Subcontractors Can Be “Network Master Switches”

Experienced project managers know the impact of subcontractor performance on project control, and scientists have now helped to describe and quantify this interaction.

A project is a network of profoundly integrated individuals and companies. Scientists analyzing networks such as power grids, computer networks, social networks and ecological systems have discovered some surprising principles that apply to construction project networks as well. Seeking to calculate and find the minimum number of nodes necessary to control a network reached the following conclusions:

1. Network shape and node location matters little. The relation between large, close and well-connected nodes may be weak — a counterintuitive finding.

2. Nodes that have close to the average number of connections are more likely to be influencers.

3. The number of nodes needed for control is related to the average number of connections per node. Dense networks can be controlled by influencing 20% of nodes, but sparse networks must influence 80% of nodes for control.

The construction project management implications of these findings are:

1. A surprisingly small number of nodes can influence the entire project.

2. Smaller subcontractors and suppliers can have a larger than expected project impact.

3. Larger projects with more nodes are easier to influence— both towards success and failure.

These findings reinforce the critical nature of a well-defined WBS (Work Breakdown Structure), work packages and careful subcontractor selection.
Nature May 12, 2011, Science news June 4, 2011