

# Skanska USA Building Innovation Grant Program

2012 Annual Report



# Innovation Grant Program

## Overview 2012



**Anthony Colonna**  
National Director, Innovation  
Skanska USA Building

The Innovation Grant Program continues to fuel game-changing ideas within Skanska USA Building. In 2012, we awarded over \$100,000 in grants to support innovations from three project teams and two continuing projects. We are pushing the boundaries of technology to improve our effectiveness in field operations and to grow Skanska's business.

Mobile applications (apps) continue to provide opportunities for us to develop new solutions. This year we worked on several apps, focusing on clients and jobsite reporting, to increase efficiency and communication.

We made great developments in prefabrication this year, increasing our expertise in the field. By continuing to provide solutions on projects, we can stay ahead of the curve in this market and develop our reputation as prefabrication experts.

This year's projects also tapped into a few new areas, aimed at providing better virtual collaboration and client communication. This report provides a status overview of all projects from 2012.

## Where to find the projects...



# Polymer Flooring for Bathroom Pods Study

2012 Grant

## Project

Alfred I. duPont Nemours Children's Hospital,  
Wilmington, Delaware

## Project Team

- Marty Corrado - Project Lead
- Frank Gavaghan - Project Lead
- Matt Pentz

## Partners

- Virginia Tech University
  - Annie Pearce, Ph.D.
  - Eric Johannigmeier, Graduate Student
  - Matthew R. Eatherton, Ph.D.

## Benefit

Allow bathroom pods to be fully constructed in the warehouse, saving time and money in onsite installation.

## Overview

We continue to test and implement new ideas to give our clients value added prefabrication solutions; the polymer base study is one example of our commitment to improve prefabrication. In the past, framing, rough-ins and interior drywall were the only components of prefabricated bathroom pods that could be built in the warehouse. Working on the Alfred I. DuPont Nemours Children's Hospital project, Frank Gavaghan, Marty Corrado and Matt Pentz saw this as a limitation and a missed opportunity to take full advantage of prefabrication. Realizing that adding the bases and finishes to the warehouse prefabrication would save time and money during onsite installation, they set out to find a solution using an innovative grant.

The team worked with Virginia Tech to perform tests of a polymer base for the bathroom pods. Each bathroom pod was built with all finishes, including tile floors, walls, lighting, and other accessories. The base of each bathroom floor has a single integrated drain unit to ensure a water-tight seal between the base materials

and drain assembly. The floor was reinforced with a continuous fiberglass mesh layer and contains polymer-coated steel reinforcement and edge supports. The team performed the following tests on the polymer base:

**Drop testing** – Simulated stress that would occur if the slab was dropped from a forklift during handling or placement of the bathroom module.

**Vibration testing** – Tested the stability under likely conditions during trucking from the manufacturing site to the job site.

**Load testing** – Performed on the edges of the slab to simulate loads due to potential racking during transportation.

**Fire resistance** – Estimated the fire resistance of the base, using IBC 2012 calculations.

The results of the testing were positive. With waterproofing, the slab was able to withstand up to a six inch drop without any serious damage. The slab also handled vibration well, as long as the base was supported every three feet.

## Current Progress

Due to the success of the testing, Alfred I. duPont Nemours Children's Hospital is implementing use of the polymer for the bathroom pod bases and installing all finishes in the warehouse. This process will continue on future projects as part of prefabrication.



Above: Concrete slabs testing in the Virginia Tech lab

# Virtual Collaboration in Construction

## 2012 Grant

### Overview

With the number of projects our Virtual Design and Construction (VDC) teams are working on simultaneously, we are not always able to devote a VDC resource to each site. The Boeing Everett Delivery Center (EDC) Project Team faced this challenge and applied for a grant to develop a virtual workspace that would allow a VDC member to work onsite without physically being present.

VDC members and grant recipients, Helen Juan and Greg Smith, worked in collaboration with the University of Washington to study the capabilities of different software products to allow our teams to work in a virtual environment, granting clients and project teams access to a VDC employee at all times.

Over the past year the grant team tested three virtual meeting programs: Sococo, Second Life and CyberGRID/Unity. These programs give VDC teams the capability to review and collaborate on 3D models virtually. Part of the study looked at combining different commercially available software systems to increase capability.

