

# New England Construction

Edition

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## PREFAB BUILDING RISES QUICKLY BY THE NUMBERS

**Maple-Leaf Construction builds pre-engineered Butler Building for Reeds Ferry shed manufacturing**

*By Paul Fournier*

**A** new manufacturing facility recently took shape in Hudson, N.H., with construction workers assembling the building by the numbers like a giant modeling kit.

Maple-Leaf Construction Company Inc. of Nashua, N.H., is construction manager for the new, \$1.2 million-plus factory, a pre-engineered steel Butler Building that will house the manufacture of small wooden buildings by owner Reeds Ferry Small Buildings Inc. Maple-Leaf Construction, a construction manager and general contractor, is also an authorized builder of Butler Manufacturing structures.

Butler designs, manufactures and sells pre-engineered steel systems for buildings up to eight stories. The buildings are erected by contractor members of its Butler Builder network, some 1,400 authorized independent contractors worldwide. Butler custom-engineered the Hudson facility to fit the conceptual design of Reeds Ferry's architect, Dennis Mires, P.A., and shipped hundreds of building components to the job site on flatbed trucks.

Under the direction of Maple-Leaf Construction project manager William Francoeur and job superintendent Michael Marois, crews had begun to prepare the site for the new building in late September 2009. Work started with ledge blasting by Precision Drilling & Blasting of Lowell, Mass. and site excavation and grading by American Excavating of Derry, N.H. Tru-Form Foundation Inc. of New Ipswich, N.H., formed and placed concrete footings, foundation wall and five-inch slab on grade for the building.

### Delivering the Building

Butler began shipping building components to the job via B. Carlson Trucking Inc. during the first week of December. The steel erectors, Raymond Brothers of Epsom, N.H., used its



*Raymond Brothers worker on a Grove lift attaches roof purlin to frame of Butler Building being built by Maple-Leaf Construction in Hudson, N.H.*

Grove TMS700B hydraulic crane to offload beams, columns, purlins, girts and rigid frame parts from Carlson's Freightliner/flatbed rig. Job superintendent Marois checked labels on each structural member and each crate of smaller parts against a master list as they were offloaded. Components were placed strategically around the site to facilitate construction and inventory control.

Butler pre-engineered building components are designed to mate precisely with each other and are labeled to indicate exact locations in conjunction with detailed plans for erectors. Buildings are designed to be fabricated and erected faster with fewer people than are required for conventional buildings. One of their key features is the use of rigid steel frames that are shipped in pieces and bolted together at the job site. These frames allow creating large interior spans without columns.

### Rigid Frames Prevent Drift

In conventional structures, horizontal beams carry floor and roof loads and transmit them to vertical columns that transmit the loads to the foundation. Without the presence of diagonal bracing or perpendicular shear walls, lateral loads such as wind

# **Prefab Building Rises Quickly by the Numbers**



**Owner: Reeds Ferry Small Buildings Inc.  
Construction Manager: Maple-Leaf  
Construction Company Inc.  
Steel Erection Contractor: Raymond Brothers**



*Tru-Form Foundation Inc. workers direct discharge of concrete from Redimix Companies' Oshkosh transit mixer for foundation wall.*

*Left: Steel erector bolts roof-beam held by Grove crane to column section of Butler Building rigid frame for new Reeds Ferry Small Buildings manufacturing facility.*



*Maple-Leaf Construction job superintendent Mike Marois, at right, checks master list as coded building components are delivered.*

can change the 90-degree angle between columns and beams, resulting in "side sway" or "drift" of a building.

Rigid frames integrate columns and beams, and do not allow any change in the angle between columns and beams, preventing drift. But since they resist combined shear, axial and bending stresses, building designers at one time thought that rigid frames couldn't be pre-engineered due to the complicated calculations required.

In 1939 engineers at Butler Manufacturing overcame this problem and came up with a design for pre-engineered rigid frames. The following year, the company introduced its first line of pre-engineered buildings using such frames.

