

Freeze/Thaw Protection

Exposure to cold weather is believed to damage and destroy millions of cubic feet of concrete annually; from buildings to roadways, dams to bridges. Any time concrete is saturated with water and frozen to 25°F or less.

Saturation is defined as 91% of the cement porosity filled with water. Lean, normal-weight concrete is about 6 to 10% porosity, which equals 11 to 18 gallons in a cubic yard. In a normal 4 inch thick concrete slab, less than 1/2 inch of water will completely saturate the concrete.

The typical Southwest Idaho

climate imposes roughly 100 days of below freezing temperatures, 20 of which never warm to above freezing. That equates to a minimum of 80 freeze/thaw cycles annually.

Entrained air bubbles are the only way to properly protect concrete from damage by freeze/thaw. A quality air entrainment system consists of a well-dispersed, microscopic porosity system. The important parameters include the air content and the spacing factor.

An effective air-void system has 1µm to 1mm air bubbles, evenly distributed and having



a spacing factor of 0.008 inch. ACI 318-14, Table 19.3.3.1 prescribes an air content for 3/4-inch aggregate concrete of 6% (±1.5%) for F2 and F3 exposure, which is concrete exposed to *ANY* ice or snow or *ANY* deicing chemicals.

Learn more → concrete.org;
concreteconstruction.net;
cement.org

EPS Foam Concrete Forms

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Expanded polystyrene (EPS) is a lightweight, inexpensive, rigid material that is commonly used in packaging and as

an insulator. It can be formed in any shape and is stiff enough to support normal-weight concrete.

Recently, WW Clyde working with ACH Foam Technologies used EPS to form piers on the Cheyenne South Valley Connector in Pocatello. EPS Geofoam is also frequently used as an embankment fill material. The bridge will be completed this month.

Learn more → pocatello.us;
wwclyde.net; forconstructionpros.com

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*Assuring the
Strength, Safety
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Boise's New JUMP

The Landmark JUMP opens this month!

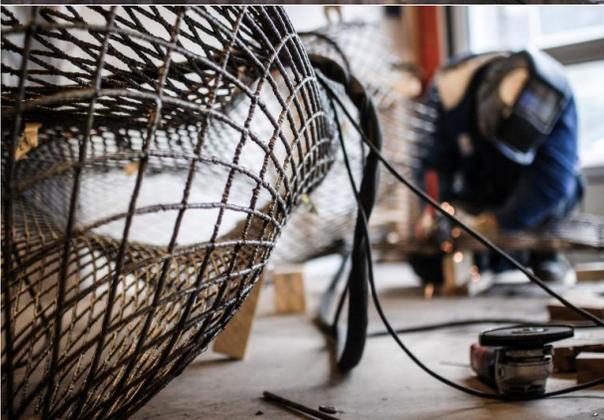
Jack's Urban Meeting Place is the Simplot Family's legacy gift back to the community it calls home. Looking like a stack of building blocks, the structure is composed of a cluster of specialty-purposed rooms. These include typical meeting and event rooms, but also a variety of *studios*, including kitchen, dance, play, and creativity.

Some of the construction accomplishments of the ambitious undertaking include:

- 27,000 yds³ of concrete
- 90,000 ft² of PT decking
- Double-reverse helical ramp
- 190,000 ft² below-ground parking garage
- 5-story spiraling slide
- 52 antique tractors

Learn more → mcalvain.com; jump.org; boiseweekly.com

3D Printed Steel Bridge



3D printing technology has quickly advanced from science-fiction to concept to novelty to legitimate construction technique in an amazingly short timespan.

3D printing works like standard printing but adds the vertical dimension to the normal up-down, left-right dimensions in order to 'build-up' a shape.

Instead of ink, 3D printing uses thermal set materials that flow as hot liquid and quickly cool into a solid at STP. These materials include glass, plastic, and metal. Other materials can be fluid suspensions that

harden by drying or curing such as plaster, concrete, and epoxy resin.

The metal bridge is being constructed in Amsterdam by the Dutch company MX3D. The ornate pedestrian bridge will be printed in a test lot in downtown and will ultimately span a small canal.

The rendering at upper left shows the printer mounted to a segment of finished bridge as it prints more bridge in front of itself.

Learn more → time.com; manufacturing.net; pddnet.com

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