### Current Progress

To begin testing, the team worked with five participants from the Boeing Everett Delivery Center (EDC) project in Seattle. The group tested the Sococo software first for 60 days. The software allowed the group to coordinate issues in 2D drawings over the phone and via Skype. Without the software, they would have needed to work in person to get the coordination done. They found the software simple and user friendly.

The second round of testing explored the CyberGRID/Unity software. This software allows users to view 3D models and provides avatars for team members to virtually walk through the model together and review issues. Avatars are virtual simulations of people that can communicate through voice and text. The team conducted testing to simulate the participants work on various stages of the EDC project. In a one hour long test, participants used the software to walk through the project and address three different deficiencies. The team would have needed ten hours to perform the same

### Project

Seattle Office

### Project Team

- Greg Smith - Project Lead
- Helen Juan - Project Lead
- Peter Avratin, Jeff Richards, Ryburn Halstead, and Jhomar Small - Project Engineers

### Partner

- Virginia Tech University
- University of Washington
  - Anne Anderson, P.E.
  - Carrie Struts Dossick, Ph.D., P.E.

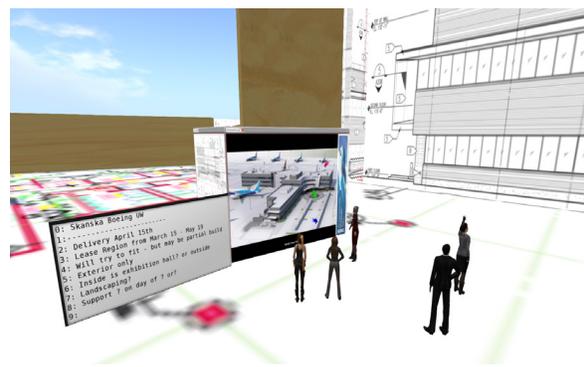
### Benefit

Allows VDC teams to work more efficiently to solve issues with clients.

tasks remotely without the software, showing a clear advantage of using CyberGRID/Unity.

The team is in the final phase of testing the last software piece, Second Life. For the test Skanska will have an exhibit of the Second Life virtual world available to employees of Skanska, Boeing, and members of the University of Washington research team. The exhibit will showcase highlights of the EDC construction project and Skanska's use of BIM and other innovative technologies. When the research is complete the team will make recommendations on the best way leverage this technology at Skanska.

Helen and team note that seeing all the issues in a real world environment can't be replaced with this method but it does save time and provide more access to team members when addressing project concerns.



# Client Mobile Phone Application

2012 Grant

## Project

University of Florida

## Project Team

- Maria Houle - Project Lead
- Debra Bauman
- Jay Weisberger
- Lydia McDowell

## Partner

- Edouard La - Intern, University of Florida

## Benefit

Improve communication with our clients on project milestones and news.

## Overview

With the exponential growth of mobile applications and social media, we are seeking new ways to deliver value and meet our clients' expectations. Maria Houle, grant recipient and project executive at the University of Florida project, is looking to engage project stakeholders with the development of a project news app. This innovative technology will allow us to communicate directly with students and surrounding communities, audiences that formerly have been difficult to reach.

In the past, teams have attempted to deliver up-to-date information and high level project news to clients and employees with newsletters. That information quickly becomes outdated and can be hard to manage. The proposed app will provide a platform to distribute project-specific information in a user-friendly format that can be easily updated by Skanska teams.

In the fall of 2012, a University of Florida intern conducted a survey of nearly 30 clients to measure their interest and potential usage of a client information app. Results showed that 96 percent of our clients have a smart phone and use mobile apps regularly; 100 percent would view the app on a bi-weekly basis or more if one was available.

## Current Progress

The team met in January 2013 to design the functionality of the app and choose the following content to include:

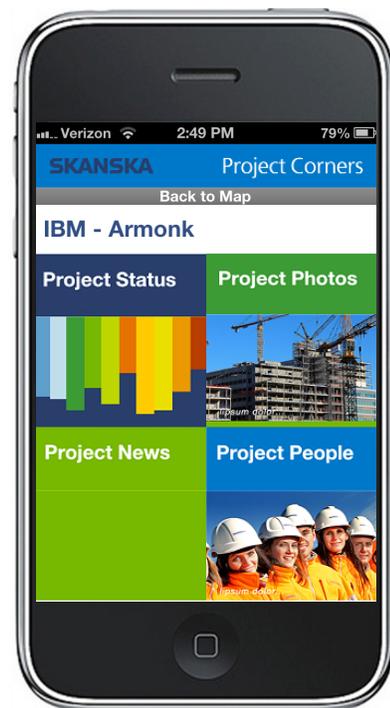
**Project Status** – Project calendar with milestones, a live news feed that shows short descriptions of site events, and a progress meter showing the days left of the project.