### Putting the Pieces Together

Four heavy steel rigid frames required for the Hudson facility were each assembled of six separate structural sections at the job site. Structural sections closest to the roof-beam/column juncture are haunched, or tapered, since that is where stresses are greatest.

Raymond Brothers erected eight tapered 20-ft.-tall columns first, attaching their bases to bolts embedded in the concrete slab. Next, workers attached 8-in. galvanized horizontal steel girts to the outside face of columns. Metal siding would be attached

to girts later in the process. With the help of the crane, the crew attached four beam sections together on the ground to form an inverted flat 'V,' then raised the entire assembly to the top of two opposing columns. Next, while the crane held the inverted V-section in place, a worker on a Grove boom lift bolted the haunched end beams to the column tops.

While the crane supported a frame, workers attached galvanized steel purlins to the tops of two adjacent rigid frames, tying them together. This essentially completed the building's steel skeleton. (The two gable ends of the building employed standard column and beam construction.) The completed skeleton has a clear span of roughly 80 ft., a length of 125 ft., a wall height of 20 ft. at the eaves and a peak height of approximately 27 ft.

### Finishing the Shell

Raymond Brothers finished the building shell with the installation of a metal standing seam roof system and Butler's Shadowall metal siding system. It took less than two months to construct the steel building shell, discounting time lost for inclement weather and other contingencies. By February 2010, crews were working on the interior of the facility.



*Girts are attached to tapered column sections of rigid frame as assembly of Butler Building begins.*



*Roof beam sections of rigid frame are put together as Grove crane gets ready for lift to top of columns.*



*Crane holds rigid frame in place as workers tie frames together with roof purlins.*

Reeds Ferry Small Buildings Inc. will manufacture sheds, utility buildings, gazebos and pool cabanas at its new facility in Hudson. Established in 1960 by the late Hobart D. Carleton, the company is owned and operated today by second and third generations of the family: the father, Harry, and three sons, Steve, Tim and Mike Carleton.

Maple-Leaf Construction Company Inc. has been in business since 1964, established by the late Ernie Dubois and Paul St. Laurent. Ernie's son, Loren Dubois, is the current owner and president of the independently owned company. Maple-Leaf specializes in commercial construction and operates within New Hampshire, Massachusetts, Maine and Vermont. It has been an authorized Butler Builder since the mid-1990s. 🏠



Building skeleton is nearly complete. Standing seam metal roof and siding will be placed next.  
Bigger photo: Erection crew attaches Butler's Shadowwall metal siding to horizontal girts.

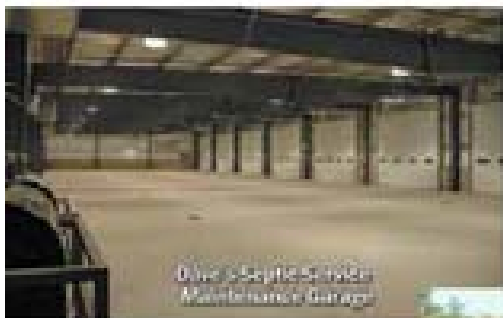
Shell is finished as work takes place inside on offices and manufacturing equipment for Reed Ferry's line of sheds and other small buildings.



# MAPLE-LEAF

CONSTRUCTION COMPANY, INC.  
NASHUA, NEW HAMPSHIRE

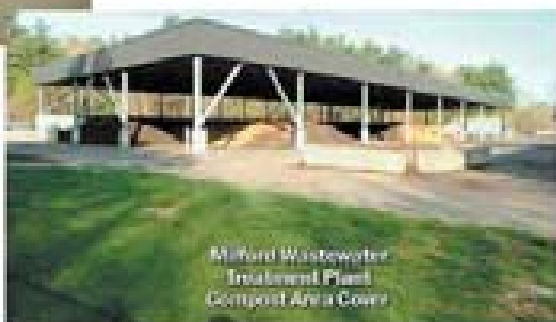
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