



SINCLAIR GROUP

Rapid Transformation™ • Extraordinary Results

Innovation for Competitive Advantage in Manufacturing

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Innovation Topics

- Broaden the concept of technology
- Illustrate the practical management of technology innovation
- Practical principles for managing innovation for competitive advantage

Disruptive vs Sustaining Innovation

Innovation

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graph TD; Innovation --> Unbounded[Unbounded creativity]; Innovation --> InSide[In side /Out side];
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Unbounded creativity

Outside / Inside

Disrupts Business Models

Enables new entrants

In side /Out side

Support Current Business Models

Bounded Creativity

Discourages new entrants

Technology

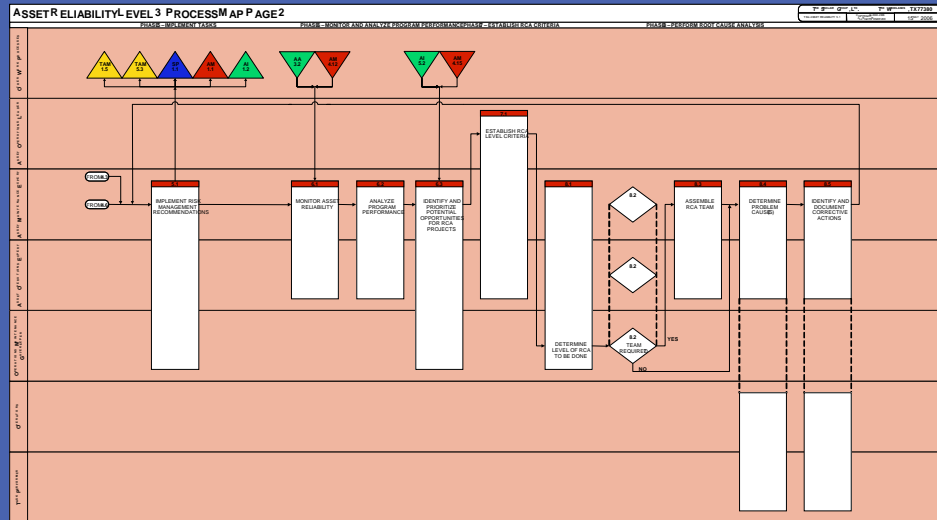
From Webster's Dictionary:

The application of scientific knowledge,
especially in industry or business

Technology is Everywhere in Your Business

- Human Resources
- Financial Methods
- Strategy and Planning
- Sourcing
- Marketing and Sales
- Manufacturing
- Product Design & Development

