Not Your Average Spool
BIM Enabled Drywall Prefabrication on Sutter Castro Valley Clinic
Evolution of Interior Framing Automation
2009: Finding the “Big Ticket” Issues
Early Lessons Learned

- Early Field Input and Buy-In
- Subcontractor Models Must be Accurate
- Current Software Needs Development
2011: What We Model = What We Build
Building From Field Knowledge
“Dynamic Detailing”
The Drywall Spool Sheet

- SPOOL SHEETS GENERATED: 16K
- M: 1.3
- FULL TIME MODELERS: 8
Streamlining the Process
The Payback: Productivity!

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8%</td>
<td>Production Increase Full Height Framing</td>
</tr>
<tr>
<td>4%</td>
<td>Production Increase Sheetrock Install</td>
</tr>
<tr>
<td>11%</td>
<td>Production Increase Taping and Finishing</td>
</tr>
<tr>
<td>6%</td>
<td>Decrease Material Waste</td>
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</tbody>
</table>
Prefab?
Prefab Brainstorming

- Prefabrication
  - Leadership Group
    - Quality
    - Schedule
    - Drywall
    - Owner
    - Buy-in
    - Safety
    - MEP
    - Enabling Details
    - Full Height Posts
    - Floor Flatness
  - Structural Impacts
  - Logistics
    - On-site Fab?
    - Off-site?
    - Warehouse
  - Design
    - Shared Racks
    - Panels
    - Modules
    - Full Height Walls
    - Acoustics
    - Coordination
  - BIM
    - Spool Sheets
    - QC Review
    - Flatness
    - Coordination
    - QC Review
  - Shipping
  - Sequencing
  - Off-site?
  - On-site Fab?
  - Full Height Posts
  - Floor Flatness
  - Shipping
  - Logistics
  - Prefabrication
  - Design
  - Coordination
  - BIM

- Structured Impacts
  - Full Height Posts
  - Floor Flatness
  - Enabling Details
  - MEP
  - Safety
  - Schedule
  - Buy-in
  - Owner
  - Drywall
  - Logistics
  - Off-site?
  - On-site Fab?
  - Warehouse
  - Coordination
  - QC Review
  - Spool Sheets
  - BIM
  - Design
  - Prefabrication
“If you want to make enemies, try to change something.”

- Woodrow Wilson
  President, United States of America

"People are starting to give reasons why [prefab] can't be done...we must be doing something right."

- John Vardaman
  Innovation, DPR Construction
What to Prefab? Shared Racks!

CONDUITS

4"x24"

SEISMIC STIFFENERS INSTALLED
PER REQUIRED DISTANCES
PRESCRIBED BY CODE.

ROD SUPPORT SIZE TO BE
DETERMINED BY COMBINED LOADS

ARM BAR BOLTED TO
STRUCTURAL STRUT

STRUT SUPPORT OR "L"
CHANNEL SUPPORT BAR.

MECHANICAL PIPES & ELECTRICAL
CONDUITS COMBINED SIDE BY
SIDE, TRADES TO COORDINATE
LOCATIONS AND ROUTES

SECTION VIEW
What to Prefab? Shared Racks!

Electrical Route
Tele-Data Route
Mechanical Mains
What to Prefab? Patient Room Walls
Wall by Wall Review

- Confirm ADA reach/height at soap disp.
- Millworker to comment on supports
- Move 8”
- Confirm specs and mounting req’s for accessories
- 8’ 4 7/8’ to center line
- Final verification of outlet locations
Fully Coordinated BIM Spool Sheets

LEVEL 4
POD 401
4411/WEST
ELEV. #26
Post and Panel Construction
Vertical Racking System
Panel Building Table with Material Organization
Specially Fabricated Panel Transport Carts
Bundles of Panel Track/Studs Labeled & Cut Direct from Manufacturer
Warehouse Activities
Delivery and Installation
The Results – Schedule Study

- Frame / Top Down Full-Height and Priority Walls
- MEP Overhead Rough-in
- Frame Walls
- MEP Wall Rough-in
- Hang and Tape Walls
- Ceiling Installation

Install Wall Panels ★

Three Weeks
## The Results – Productivity Savings

<table>
<thead>
<tr>
<th>Trade</th>
<th>% Savings (Work Hours Actual / Work Hours Budget)</th>
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<tbody>
<tr>
<td>Mechanical</td>
<td>18.75%</td>
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<tr>
<td>Electrical</td>
<td>-5%</td>
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<tr>
<td>Plumbing</td>
<td>0</td>
</tr>
<tr>
<td>Drywall</td>
<td>50%</td>
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</tbody>
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Prefab is Modular

FLEXIBLE
Lessons Learned

- Prefab Works!...but it’s not one size fits all
- BIM is the tool that enables Prefab
- Prefab can be very flexible