



WINTER 2009

Needham NEWS

AN UPDATE OF THE NEEDHAM COMPANIES

Construction Forecast 2010

In last year's end-of-the-year forecast, this newsletter predicted construction declines of at least 25 percent, and perhaps as much as 50 percent. In the case of Needham this prediction has been very accurate; revenues to date this year are off 42 percent. While it is normally good for engineers to be accurate, it would have been less disruptive and stressful if the 2009 prediction had missed the mark.

Needham has responded by reducing staff and controlling costs. This has caused the service quality to decline in some cases, but at least Needham is here to make a 2010 prediction! In fact, Needham has remained a solid venture and is set to respond quickly to growth and opportunities. So now the question is; when will growth resume.

Since structural engineering tends to be a leading indicator, Needham's work load can be a good glimpse into 2010. The company backlog declined severely throughout the first half of 2009, stabilized during the summer, and has slightly increased towards year end. However, it is still rather soft. What are really missing are the larger, private commercial or industrial projects. There are still prospects in Department of Defense construction (hangars and BRAC work), movie theaters, and very small commercial jobs. Also there is a lot of "remodeling" or modification work.

In the 2009 forecast it was predicted that industrial, medical and religious markets would offer some hope. This has proven somewhat true. What was not foreseen was the negative impact of polices proposed and enacted by Washington. Despite very low interest rates, the stiff oversight of financial institutions has constrained credit. This has hurt the religious market. The proposed health care reform has virtually stopped new medical projects. Any upturn in industrial work has been slowed by the uncertainty of "Cap and Trade". Even the stimulus money has severely hurt the progress of many larger DOD projects (this is a story for another time).

So the best construction forecast is a "flat" to up 5%. Any increase will occur in the second half of the year. For the general contractor it may get worse before it gets better.

While structural engineers and architects expect new design work to slowly improve during 2010, much of the larger work will not start construction until 2011. Even this mildly optimistic forecast assumes Washington sorts out the issues and backs-off many of the anti-business policies currently proposed. Business needs cost certainty to have the confidence to expand.

So the forecast may be "cloudy, clearing expected late". Let's hope this forecast improves.

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DBS Design Tip – Aircraft Hangar Buildings Why use a box truss at the front of a hangar?

Aircraft hangars often have large clear-span openings, but are not very deep. As an example, a hangar for a C-130 often requires a clear-span of 140 feet or more, while the depth may be as little as 100 feet. A box truss at the front provides a stable, solid structure that is very stiff. This stiffness is required



to ensure the doors operate smoothly in all weather conditions. The stability of the box allows the truss to be set, the large cranes to be cut loose, and the front to back framing can erected later with smaller equipment.

While a box truss may not result in the lowest possible, theoretical steel weight, it will result in the lowest-cost, erected structure. A box truss design also avoids the problems associated with very high horizontal reactions from rigid frames. Finally, the box truss is allowed in high seismic areas where rigid frames are often prohibited by code.

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Tilt-up Concrete Construction A Competitive Edge, Outside the Box

As the recession lingers on, a bright spot for Needham and Associates has been tilt-up construction. Tilt-up is increasingly seen as the preferred way to build certain types of structures. Tilt-up is rapidly shedding its image as “big, windowless box” construction. Owners and Architects are embracing the tilt-up concrete process on projects that in the past, would have been steel frame with brick veneer, or steel frame with high end architectural pre-cast.

“High-end” Tilt-Up

The Zona Rosa Building C is a great example of the trend towards “high-end” tilt-up construction of office and retail. Zona Rosa featured multi-story panels, complex architectural features with thin-set brick, and load bearing construction. To achieve this Needham had to employ complex, concrete-frame analysis instead of the normal slender wall design approach used on most tilt-up projects. The added design complexity was more than justified by the outcome, since this project won a national award from the TCA in 2009.



Composite Construction

Needham has recently been designing projects using a composite cold-formed steel stud integrally installed on a thin concrete tilt-up panel. The panel is then lifted into position using a normal tilt-up lifting approach. The result is composite steel-concrete panel that is ready to insulate between the studs, has room for utilities, and possess much of the speed and durability of conventional tilt-up. All of this at less cost than typical stud-veneer construction.

This approach can also use sandwich panel insulation if very high-wall R-values are needed. It is also a very “green” product, since 100 percent of the steel is recycled and the concrete veneer can be constructed with local materials. The use of fly-ash can further enhance the “green” value of the product.

This is a tilt-up product with a bright future for office, retail and institutional construction previously dominated by steel studs and veneer systems.

Storm Shelters

A growing trend in “tornado Alley” is the inclusion of storm shelters or refuge areas in many public, and now in some private buildings. This practice has been encouraged by FEMA through various polices and the publication of FEMA standard 361.

These shelters go well beyond the old “root-cellar”, holes-in-the-ground found on many farms. They often double as interior rooms in buildings and are now even being incorporated into the overall functional, architectural layout of the building. For example, a conference room or lecture hall might also double as a community shelter. This is quite a challenge since the FEMA design requires wind loads of 200 pounds per square foot (ten times the normal wind force) and the ability to deflect all projectile debris. Tilt-up is one of the few products that can do this in an economical manner.

As the construction industry soldiers through these difficult times, the designers and contractors that can offer improved value to owners will succeed. Tilt-up construction is moving well beyond the “big box”. For Needham clients, the motto might be... “think outside the big-box” and achieve success.

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