**Project News** – News articles written by Skanska employees about the project. The articles will be on a broad range of topics specific to the project and could include special events, LEED, project staff, safety and innovation.

**Project Photos** – Photos and videos of the project showing progress and events.

**Project Faces** – Contact information for the project team as well as photos of people working on the jobsite.

The team is working with IT and potentially an outside software developer to build the application by the close of Q3.



# Time and Materials Tracker App

## Past Grant

### Overview

Time and material tickets (T&M) on projects add up quickly and can be cumbersome to manage in paper form. Brian Tighe, grant recipient, has set out to change that by creating a T&M web and mobile application, which allows the project team to enter labor, equipment and material rates for each subcontractor. The goal of this project is to create a transparent, paperless process to manage T&M tickets from receipt through approval with real time visibility.

The developed iPad application also allows superintendents to enter T&M tickets in the field in real time for calculation and review. This level of transparency will allow the project team, especially PMs and PXs, to better manage the process and the budget because charges against the cost event (CE) are immediately accessible.

The application is available on the iPad and pulls information from Prolog, providing access to vendors, cost events and cost event items that have been entered into the system. Ticket pricing can be compared to the placeholder CE values to ensure that actual costs are not trending higher than expected. This will be especially helpful to projects that involve several subcontractors, a tight schedule, large Skanska project team and a high level of change management.

### Benefits

- Provide higher transparency of cost
- Ensure there are no double tickets
- Accelerate turn-around time for approvals
- Improve backup cover sheets used for owner changes.

### Current Progress

Currently the tool has been developed for the iPad and is in beta testing with several projects across regions, expected to conclude in Q2. With positive results, the app will be available to every project that elects to use it.

### Project

Metro New York Office

### Project Team

- Brian Tighe - Project Lead
- David Bland
- Ivette McCann

### Partner

- Skanska IT

### Benefit

Estimated time savings of 50% to process T&M tickets and 80% in cost event analysis.

Sync	CE#	Description	Ticket#	Estimate	Status	P Rec
<b>ADCO Electrical Corporation</b>						
●	00015-0...		1234	\$13,000	Closed	No
●			234	\$0	Approved	No
●	00660	Shortened	bobtest	(\$1,795,337)	Started	No
●	00001	off(Mts#)		(\$58,862)	Closed	No
●	00660	Shortened	bobtest3	(\$1,795,337)	Started	No
Total:				(\$3,636,906)		
<b>BENSON INDUSTRIES LLC</b>						
Sync	CE#	Description	Ticket#	Estimate	Status	P Rec
			from ze...	\$0	Started	No
Total:				\$0		
<b>The Manhattan Company of New York</b>						
Sync	CE#	Description	Ticket#	Estimate	Status	P Rec
●	00001		123456	(\$855,170)	Closed	No
Total:				(\$855,170)		

Delete this Ticket

Details Labor Equipment Materials Rental Sub Notes

Subcontractor Name: Macedos Construction, LLC

Ticket #: 1001

Subcontract #: [ ]

Cost Event: [ ]

Cost Event Item: [ ]

CEI Description: [ ]

Status: Invoiced [ ]

Pricing Received: Yes No [ ]

Sub Ticket Date: 03-05-2012 [ ]

Ticket Description: delete some outlets

Save

# inSite Monitor Environmental Monitoring Mobile App

## Past Grant

### Overview

Maintaining patient safety during a hospital expansion and renovation project is absolutely paramount. This was key to the development of the inSite monitor, an application that allows the project team to remotely monitor noise, differential pressure and particulate matter at the site.

The old system required a Skanska team member to manually walk the site on an hourly basis to read and record each sensor's measurements. This proved to be inefficient and did not guarantee enough protection against any out of tolerance conditions.

Two years ago, a grant team led by Tony Baldassari, Skanska Superintendent, started developing an environmental monitoring system to address this challenge. In collaboration with the Tampa General Hospital project, a prototype system was developed and tested during renovation of the NICU wing. With successful testing Skanska began working with a manufacturer and software developer to create a full system, a computer base station to receive data from environmental sensors and a mobile app to communicate the data to users.

