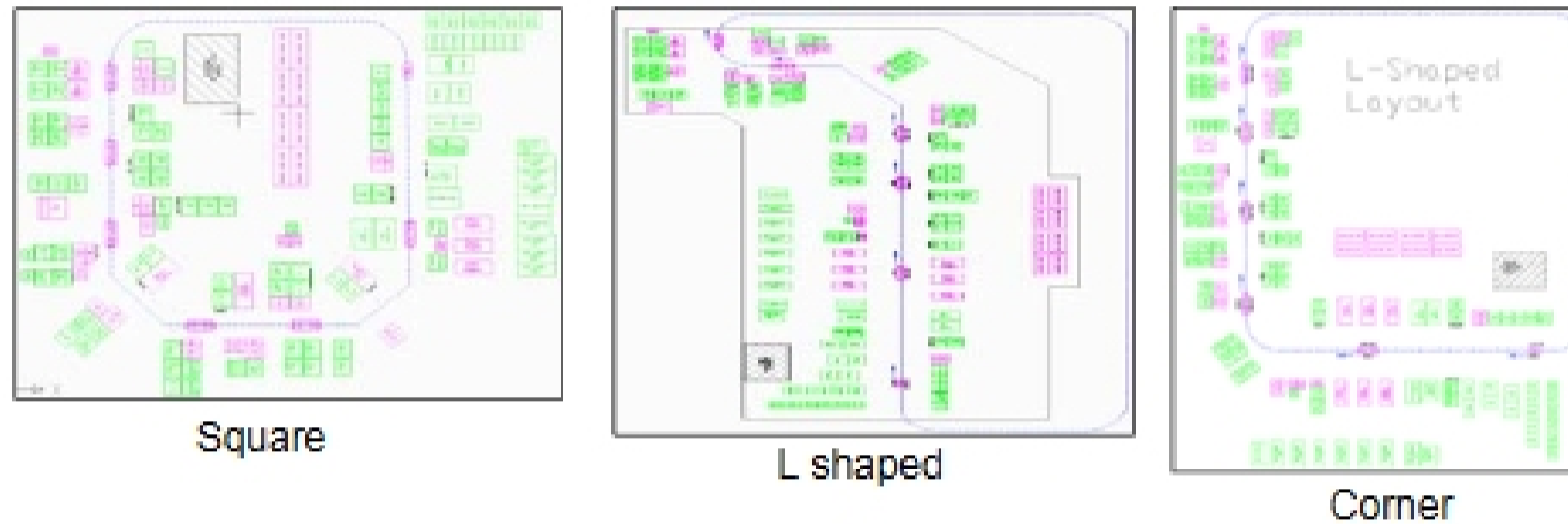

Engine Subassembly Layout & Scheduling

Project Overview

- John Deere Dubuque Works (JDDW) must add assembly capability for new XLH series engines, which requires a new assembly line design.
 - XLH engine production must be scheduled for optimal production.
-

