Command
Alkon ®

Using Artificial Intelligence and Machine Learning to Improve Productivity and Profitability in the Construction Industry

Michael Hoagland

Current Challenges

Rising Inflation Rates

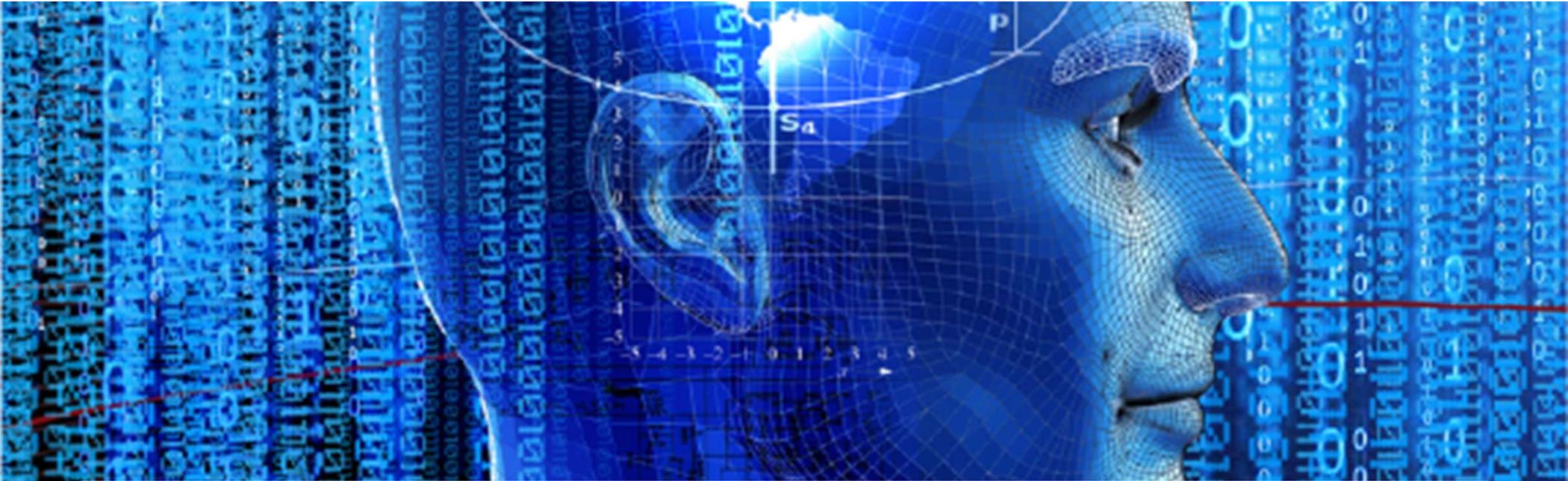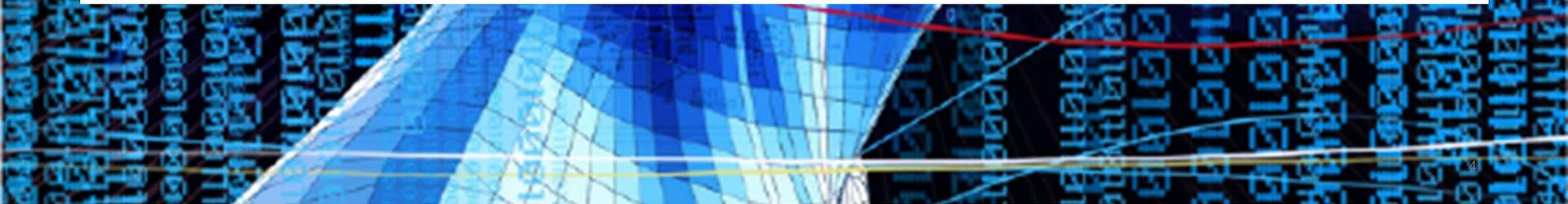**Supply Chain Pressures**

Rising Inflation Rates

Reducing Environmental Impact

Disintegration of the Workforce

How will Technology, AI & ML, assist the Construction Industry in meeting these challenges?

