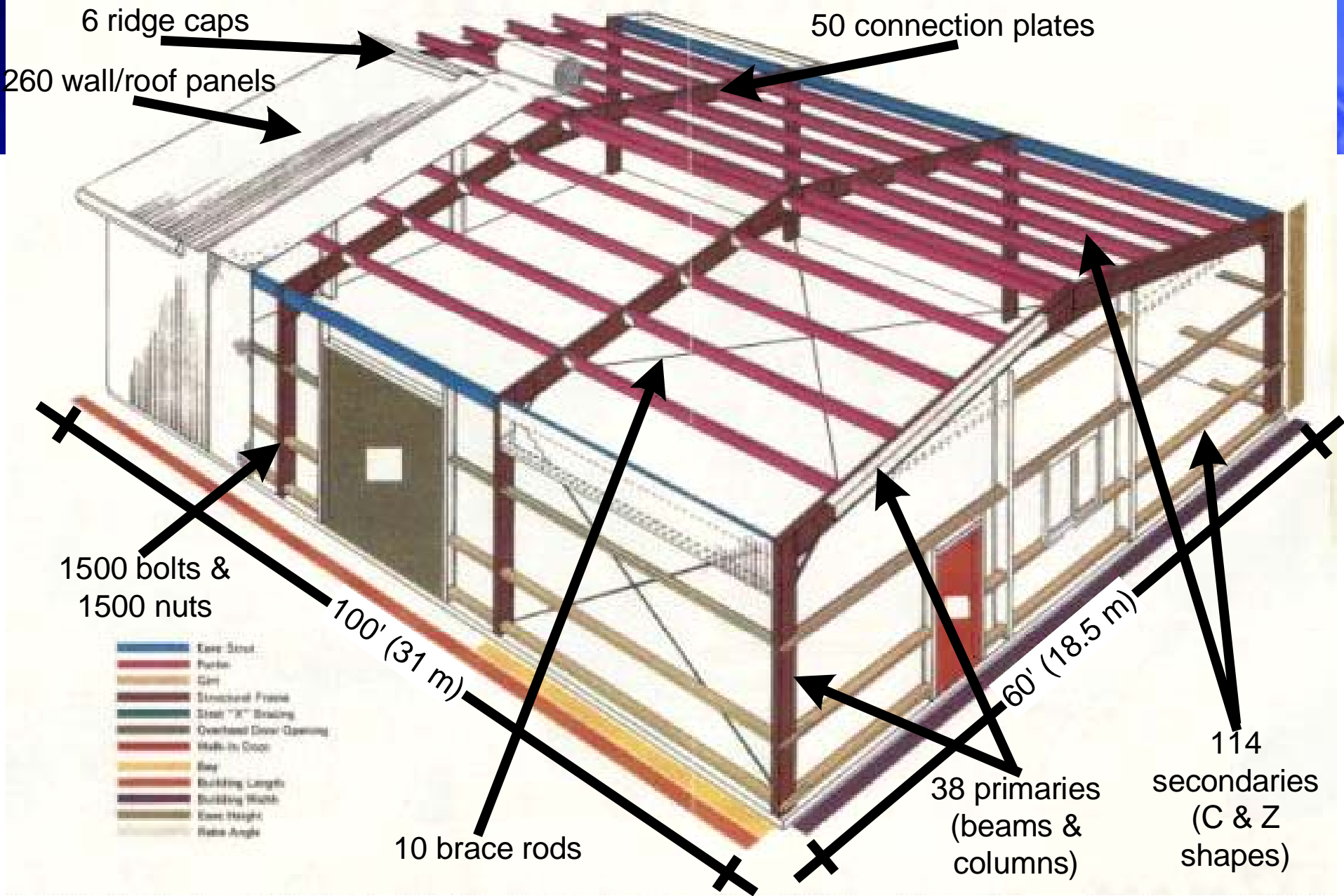


BUTLER MANUFACTURING
APPLICATION OF LEAN SUPPLY CHAIN
CONCEPTS TO A
VERTICALLY INTEGRATED COMPANY

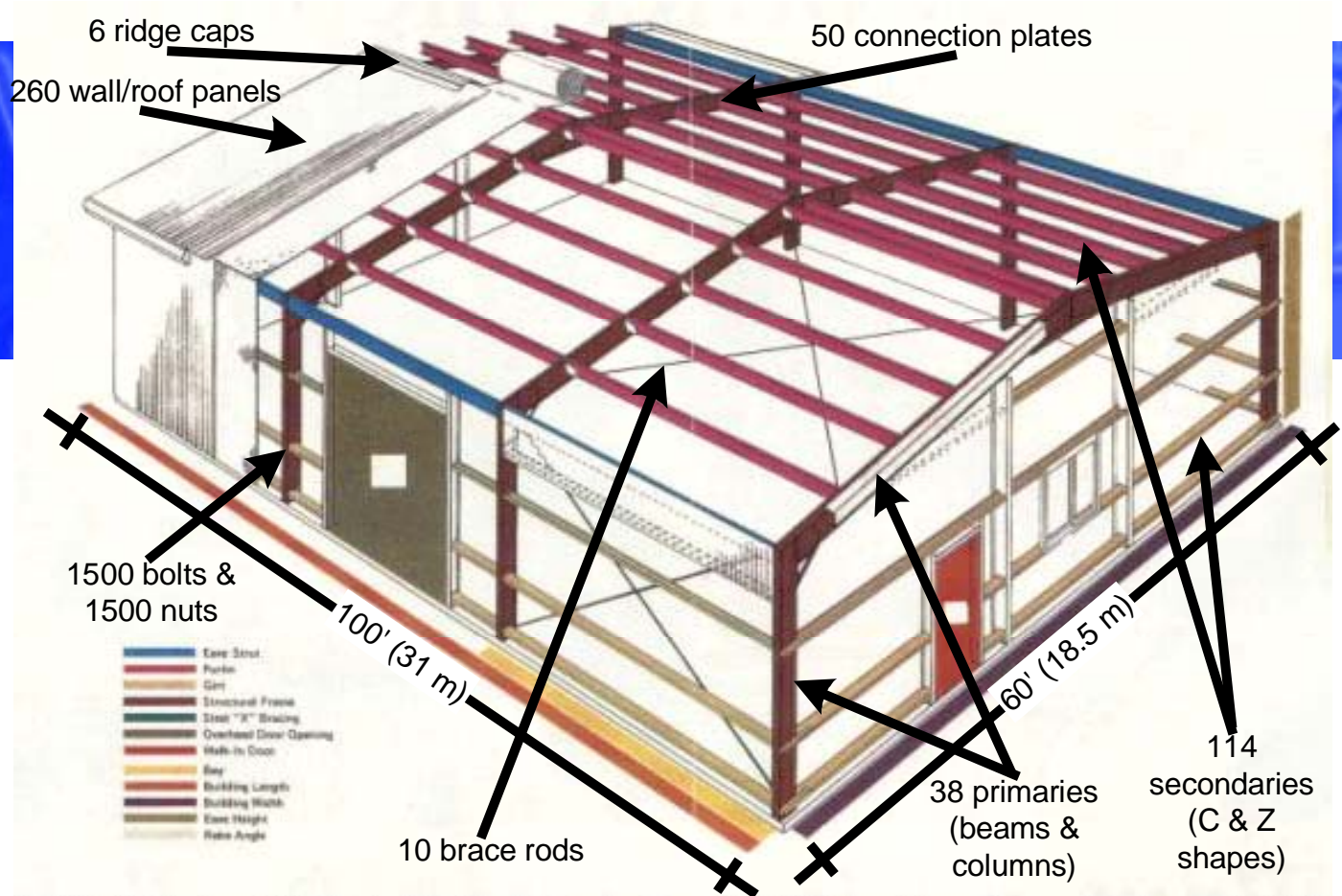
Nadia G. Akel, Iris D. Tommelein, J.C.Boyers
University of California, Berkeley & Butler Manufacturing

This work was funded by a grant from the Construction Industry Institute
for Project Team 172 “Improving Construction Supply Chain Performance”

