Transforming the Future of Construction

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Futuristic Technologies Transforming Construction Now

- FACT: concrete is single most widely used construction material in the world, second-most consumed substance on Earth after water, cheap and widely adaptable, yet susceptible to cracking and deterioration under stresses like extreme heat and cold
- “Smart” concrete – heals its own cracks, embedded with tiny capsules of sodium silicate, capsules rupture and release a gel-like healing agent that hardens to fill any crack that forms
- Smart concrete will make structures safer AND cut back on greenhouse gasses (concrete production currently accounts for 5 percent of global carbon dioxide)

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- FACT: “carbon nanotubes” have the highest strength-to-weight ratio of any material on Earth, can be stretched a million times longer than their thickness
- FACT: a nanometer is one-billionth of a meter – a single sheet of paper is 100,000 nanometers – your fingernail grows @ 1 nanometer/second
- Using cutting-edge electron-beam lithography, scientist and engineers have created tubes of carbon with walls only 1 nanometer thick
- Carbon nanotubes (light weight and strong) are being embedded into metals, concrete, wood and glass adding density and tensile strength
Futuristic Technologies Transforming Construction Now

- FACT: “ALON” – transparent aluminum, is already being used by the military for making armored windows and optical lenses
- 1980s, scientists began experimenting with a ceramic made from a powdery mix of aluminum, oxygen and nitrogen – heated for days at 3,632 degrees F, and polished to a perfectly clear, glass-like material with the strength of aluminum
- “Clear metal” is being used to construct towering glass-walled skyscrapers requiring less internal support; AND military buildings are installing transparent metal windows impervious to the highest-caliber artillery fire!

Other Futuristic Construction Technologies

- Aerogel Insulation
- “Robot Swarm” Construction
- 3-D Printed Houses
- “Smart Roads”
- Building with CO2
Dave Roos, Author “10 Futuristic Construction Technologies”

“…machines will soon rival our own intelligence…99% percent of the time this will be a good thing, making roadways safer and automating tasks that used to require hundreds of hours of dangerous human labor…

…and if Hollywood has taught us anything, machines will eventually REBEL against us and harvest our organs for battery power…I just hope scientific progress is held in check by a strong ethical “off” switch…

To be safe, I unplug all of my “smart” appliances at night – I like my spleen right where it is, thank you!”
Jason Barber, PE  
Operations Manager, Dynalectric Colorado

Dynalectric has been in business in Colorado for over 60 years. We are a subsidiary of EMCOR, a top ranked Electrical / Mechanical / Facilities Management firm in the US. EMCOR is a Fortune 100 company and is also identified as one of the best companies to work for. We employ on average over 250 electricians, with offices in Denver and Colorado Springs. From data centers, hospitals, manufacturing facilities to street lighting, Light-rail infrastructure, ITS and traffic intersections we handle complex electrical installations for fortune 500 companies as well as start up businesses here in Colorado.

I oversee the operations of our Colorado Infrastructure Group. This includes all financial, work procurement, safety and field operational responsibility.

Brick and Mortar Ventures identify, invest in, and grow emerging companies developing innovative software and hardware solutions for the industries of architecture, engineering, construction, and facilities management.

I am an industry advisor to multiple Brick and Mortar portfolio companies.

The Future of Construction

Productivity in manufacturing has nearly doubled, whereas in construction it has remained flat.

Overview of productivity improvement over time:

- Manufacturing
- Construction

$ thousand per worker

Source: Expert interviews; IHS Global Insight (Belgium, France, Germany, Italy, Spain, United Kingdom, United States); World Input-Output Database

McKinsey & Company
The Future of Construction
How do we solve the productivity issue?