Technology- A Management Definition



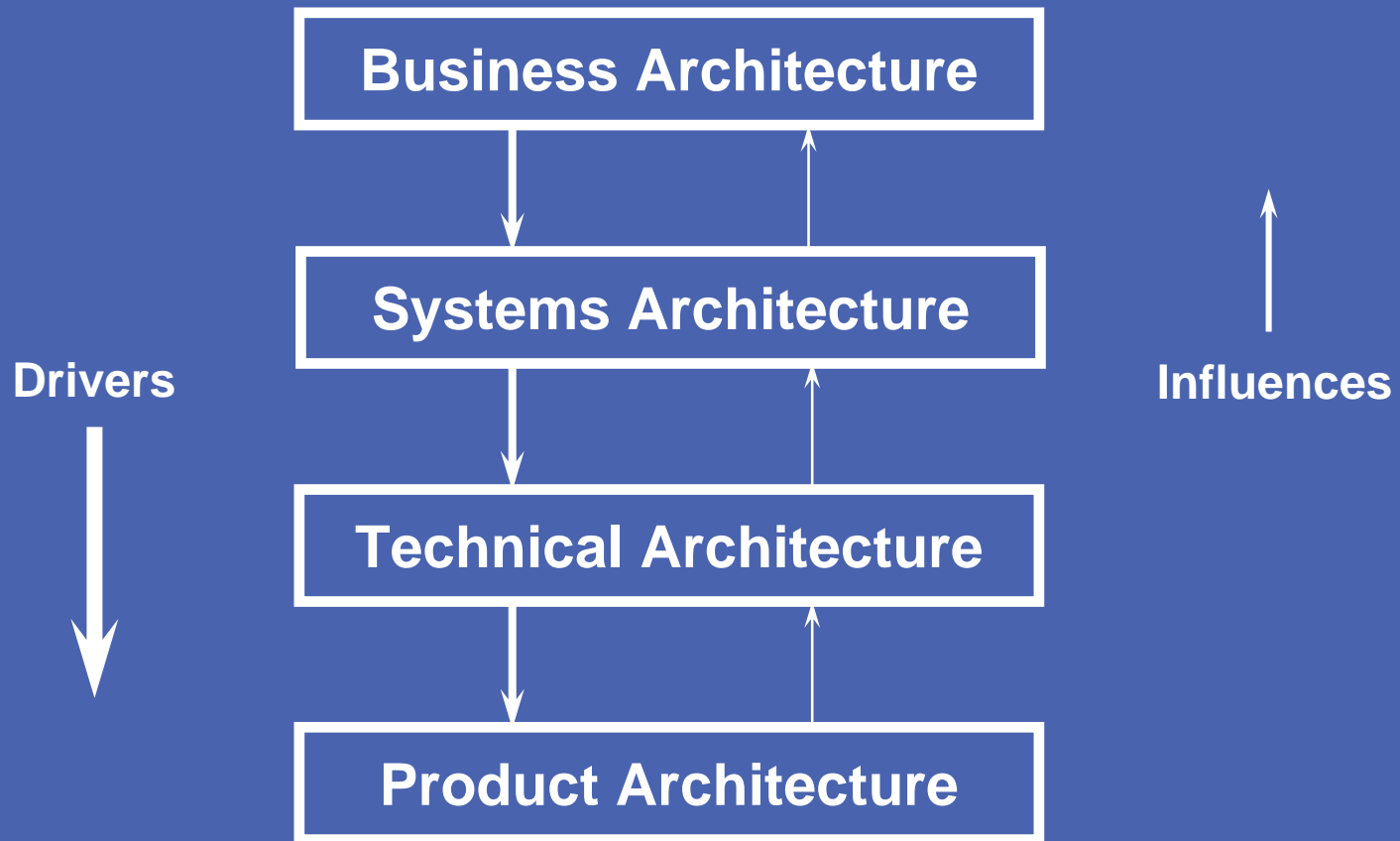
Work Process Design

Tools

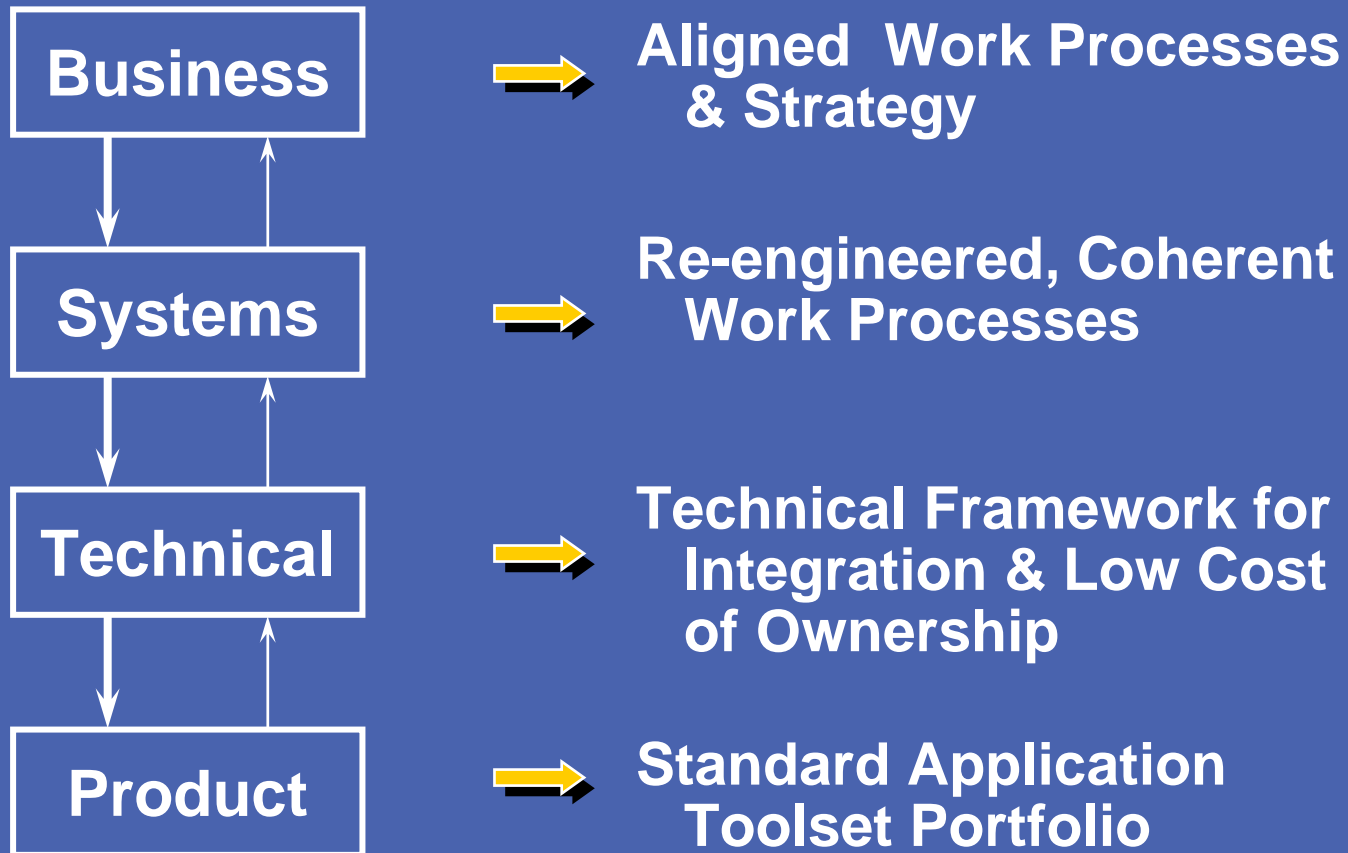
Standards

The application of knowledge, especially in business or industry

Information Architecture Structure

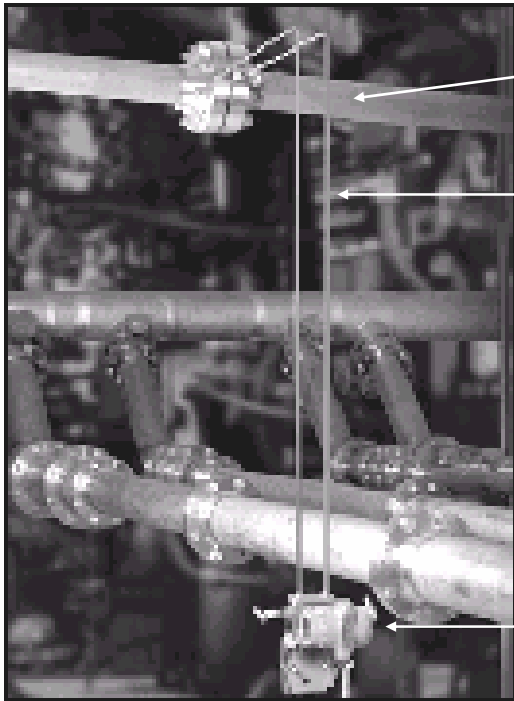


Results of Using an I/T Architecture



Instrument Installation Systems - What Are These Things?

Traditional DP Installation



Process Piping

Impulse Piping

Transmitter



The Conventional Wisdom

- Process Measurements are Critical to Operational Excellence
- Accuracy Requires Routine Calibration
- Installation Should Facilitate Maintainability
- Tubing Fittings are the Obvious Low Cost Piping Method

Analysis of Experience

- Maintenance Work Order History Revealed 60% of Effort Non-Value Added Activity
 - “Zero Transmitter”
 - “No Problem Found”
- Transmitter Is Not the Problem
 - #1 Source of Error & Maintenance -Impulse Lines!