Small pre-engineered building with a 18.5 m x 31 m footprint. (Photo: Stuart 2002)



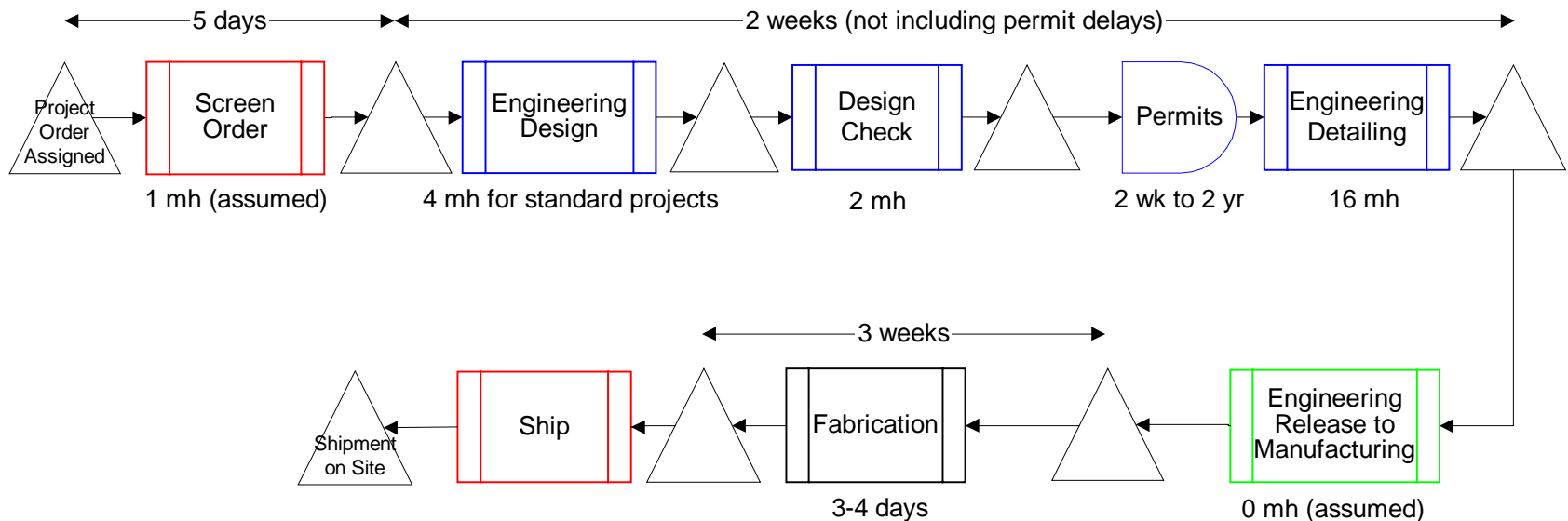
Small pre-engineered building with a 18.5 m x 31 m footprint.
(Photo: Stuart 2002)



Plant order capacities for various materials in a 570 m2 building

	Primaries	Secondaries	Connections	Ridge Caps	Brace Rods
Production capacity [pieces/week]	800	3000	1750	1575	3000
Number of pieces for one 6000 sq.ft. building order [pieces/order]	38	114	50	6	10
Maximum number of orders/week	21	26	35	263	300