Technology Prediction is a Risky Business

"**X-rays are a hoax**"

Lord Kelvin
Physicist
1900

"The Radio craze will die out in time"

Thomas Edison
1922

"I think there is a world market for about five computers"

Thomas Watson

Chairman - IBM

1943

"There is no reason for any individuals to have a computer in their home"

Ken Olson
President Digital Equipment Corp.
1977

"640k of memory ought to be enough for anybody"

Bill Gates
CEO of Microsoft
1981

1995 Bold Predictions...

Mobile Sales Force	Computer Optimized Dispatch	Leveraging Technology in the Fleet

Getting The Business

- Opportunities are automatically imported

- The data is synchronized to your laptop PC or Palm (hand held)
  - connecting the laptop to the Wide Area Network
  - over the Internet
  - or via a cell phone modem

- Quoting opportunities are automatically routed to the salesperson for follow up.

Optimized Dispatching

What will "Optimized Dispatch" do for me?

- Optimized Dispatch systems will provide suggestions to the Order Taker and Dispatcher:
  - to take the order out of a certain plant or a certain time of day
  - to split an order among 2 or more plants
  - to send a particular load on a particular truck
  - to re-route trucks between plants
- Constantly updated

Equipment in the Truck

- An electronic "ticket" is sent to the truck via radio or digital comms.
- UPS style signature board.
- Truck mounted printers, terminals
- Tickets no longer used.
- On-board computer monitors Engine and other functions.
- Temperature sensors monitor and record the concrete temperature and display this info on the board.

1995 Bold Predictions...

| Managing Supply Chain | Managing Your Quality | Managing your Business |

Material Management

- Inventory constantly evaluated
  - actual batch weights
  - cement and admix sensors
- Standard orders place via E-Commerce for re-supply of materials.
  - Your supplier is responsible for inventory levels
  - Track materials via the Internet
  - re-optimize your orders as needed
- Raw materials are delivered with bar coded tickets. The driver swipes the ticket through a bar code reader.

Ready Mix – A Quality Cycle
Summary

From the QC Lab
To the Batch Plant
To the Order Desk
To the Job
To your Profit Center

Measuring your Business

- Comprehensive Data Warehouse.

- Map reporting

- Multi-dimensional online queries are available and can be performed directly by the Manager.

2015 Predictions...

Mobilization	Same Market Challenges

What's *Different?*

- Machine Learning
    - Machine learning is a field of study in artificial intelligence concerned with the development and study of statistical algorithms that can learn from data and generalize to unseen data, and thus perform tasks without explicit instructions.

- Cognitive Artificial Intelligence
    - Cognitive AI, also referred to as cognitive artificial intelligence, is software that tries to think and learn by imitating the way human brains work. It uses natural language processing (NLP) and machine learning (ML) to attempt to understand human intention behind queries so as to deliver more relevant responses. Such responses are the result of searching through vast quantities of data and are delivered in language a human would use. Cognitive AI is commonly used to improve problem solving, decision making, and communication.

- Application Programming Interface (API)
    - APIs are mechanisms that enable two software components to communicate with each other using a set of definitions and protocols. For example, the weather bureau's software system contains daily weather data. The weather app on your phone "talks" to this system via APIs and shows you daily weather updates on your phone.

Applying ML & AI to your Business

- Recall our Challenges:
  - Rising Inflation Rates
  - Supply Chain Pressures
  - Government-led infrastructure Activity
  - Reducing the Environmental Impact
  - Disintegration of the Workforce

- Predicted Advancements:
  - Process Automation
  - Knowledge Transfer
  - Skill Enhancement
  - Collaborative Tools
  - Workplace Adaption