The New Reality

- Electronic Transmitters Do Not Fail or Drift
- Over 50% of Field Maintenance Activity is Non Value Added
- Root Cause Failure Analysis Determined That -
 - Most Problems are Caused by Improper Installation
 - *Installation for Maintainability* Caused Most of the Problems

The Solution

- Design Standard Installations for High Accuracy and Low Maintenance
 - Standard Designs Reduced by 10X
- Determine Fabrication Method
 - Reduced Set of Standards Enables Shop Fabricated Welded Piping Design
 - » New Designs Significantly Stronger With Reduced Leak Points
 - » Improves Safety and Environmental Performance
- Changed Work Processes for Design and Construction

A Typical Design



Impact On Work Process

- Virtually Eliminated Instrument Installation Design from Detailed Engineering Effort
- Significantly Reduced Field Construction Effort and Cost

Impact on Construction Process

Old Process

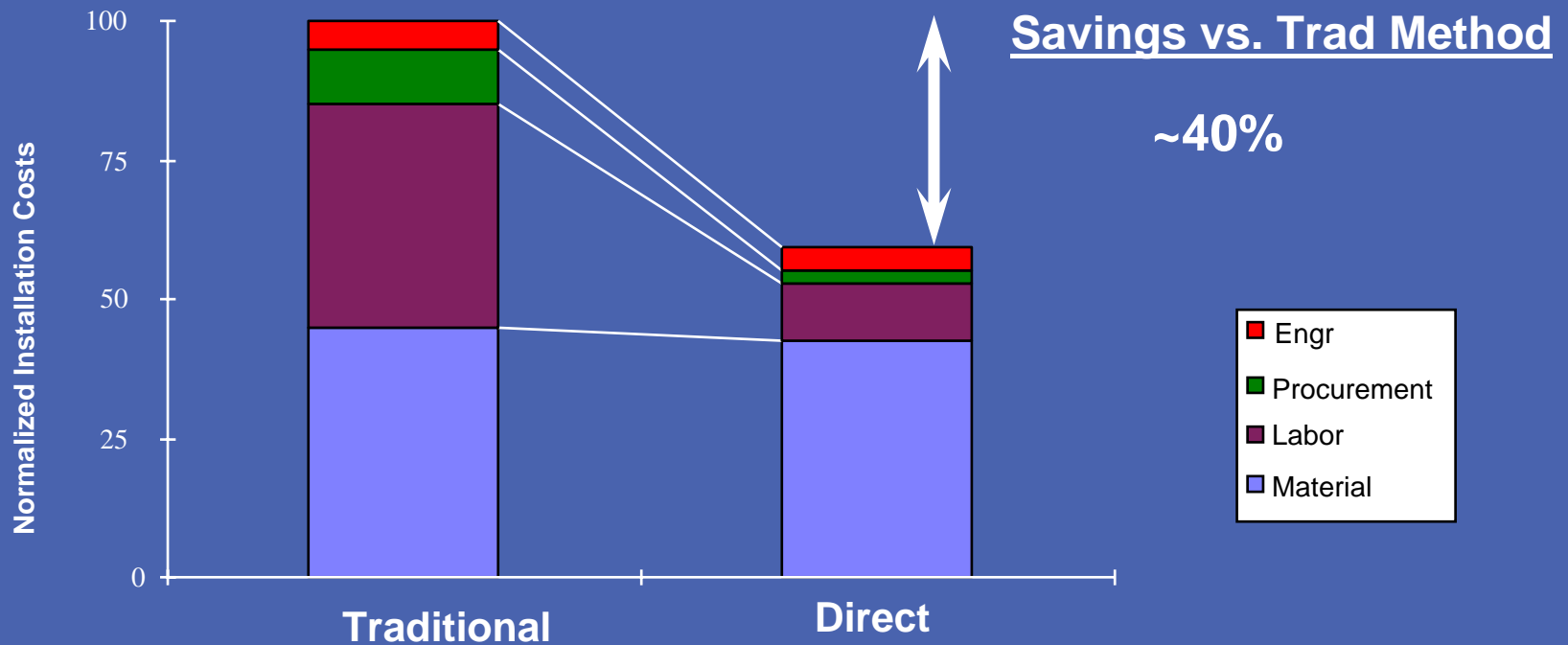
- Weld Root Valves to Process Piping
- Obtain Transmitter
- Build Stand or Mounting Bracket
- Mount Transmitter
- Install Impulse Piping
- Install Conduit
- Install Wiring and Verify Continuity
- Verify Calibration