Value Stream of Order Process



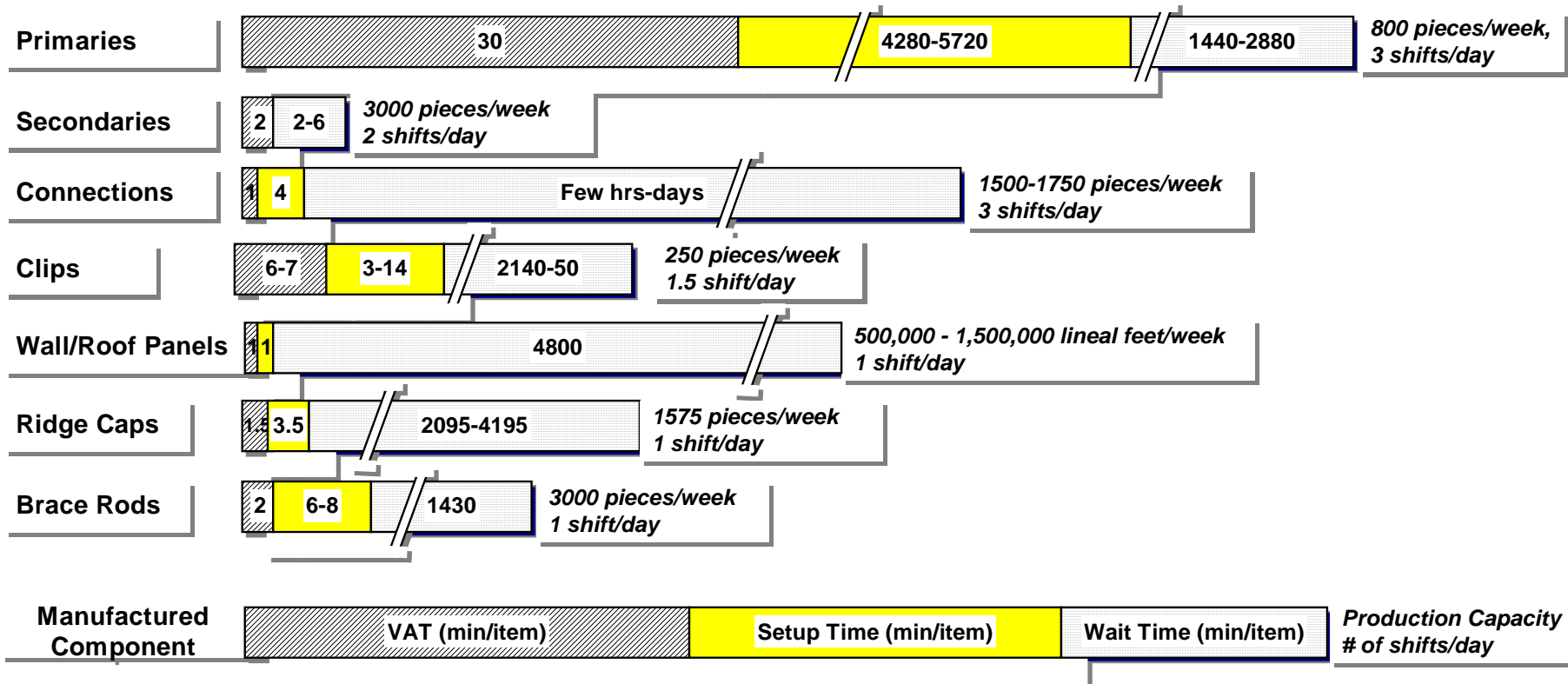
	Average Total Value-Added Time	= 1.28 weeks (6.375 days , 1.6 - 12.8% of total)
	Average Total Queue & Setup Time	= ~9-79 weeks (87.2 - 98.4% of total)
<hr/>		
Average Total Actual Time in System		= <u>10-80 weeks</u> (100%)

Value Stream Analysis

Based on actual Visalia Plant order data

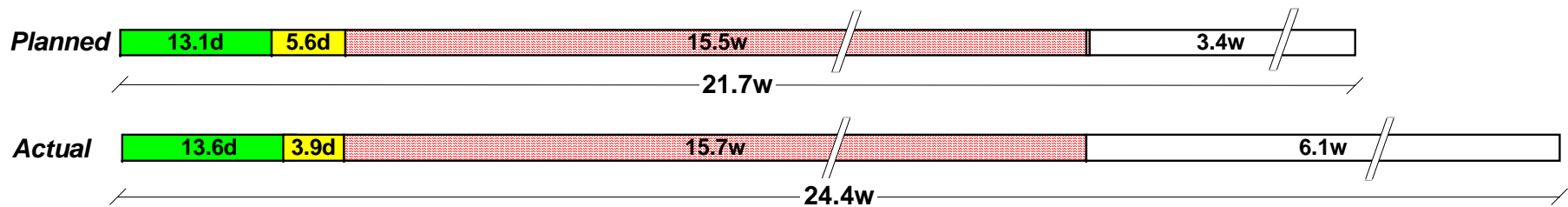
Lead Time [weeks]		<u>VAT</u>
from	to	LT
Order Assigned	Original Planned Ship Date	7.4%
Order Assigned	Revised Planned Ship Date	6.7%
Order Assigned	Actual Ship Date	5.6%

