

**Sandra Cooper**

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**From:** Ed Houghton  
**Sent:** Tuesday, October 09, 2012 7:23 AM  
**To:** Sandra Cooper; Rick Lloyd; Mike Edwards; Kevin Lloyd; Dale West; Ian Chadwick; Keith Hull; Sandy Cunningham; Joe Gardhouse  
**Cc:** Sara Almas; Larry Irwin; Marjory Leonard; Marta Proctor  
**Subject:** FW: Sprung vs Metal

Your Worship, Deputy-Mayor Lloyd and Members of Council:

Please see the response from Mr. Phil Sprung in regards to the WGD Report that is being circulated. Please treat these comments confidential since we do not wish to have WGD harmed in any way.

Regards.....Ed

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**From:** Phil Sprung Jr. [<mailto:sprungp@sprung.com>]  
**Sent:** October-06-12 11:32 AM  
**To:** David MacNeil; Peter Bos; Tom Lloyd  
**Subject:** Sprung vs Metal

Firstly, this report is created by someone who has, at best, a very minimal knowledge of tensioned membrane structures and more importantly, apparently very little knowledge about a Sprung Structure and how dramatically different the Sprung product is as compared to any other fabric structure in the world. Responses in brackets below.

*Energy Use / Thermal Performance*

*The normal insulation value for a Pre Engineered Structure with a sandwich panel is R-19 for roofs and R-12 for walls. However greater R values can be achieved with insulated panels and roofs. By increasing the thickness and providing more insulation, values as high as R30 are achievable. (Pre-engineered metal buildings compress the insulation at every main support beam. Insulation relies on its thickness to achieve R-value. This compression significantly reduces the R-Value of the finished product, ie - R19 becomes R12, R12 becomes R8, etc) Membrane Structures by their nature have no inherent thermal resistant R value, however by creating a cavity higher R values can be obtained. With a 6" cavity and thermoplastic or similar insulation R30 is achievable. Actual energy usage can be calculated based upon a developed envelope design and usage assumptions. At this point of time there is insufficient detail available to do accurate modeling. For both systems with equivalent amount of insulation applied in a continuous fashion with no framing breaks, the performance would be expected to be the same. Cladding a Pre-Engineered Structure with a continuous insulation layer protecting the structure from the outside temperature is achievable. While the avoidance of thermal breaks is not possible with a Membrane Structure as the aluminum frame that supports an interior and exterior membrane encapsulating the insulation has direct contact with both the inside and outside resulting in thermal bridging. For this reason the performance of a Pre Engineered Structure with an equivalent amount of insulation to that of a Membrane structure would be expected to be superior.*

(The aluminum beam does create a small amount of thermal bridging, however, the thermal caps on both the exterior and interior of the Sprung Structure c/w neoprene wipes where in contact with the membrane and aluminum, eliminate most of the bridging. The Sprung product starts with a 9 inch R-30 foil backed fiberglass blanket which is not compressed at our main structural beams as it is on a Pre-fab metal building. This makes the performance of a Sprung Structure, with an equivalent amount of insulation, superior. Another important factor not considered in this comparison is the fact that Sprung Structures have up to 5 times higher air tightness values as compared to a pre-eng metal building which is a significant factor in determining the overall performance and energy efficiency of the finished product)

### *Enclosure Durability*

*Insulated metal panels typical for a Pre Engineered building system come with a variety of finishes and coating systems. Modern coating systems for panels include coatings which are durable contain synthetic resins, ceramic and other inorganic pigments. They have a chemical bond which provides resistance to ultraviolet radiation resulting in good color retention and resistance to chemical degradation. Still even as coatings have improved, it is expected that at some point repainting may be required. The expected life span of panel coatings is dependent upon the environment but warrantied for 20 to 40 years. On a Pre Engineered Structure typically the roofing is TPO or PVC, and is warrantied for 20 years.*

*Membrane Structures have an integral roof and wall system, with an aluminum reinforced layer at the bottom of the envelope. As the main part of the enclosure is a membrane, it is expected that it's life expectancy before replacement would be in the range of 20 years as with PVC roofing. The product often comes with pro- rated guarantees for approximately that time.*

