

CASE STUDY

A prefab home manufacturer's quest for the ultimate floor joist leads it to TRIFORCE®

PROJECT

Bonneville Homes
prefab home floor systems

TYPE OF CONSTRUCTION

Factory-built residential

TRIFORCE® combines open design, strength and flexibility to create ground-breaking efficiencies for prefab home manufacturers.



1 800 263-7265 openjoisttriforce.com

CASE STUDY

Over the course of its 55-year history, Bonneville Homes, a leading Canadian prefab home manufacturer, has constantly evolved its building techniques in pursuit of greater quality and durability. The company is now a leader in prefab home design innovation.

The choice of floor structure materials is key in prefab housing. The floor is the **base element** of the construction, to which the walls are attached. The floor system also **dictates the mechanicals installation method**. Finally, it must enable the structure to be strong enough to **withstand transportation** to the site.



CHALLENGES

2x10

Bonneville Homes started out with 2x10 in the 1960's. These were strong but heavy. They also precluded any mechanicals installation until the structure was installed onsite. Since plumbing and HVAC had to be installed below the floor, this limited basement height.

I-joist

In the late 1970's, the manufacturer seized the opportunity offered by engineered wood and switched to I-joists. Their superior strength allowed more elaborate structures. Because of height restrictions during transportation, the maximum I-joist size used was $9\frac{1}{2}$ ". This allowed only minimal use of the floor cavity for mechanicals.

Plated trusses

In the mid-1980's, an open web structure was chosen to fit the maximum amount of mechanicals within the floor cavity. This would accelerate onsite installation and maximize the basement space of the finished home. Bonneville Homes worked with truss providers but, having mixed results, switched to making their own. Even so, the major drawback of floor trusses remained: they used metal plates that could strip wires and limited truss opening.

SOLUTION

In the mid-1990s, Bonneville Homes adopted the Open Joist 2000, an all-wood, open-web joist without metal plates. Its glued finger-jointed design made it light with ample floor cavity space. Its unique ability to return to its original shape even after being overloaded made it ideal for transportation.

The Open Joist 2000 was replaced by the more advanced open joist TRIFORCE® in 2010.

TRIFORCE® simplified joint system allowed it to be built 100% robotically, which vastly improved precision and reliability. With a new triangular structure, Bonneville Homes now had unprecedented floor cavity within the $9\frac{1}{2}$ " limitation, which opened the door to newer and more advanced home designs. TRIFORCE®'s mass production also solved 2 other problems for Bonneville Homes : Firstly, they could give up their own truss production and dedicate resources elsewhere. Secondly, they could get quick access to virtually unlimited TRIFORCE® stock during sales peaks.

Finally, using performance increasing strongbacks, Bonneville Homes could embark on ground breaking projects such as Loggia, a modular, luxury condominium construction. This 4-building 6-story development was assembled on site in a mere 7 days!

TECHNICAL DETAILS

TRIFORCE® enables Bonneville Homes to save time and money while increasing quality.



2x6 strongbacks are attached perpendicular to the joists to increase transversal rigidity of the floor system. Tying the joists together with strongbacks enables the floor system to react to vibration as a cohesive unit. Strongbacks are a simple and economical solution offering floor performance that's greatly appreciated by customers.



The prefab home manufacturer installs plumbing, electricals and HVAC before the house leaves the factory, accelerating onsite completion. Hiding mechanicals in the floor cavity also makes the home more spacious and can allow more storage space.



Manufactured in a 100% robotic process, TRIFORCE® joists are also individually tested beyond their load capacity, ensuring unmatched quality and reliability, an important aspect as per Bonneville Homes' R3000 quality program.

CONCLUSION

Bonneville Homes uses the open joist TRIFORCE® exclusively for all their floor systems. The $9\frac{1}{2}$ " depth joists provide a maximized floor cavity for mechanicals while minimizing height for transportation. Installation of plumbing and HVAC at the factory also accelerates on-site completion. 2 $\frac{1}{2}$ wide chords allow faster and easier installation of the subfloor, which is screwed and glued into place for enhanced stability.

Thanks to TRIFORCE®'s high performance floor system, Bonneville Homes can explore new home designs while offering their customers strength, quality and comfort.



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