Layout Selection Procedure

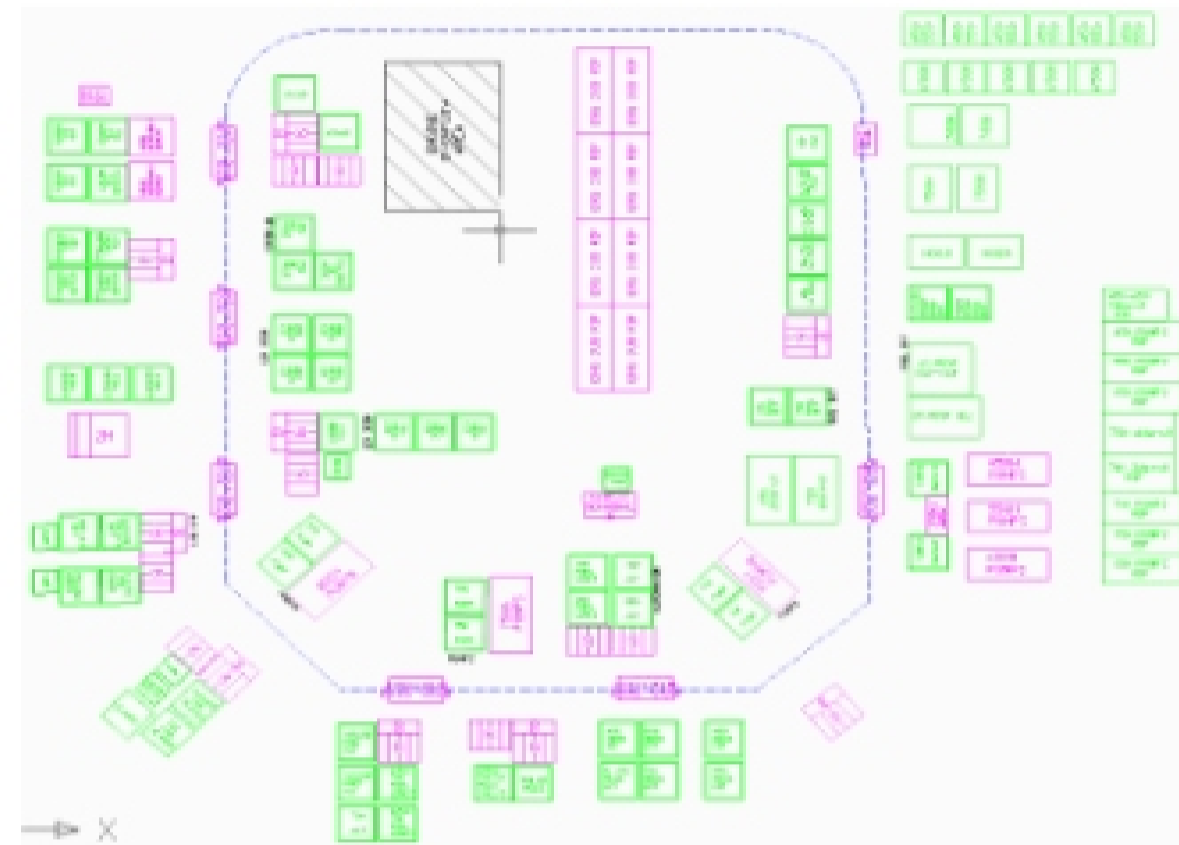
- Four layout alternatives considered, including a tapered “L” shaped design, a square layout, triangular layout, and a sharper “L” or corner layout and were based on common facility layouts.
- Selection based on JDDW engineering requirements.



Decision Focus for Selection of Engine Subassembly Layout

Criteria		"L"	Square	Triangular	Corner
MUSTS	GO/NO GO				
Volume of 15 crawlers a day		Go	Go	Go	Go
One day maximum throughput		Go	Go	Go	Go
Able to handle product mix and options		Go	Go	Go	Go
Significantly different from straight-line layout		Go	Go	No Go	Go
WANTS	Weight	Pts	Pts	Pts	Pts
Best use of direct labor (minimized indirect)	5	5	5		7
Best use of existing tooling	1	5	5		5
Better facilitate meeting current production	10	5	5		5
Can do XLH prototype builds on new line	2	10	10		10
Low cost for transition	4	5	4		5
Most efficient use of human resources					
Opportunity for modular assembly	7	3	9		5
Best throughput	9	5	5		7
Supports production growth in volumes	5	5	5		5
Efficient use of main line space	5	9	4		5
Visibility of entire sub area/Walk distance	3	3	5		7
Centralized inventory	5	3	9		4
Point Totals for each option		372	419	0	404

Selected Assembly Line Layout



Scheduling - Algorithm

- Modified SPT Scheduling Rule with Heuristically Assigned Precedence Constraints
- Mean flow time is minimized by the sequence:
 $t_{(1)} \leq t_{(2)} \leq t_{(3)} \dots \leq t_{(i)} \leq \dots t_{(n)}$
- Precedence constraints developed based on engine build requirements drawn from JDDW engineering specifications.