Cycle Times for Material Fabricated at Butler Visalia

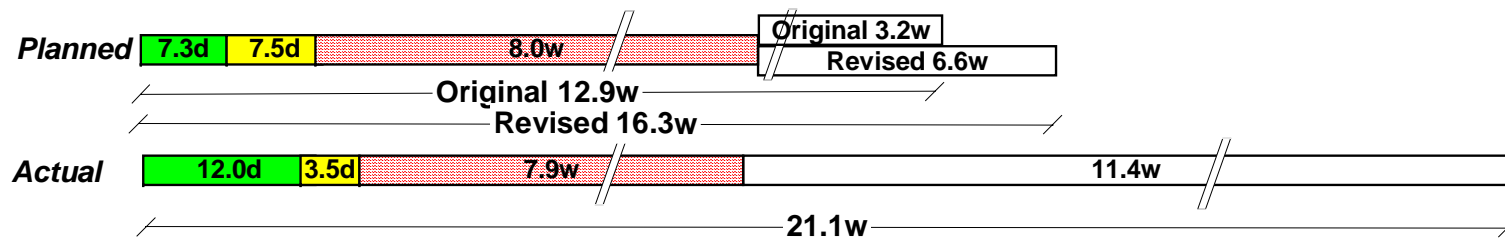


Change Order Analysis: Schedule Plan Stability

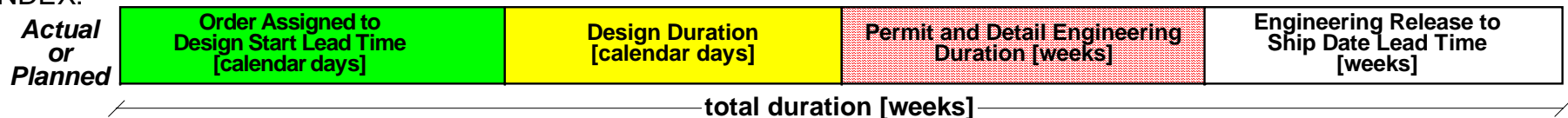
A. Butler Orders without Change Orders



B. Butler Orders with Change Orders



INDEX:

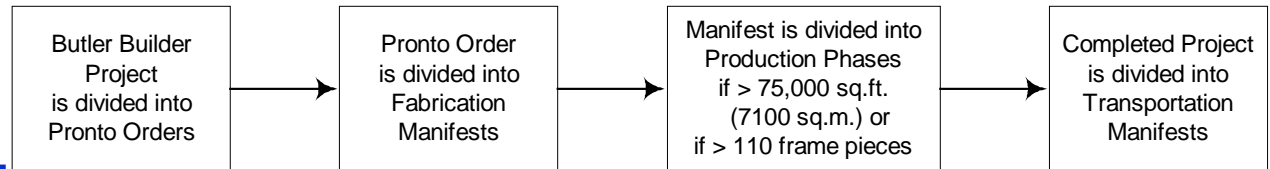


Lessons Learned

- Elasticity in production capacities
- Modularization and its impact on the production process (supply chain)
- Design for constructability or mistake-proofing (poka-yoke)
- Gaining insight into product demand
- Standardization

Conclusions and Recommendations

- **Batching**
- **Balancing**
- **Horizontal Integration**
- **Synchronization, One-Piece Flow, Pull**
- **Transparency**
- **Production**
- **Array of Products Produced**



The background of the slide is a complex, abstract pattern of blue and yellow lines and shapes, resembling a microscopic view of a biological structure. The word "Questions?" is written in a large, bold, yellow, italicized font across the center of the image. The overall aesthetic is scientific and modern.

Questions?