In 2012, we were able to turn the prototype into a commercially available product that is now available for purchase on any Skanska USA Building jobsite. The developed system allows particle, differential pressure and noise sensors to be checked in real-time on smart-phone devices or desktop computer. Alerts notify the team with a message via email or SMS when a sensor is approaching a level of risk. This allows our team to be proactive in preserving our clients' healing environments.

### Current Progress

The inSite Monitor has been piloted on several sites and is now commercially available for purchase as a kit on the Skanska Company Store, found on MySkanska. The system is shipped with all the parts and pieces assembled. Minor setup is needed by the project team upon arrival. The tool is fully supported by Skanska IT and can be elected for use on any project within Skanska USA Building. The mobile app is available to project teams currently using the system and as a demo for sales teams when meeting with potential clients. The app can be downloaded from iTunes.

[Click here](#) for the online order form.

### Project

Tampa General Hospital Expansion (Florida)

### Project Team

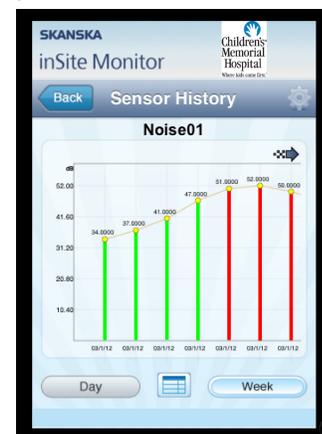
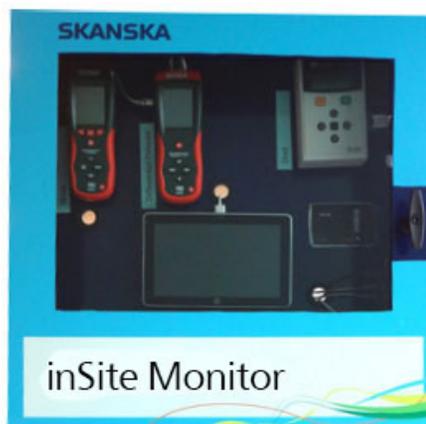
- Anthony Baldassari - Project Lead
- Fred Hames
- Roger Stephan
- Scott Powell

### Partners

- Duke Pratt School of Engineering
- Duke University Smart Home Program
  - Dr. Brad Fox - Duke Engineering Management Program
  - Harris He - Duke University Intern
  - Bill Lee - Duke University Intern

### Benefit

To improve the efficiency and accuracy of environmental monitoring on jobsites.



# Leak Prevention Application

Past Grant

## Overview

Leak prevention is a universal construction challenge that Skanska is constantly working to improve. It is estimated that between \$5 million and \$10 million dollars a year is spent on warranty callbacks related to leakage problems in new construction.

To address this issue Skanska's National Operations Leadership Committee (NOLC) formed a task force to evaluate the company's leak prevention QA/QC process. The team came up with the idea to create an iPad application to improve a back-end inspection process to be managed in the field. They worked with an external app developer to design the functionality of the tool. Skanska IT was involved to help in the process and provide long term support.

After two rounds of beta testing by several Skanska projects, the app has been fully developed, to include a document library and inspection record that can be managed in one place for each inspection point and scope of work, assembly drawings, pictures and RFIs. The app allows for a visual record of quality inspections for the building's exterior envelope. When the project is complete, the jobsite can run reports and archive the data.

## Benefits

- Expected to cut inspection time by 30 percent
- Expected to cut warranty callbacks by 50 percent
- Reduces the risk to the owner that their building will leak.

## Current Progress

After extensive testing by dozens of jobsites, the app has been deployed on the Skanska App store. With full support from the NOLC, Skanska USA Building has rolled out the tool as a requirement on all new projects. Training guides and Skanska IT support are available.



## Project

San Antonio Office

## Project Team

- Marty Massey - Project Lead
- Randy Pitre - Project Lead

## Partners

- Skanska IT
- National Operations Leadership Council

## Benefit

Expected to cut inspection time by 30% and warranty callbacks by 50%.



# DayFacts Daily Superintendent Report

## Past Grant

### Overview

The superintendent's daily report is a critical part of Skanska's risk mitigation plan, but the current paper process is labor intensive and reports are not easily shared.

