum recycled content of 10% for structural materials; the current version of LEED gives a point for this. In other words, a minimum recycled content has been elevated to a requirement and not simply a credit to be achieved.

Second, coupling a mandatory recycled content requirement with the proposal to remove structural materials from the Recycled Content credit will encourage the use of recycled non-structural building materials. It ensures that there are achievable credits for non-structural materials by not putting them in the same category with structural materials. Putting the two in the same category has in the past effectively removed any opportunity to encourage the use of recycled non-structural materials, as these credits were easily achieved by structural materials in most cases, given their relatively high percentage of total building materials weight and cost.

The point has been made that rewarding recycled content credits to non-structural materials might unintentionally provide incentive to use more materials instead of less. However, because structural and non-structural materials are treated separately, there is no incentive to use more non-structural materials to achieve the required recycled percentages for the credit, as adding more materials to meet the recycled content point requirements would also drive up the total amount of non-structural materials.

As such, AISC has indicated our support of this change to USGBC. We also suggested the possibility of increasing the mandatory minimum to a level higher than the currently proposed 10%.

The Regional Materials credit has always been a source of confusion in that it is based on that portion of a material that is both recovered and manufactured within 500 miles of a project site. Removing structural materials from this credit means eliminating concerns over the lack of distinction between cradle-to-grave materials and cradle-to-cradle materials, the lack of clarity regarding the identification of the manufacturing site and the lack of consideration of different modes of transportation and equivalent utilization of lighter materials. This has been particularly confusing when steel of all types was evaluated. Was the recovery site the location of scrap generation, scrap collection, scrap processing or where the material would ultimately be recycled at the end of life (steel is a closed-loop cradle-to-cradle mate-



*Geoff Weisenberger, LEED GA, is AISC's director of industry sustainability. You can reach him at [weisenberger@aisc.org](mailto:weisenberger@aisc.org). Learn more about steel and sustainability at [www.aisc.org/sustainability](http://www.aisc.org/sustainability).*

rial where 98% of structural steel will be recycled in the future)? Was the site of final manufacture the mill producing material (30% of the cost and 5% of the labor) or the shop fabricating the material (70% of the cost and 95% of the labor)? Why wasn't credit provided if rail or water transportation was used rather than truck (a significant amount of steel is shipped by rail and barge, which is four times as energy-efficient as trucking)? And how do you compare the transportation impacts of a material if significantly less of the material is required compared to an alternative material? AISC is supportive of the removal of structural materials from the regional credit and indicated as such during the public comment period.

### Removing the Engineer?

Again, there are those who feel these changes effectively remove structural engineers from the equation or marginalize their contributions to the sustainability of a structure. Much to the contrary, by focusing this credit on non-structural components of the building, the structural engineer is encouraged to move away from seeing sustainability as merely a material specification exercise to seeing it as a design optimization process, regardless of structural material used.

AISC's recent LCA study comparing a concrete building with a steel building indicates that the environmental and energy impacts based on a structural framing system's primary material typically fall into a relatively narrow range, varying by only about 10%, which is considered to be a wash in such comparisons (see "And the Winner is..." in the August issue of *MSC*, available online at [www.modernsteel.com/backissues](http://www.modernsteel.com/backissues)). At times steel framing systems may outperform concrete framing systems, and at other times concrete may outperform structural steel systems. But in nearly every case and impact category, the difference between the impacts of the two materials is relatively small.

On the contrary, the savings on the St. Vincent Mercy Medical Center were big: a 14% reduction in cost, a 15% reduction in material quantity and a 25% reduction in the embodied carbon of the structural system. While not diminishing the value of recycled content or regional manufacturing, these savings—which were design-driven and based on the decision to go with integrated design process instead of a traditional design-bid-build construction meth-

odology—are far more significant than the savings associated with the mere selection of a framing material based on those two parameters.

The current draft of LEED 2012 addresses this with the inclusion of an Integrated Process credit. The proposed new credit encourages collaboration among all of the disciplines involved in the project and lists a material LCA as one of several analytical options that can be performed by the design team.

### Above and Beyond

In other words, as the green buildings movement has in some ways evolved from LEED, LEED is maintaining its continued importance in the movement by evolving itself. One major, long-term complaint of LEED is that it's "all about chasing points." In the case of structural materials, the proposed version of LEED 2012 provides the opportunity for structural engineers to move beyond merely having the opportunity to add to the total number of credits a project can achieve by simply choosing

materials. Rather, structural engineers will be able to focus their skills, attention and sustainable design decisions within a truly sustainable, collaborative design process and see their contribution recognized and rewarded.

Keep in mind that the current version of LEED (2009) is still being used, and it's possible these changes might not make it into the final version of LEED 2012. But they are being seriously considered, a sign that the U.S. Green Building Council (the creator of LEED) is clearly devoted to continually improving its system while at the same time improving the environmental aspects of the buildings that use it. **MSC**

*To see the current draft of LEED 2012 and its schedule (the second public comment period will take place between July 1 and August 15), go to [www.usgbc.org](http://www.usgbc.org), click the LEED drop-down menu, select LEED Rating Systems, and on the resulting page click LEED Rating System Development.*