New Process

- Weld Root Valves to Process Piping
- Obtain Transmitter and Mounting Kit
- Install Mounting Kit and Transmitter
- Install Conduit
- Install Wiring and Verify Continuity
- Verify Calibration

Impact on Installation Costs

Cost Breakdown: Avg. Traditional vs. Direct Mount



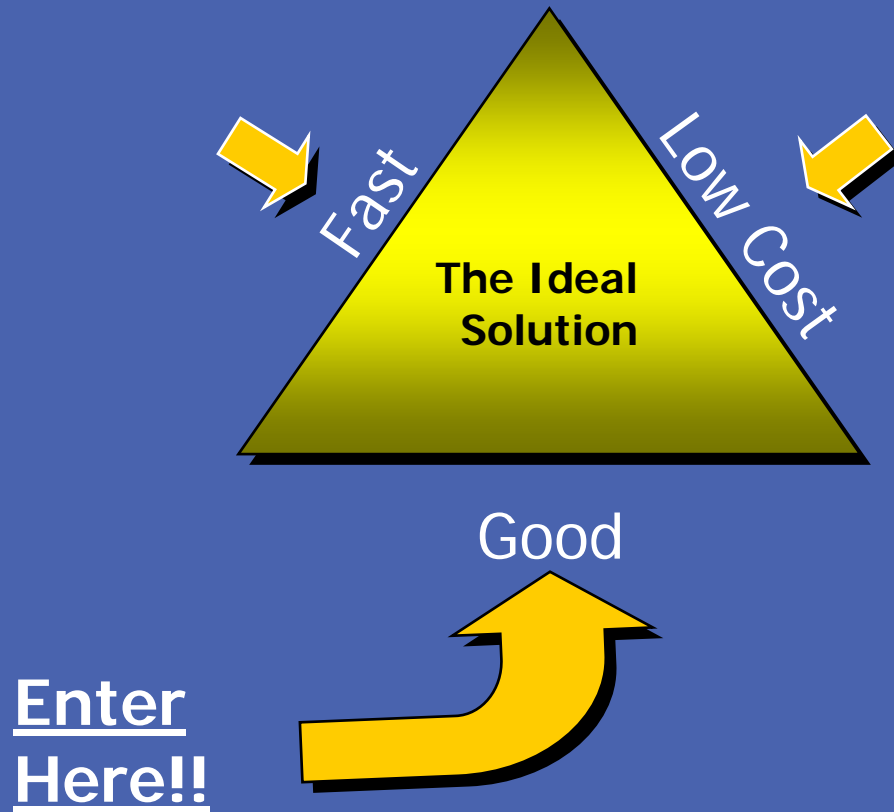
Results in the Field - Three Year's Experience

- 90% Reduction in Transmitter Work Orders
- 46% Reduction in Transmitter Maintenance

Instrument Installation Lessons Learned

- **Business Objectives Drive Technology Objectives**
Technology Solutions Should Not be Searching for a Problem to Solve!
- **Use Data to Develop Profound Knowledge**
- **Variability is the Enemy!**
- **Separate “Develop Technology” Process from “Implement Technology” Process**

Instrument Installation Experience



Disciplined Innovation Principles

- Create the environment for success
- Align innovation to business objectives
- Measure the results of innovations
 - Success is measured against the business objective
- Separate *technology innovation* from *technology application*
- Actively manage the work process-standards-tools relationship