The DayFacts system, developed under the grant program in 2011, is a web-based tool that mirrors the current paper process. Each subcontractor can log on and enter their daily manpower, issues, safety issues, deliveries, and equipment, just like the current report. During the day, the superintendent has a real-time dashboard showing the status of each subcontractor report (complete/in-progress/not started). At the end of the day, the superintendent views a composite summary of all the reports, and has the opportunity to comment or dispute each subcontractor entry. The web-based nature of the system makes it easy for management, like project executives, to monitor a summary of daily reports for all projects. All the data is stored in a database, simplifying reporting, archiving and retrieval.

#### Project

Metro New York Office

#### Project Team

- Keith Dean - Project Lead
- Ellen Mair

#### Partner

- Skanska IT

#### Benefit

Allows Skanska personnel to spend more time actively managing their project, opposed to reviewing reports in the trailer.

### Current Progress

The prototype has been developed and deployed successfully on about 120 jobsites over the past two years. Due to the success, Skanska IT has moved DayFacts to a supported platform and made enhancements to the software. Benefits of the updated version include, Active Directory integration, allowing all employees to have access, and JD Edwards integration, providing automatic project and subcontractor information and reports. With the support of the National Operations Leadership Committee, DayFacts will be a standard on all jobs. Migration of projects from the prototype version to the new version and all new implementation is expected by the end of 2013.

The screenshot shows the DayFacts web application interface. At the top, there is a navigation bar with tabs for 'DAILY REPORT STATUS', 'SUBCONTRACTOR REPORT STATUS', 'REPORTS', 'SETUP', and 'HELP'. Below the navigation bar, the page title is 'Daily Input - DAYFACTS TEST 1 - 1/31/2013'. There are buttons for 'Save' and 'View Daily Report'. A 'Shift:' dropdown menu is set to 'All'. Below this, there are tabs for 'MANPOWER', 'ISSUES', 'SAFETY', 'DELIVERIES', 'EQUIPMENT', 'WEATHER', and 'VISITORS', each with a red notification icon. The main content area is a table with columns: Company, Shift, Craft, 2nd Tier Vendor, Disputed, Fore men, Crafts men, Laborers, Total, Work Performed, and Skanska Comments. The table contains five rows of data and a 'Total' row.

Company	Shift	Craft	2nd Tier Vendor	Disputed	Fore men	Crafts men	Laborers	Total	Work Performed	Skanska Comments
10 point environmental, inc.	S1	Electrical	<input type="checkbox"/>	<input type="checkbox"/>	1	4	0	5	Did electrical work.	<input type="button" value="Edit"/>
1st choice custom builders	S1	electrical	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0	0	ran wire through the walls	<input type="button" value="Edit"/>
1st choice custom builders	S1		<input type="checkbox"/>	<input type="checkbox"/>	0	0	0	0		<input type="button" value="Edit"/>
a b s benefit	S1		<input type="checkbox"/>	<input type="checkbox"/>	1	0	0	1		<input type="button" value="Edit"/>
a c c environmental consultants inc	S1	craft	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	1	0	2	Worked.	<input type="button" value="Edit"/>
<b>Total:</b>					<b>3</b>	<b>5</b>	<b>0</b>	<b>8</b>		

# Innovation In the Media

This year Skanska has been recognized by the media in several areas of innovation. Below are the highlights from our news-making in 2012.

## Fiatech CETI Award

Skanska USA Building in collaboration with Vela Systems was awarded the 2011 Fiatech Celebration of Engineering and Technology Innovation (CETI) Award, in the Intelligent and Automated Construction Job Site category for the James B. Hunt Library project. The project worked to implement new technologies on their site with an Innovation Grant awarded in 2011. The award was received during the spring of 2012.



## Engineering News Record - August 21, 2012

Anthony Colonna, Director of Innovation, Skanska USA Building, was interviewed about the inSite monitor and gave a demo of the system. The article was published online with a video displaying the system in use.



## Forbes Magazine – September 25, 2012

Mike McNally, Skanska USA CEO, was interviewed about our company's commitment to innovation and the Innovation Grant Program

## Information Week – Top 250 Innovators Award

Skanska USA Inc. was named one of the Top 250 Innovators in 2012. Information Week awards the ranking to companies who are the leading US users of business technology. Skanska USA Inc. was awarded 19th place.



**Skanska USA Building Inc.**  
**Innovation Grant Program**  
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