(The Kynar and Tedlar coatings applied to Sprung membranes have a 20 year guarantee and about a 30 year life expectancy. Kynar is well known by architects around the globe as it is commonly applied to metal products to extend their life)

### *Mechanical and Electrical Systems*

*It is not expected that there would be any difference between mechanical systems including dehumidifiers, the ice plant and air handling units. Electrically and lighting systems would also be similar, as lighting is always directed at work and playing surfaces and indirect bounce lighting is not normally used as it is less efficient.*

(The Sprung Daylight panel system, in portions of both the pool and arena structures, will reduce the cost of lighting substantially during normal daylight hours)

**From:** Ed Houghton <ehoughton@collus.com>  
**Date:** October 5, 2012, 3:44:51 PM EDT  
**To:** 'Dave Barrow' <dave@bltconstruction.com>, 'Mark Watts' <mwatts@bltconstruction.com>, "pwaddell@bltconstruction.com" <pwaddell@bltconstruction.com>  
**Subject:** Questions

Mark, Dave & Paul:

This is what WGD Architects said when they compared a Steel Fabricated Building to a Sprung structure. Can you help with the errors in their comments? Once again this is time sensitive.

Thanks.....Ed

### **Energy Use / Thermal Performance**

The normal insulation value for a Pre Engineered Structure with a sandwich panel is R-19 for roofs and R-12 for walls. However greater R values can be achieved with insulated panels and roofs. By increasing the thickness and providing more insulation, values as high as R30 are achievable. Membrane Structures by their nature have no inherent thermal resistant R value, however by creating a cavity higher R values can be obtained. With a 6" cavity and thermoplastic or similar insulation R30 is achievable. Actual energy usage can be calculated based upon a developed envelope design and usage assumptions. At this point of time there is insufficient detail available do accurate modeling. For both systems with equivalent amount of insulation applied in a continuous fashion with no framing breaks, the performance would be expected to be the same. Cladding a Pre-Engineered Structure with a continuous insulation layer protecting the structure from the outside temperature is achievable. While the avoidance of thermal breaks is not possible with a Membrane Structure as the aluminum frame that supports an interior and exterior membrane encapsulating the insulation has direct contact with both the inside and outside resulting in thermal bridging. For this reason the performance of a Pre Engineered Structure with an equivalent amount of insulation to that of a Membrane structure would be expected to be superior.

### **Enclosure Durability**

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include coatings which are durable contain synthetic resins, ceramic and other inorganic pigments. They have a chemical bond which provides resistance to ultraviolet radiation resulting in good color retention and resistance to chemical degradation. Still even as coatings have improved, it is expected that at some point repainting may be required. The expected life span of panel coatings is dependent upon the environment but warrantied for 20 to 40 years. On a Pre Engineered Structure typically the roofing is TPO or PVC, and is warrantied for 20 years. Membrane Structures have an integral roof and wall system, with an aluminum reinforced layer at the bottom of the envelope. As the main part of the enclosure is a membrane, it is expected that it's life expectancy before replacement would be in the range of 20 years as with PVC roofing. The product often comes with pro- rated guarantees for approximately that time.

### **Mechanical and Electrical Systems**

It is not expected that there would be any difference between mechanical systems including dehumidifiers, the ice plant and air handling units. Electrically and lighting systems would also be similar, as lighting is always directed at work and playing surfaces and indirect bounce lighting is not normally used as it is less efficient.

### **Constructability**

The project development time for both systems would be similar, as the time for design, approvals, site services, plumbing, ice plant installation, rink and other slab construction, electrical, block work and finishes are the same for both systems. As for the erection time of a super structure, it is expected that there would be no difference, leaving only a small advantage to a Membrane Structure in the enclosure of the superstructure.

Mr. Ed Houghton,  
President & CEO,  
Collingwood Utility  
Services Corp.

Acting Chief Administrative Officer, Town of  
Collingwood

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P.O. Box 189, 43 Stewart Road

Collingwood , ON

L9Y 3Z5

Phone: 705-445-1800, 2222

Fax: 705-445-2549

Email: [ehoughton@collus.com](mailto:ehoughton@collus.com)

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