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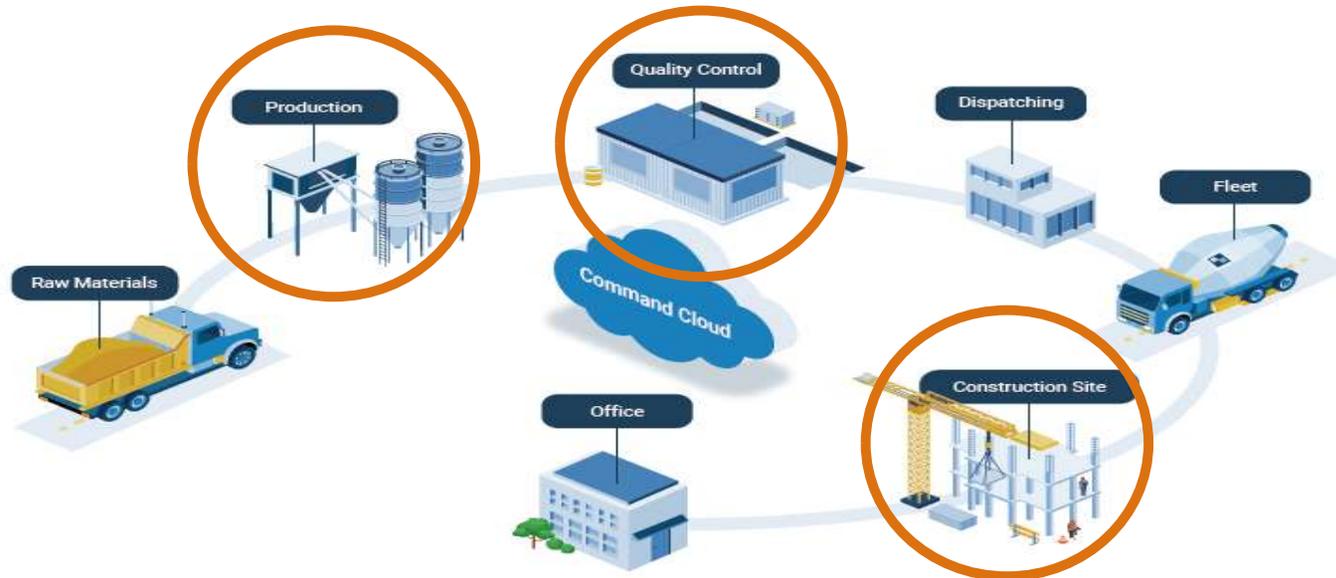   - Collaborative Tools
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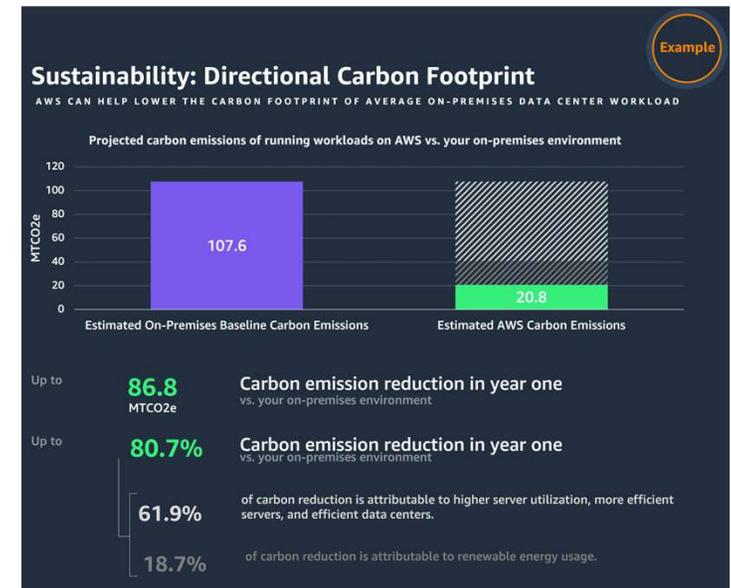 - Disintegration of the Workforce

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Cloud Infrastructure

Migrate on-prem systems to the Cloud to significantly reduce carbon footprint

- Research on AWS indicates reduction of carbon footprint by at least **80%**, a figure that can climb to an impressive **96%** once AWS attains its 100% renewable energy goal by 2025[1]

- Additionally, companies using cloud computing **save 20% annually on infrastructure costs**[2]

Sources
[1] 451 Research | AWS Cloud
[2] GITNUX Market Data, "Cloud Cost Saving Statistics 2023"

Bringing Together Technology and People to Support the Heavy Building Material Community.

Thank you!

mhoagland@commandalkon.com
205-266-1155
linkedin.com/in/michael-hoagland-40a79211

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