- Consolidated Bid Management
- Supply Chain and Material Management
- Mobile Drawing, RFI, and Task Management
- 360 Photos and Augmented Reality
- Workforce Telematics

How it’s used by GCs and Owners:

- The largest subcontractor network in North America
- Send bid invitations
- Qualify vendors
- Custom bid forms
- Analyze proposals
BuildingConnected for Subcontractors

- A centralized hub for ALL your bid opportunities
- Ingest bid invites from any source
- Track status of proposals and follow-up tasks
- Assign to team members

Once all bids are in a centralized system

- Sync important dates with Outlook & Gmail calendars
- Quickly pull reports and create charts
- Analyze which jobs are best for your business
Supply Chain and Material Management
Mission

Operational excellence:

Enable coordination at scale in the field to streamline construction operations and reclaim up to 10% of the total cost of a project.
Core use cases

- Plan viewing
- Issue tracking
- Tasking & scheduling
- Progress monitoring
- Reporting & archives

Fieldwire saves individual users on average 5 hours per week before factoring in other project savings.
- Fieldwire user survey

Use Case:
Whidbey Island Naval Air Station

Project details
- Specialty electrical contractor
- $50m+ project
- 50+ users on Fieldwire
- PMs, Supers, Foremen & Craftsmen

Fieldwire utilized for
- Plan viewing & as-built documentation
- Task & crew scheduling
- Issue tracking
- Real-time collaboration & notifications
Progress picture mess. Looks familiar?

Standard images stored in traditional folder structures are incomplete and inaccessible
Mission control for your site: No more searching for lost progress pictures
HoloBuilder equips every project stakeholder with foreman-level site knowledge

HoloBuilder’s Smart 360° Job Walks communicate current site conditions, progress, and location-based information in single source of truth.

Capture. Organize. and Share 360° progress as fast as you can walk your site

Capture & Locate 360° images
Annotate & Comment
Share & Communicate

Capture and share project status with simple site walk-through using off-the-shelf 360° camera and HoloBuilder mobile app
TimeTravel provides complete visual project history at your finger tips. Quickly create project progress documentation at preferred time intervals.

https://holobuilder.com/app/index.html#player/6538215523614720/273

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Workforce Telematics

DIGITAL TIMEKEEPING
Specifically designed for construction, Rhumbix is the most adaptable digital timekeeping solution. Timecards complete accurate time cards within 5 minutes per day and need data to go right into your Payroll/ERP system? We can do that.

DAILY REPORTS
Rhumbix is a simplified and all-inclusive application. Eliminate duplicate re-work and the need to buy more software. Automatically generate Daily Reports for your internal and G/C/Owner reporting purposes.

QUANTITY REPORTING
Easily detail installed quantities on a Unit or Percent. Complete tasks and bill Project Managers better understand production factors. Associate installed quantities to specific Cost Codes and upload photos for contextual referencing.

TGM TAGS
Sick and tired of the administrative burden that comes with Extra Work Tags? Change Orders? Document those in Rhumbix and never again lose sight or documentation on the changes of work scope for your projects.

COMPLIANCE
Does your company require Signatures, Union Compliance and In-Progress Reporting? Rhumbix is Union Compliant and gives you the ability to document all without company preference.

NOTES/PICTURES
Documentation is only as powerful as the control it provides. Quickly snap a photo and detail notes on Delays, Safety, Equipment Malfunctions, Weather and anything else that comes up on the job site.

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March 29, 2017

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FOREMAN FEEDBACK
Rhumbiz is the only available tool to automate daily feedback to your Foremen on project performance. Empower your Foremen with confidence on Actual Hours, Budgeted Hours and Remaining Hours per Cost Code.

DAILY ACTUAL VS. BUDGET
Unlock your budget info Rhumbiz and begin to have automated visibility on project performance and critical production factors. Rhumbiz answers the questions “Did I make money or did I lose money today?” Easily dig into the underperforming areas to make quicker and better decisions.

LABOR PRODUCTIVITY
Automate the reporting and analysis for crew-based performance factors. Dive into unit rate performance, cost code health and projected gains vs losses.

Optimize Productivity

By Empowering Your Foremen
DON’T GET LEFT BEHIND

The weekly NECA Technology newsletter will keep you up-to-date the latest research and development so your business won’t get left behind.

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Questions

Up Next: Lunch on Event Lawn 1

Plenary Session at 1:45 in Grand G-J

Hill Country Hoedown at 8:00 PM at the Knibbe Ranch

Don’t forget to fill out the online evaluation at www.necanet.org/NNSurvey2017