

WABASH™

Summer 2022 Wabash Advanced Manufacturing Engineering Internship Overview

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Advanced Manufacturing Engineering Intern

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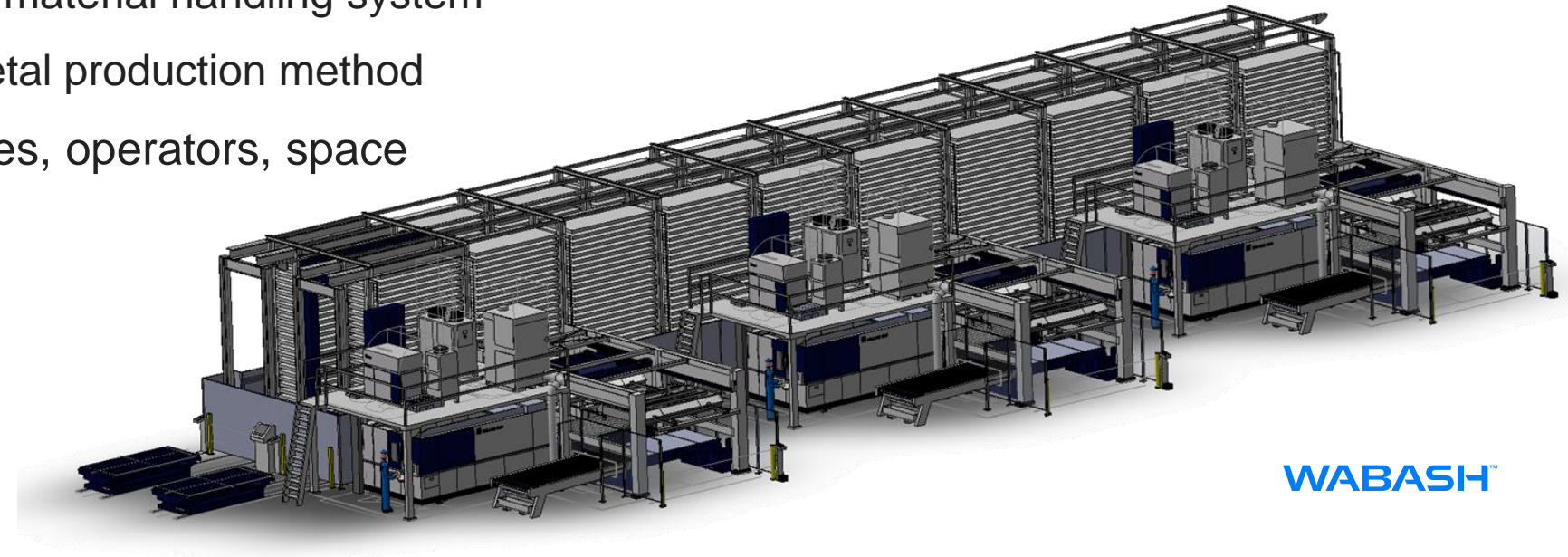
Background

Advanced Manufacturing Engineering

- Large-scale capital projects
- Advanced technology

Project Surge

- Metal Fabrication equipment upgrade:
 - New lasers, benders, and a material handling system
 - Updating the main sheet metal production method
- Reduces number of machines, operators, space



The Project

Capacity Planning Tool –
North Plant Metal Fabrication

The Importance

Problem Statement

Wabash lacks visibility to equipment capacity and capability, which creates a gap in understanding future capacity constraints and hinders future capital investment decisions.

Expected Outcome

- A spreadsheet tool that projects equipment capacity for future production circumstances

Emphasis on Metal Fabrication

- New equipment = new capabilities
- Metal Fab has been unaware of capacity limits

The Challenges

Information Access

- Learning how to use and navigate SAP
- Finding *the right* information

New Material

- Industrial engineering topics
- Learning Excel macros and VBA

Data Management

- Simplifying the Metal Fab part catalog

500 Parts



4 Families
18 Variants

The Results

Excel-based Capacity
Planning Tool

The Tool

Setup

- Configure categories
- Populate matrices

Usage

- Input production targets
- Analyze capacity
- Iterate or act

Application Examples

- Assembly lines
- Welding

Matrices	M1	M2	M3
	Matrix 1 breakdown	Matrix 2 breakdown	...
Station 1	M1.1	M2.1	M3.1
Station 2	M1.2	M2.2	M3.2
...	M1.3	M2.3	M3.3

Products	P1	P2	P3
	Product 1 breakdown	Product 2 breakdown	...
Subgroup 1	P1.1	P2.1	P3.1
Subgroup 2	P1.2	P2.2	P3.2
...	P1.3	P2.3	P3.3

Years	2022	2023	2024
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Process Matrices

Tool Setup

- One Matrix per process

Matrix Sections

- Machine Parameters
- Machine Assignment
- Cycle Times
 - Time studies
 - Calculation-based for Metal Fab

Machine	2022					
	TruLaser 5030 - 1	TruLaser 5030 - 2	TruLaser 5030 - 3	CL-7A	CL-440	CL-940
Hours/Shift	8	8	8	8	8	8
Reg. Shifts/Week	15	15	15	15	15	15
Work Weeks/Year	50	50	50	50	50	50
Operating Hours/Year	6000	6000	6000	6000	6000	6000
Machine Operators	1	1	1	1	1	1
Availability	90%	90%	90%	90%	90%	90%
Performance	90%	90%	90%	85%	85%	85%
Quality/Other	99%	99%	99%	99%	99%	99%
Net Productivity (OEE)	80%	80%	80%	76%	76%	76%
Machine Running Time (Hr/Yr)	4764	4243	3005	4364	4306	4269
Operator Working Time (Hr/Yr)	5941	5291	3747	5762	5686	5637
Utilization	99%	88%	62%	96%	95%	94%
Needed Shifts/Week	15	14	10	15	15	15
Operators/Day	3	3	2	3	3	3

Landing Gear	JOST05	28140	Assign to Machine				
	JOST07	19430					100%
	JB HUNT	7370					100%
	HOLMK501	4690					100%
	SAF01	4020					100%
	WERNER	3350					100%

Landing Gear	JOST05	28140	Cycle Times (min)					
	JOST07	19430	1.9	1.9	1.9	18.8	13.2	13.2
	JB HUNT	7370	1.9	1.9	1.9	18.8	13.2	13.2
	HOLMK501	4690	1.9	1.9	1.9	18.8	13.2	13.2
	SAF01	4020	1.9	1.9	1.9	18.8	13.2	13.2
	WERNER	3350	1.9	1.9	1.9	18.8	13.2	13.2

Quantity Input

High-level Use

- Only requires this input

Metal Fab Setup

- Annual van production target
 - % mix of variants
- Aftermarket additions

			2022		
			67000		
Product Group	Variants	Description	% Mix	After-Market Qty	Total Qty
Rear Frame	GAMXS1	Heavy Duty Galv	2%		1340
	GLVOH1	Galv Steel OH	22%		14740
	GLVSW1	Galv Steel SW	74%	2000	51580
	SSSW1	Stainless SW	2%		1340
	Check		100%	2000	69000
Coupler	COUP10	Heavy Duty 50k grid	4%		2680
	COUP11	Standard HSS grid	27%		18090
	COUP12	Reinforced HSS grid	51%		34170
	COUP13	Heavy duty HSS grid	18%		12060
	Check		100%	0	67000
Landing Gear	JOST05	Jost A421	42%		28140
	JOST07	Jost A451 Magnum 10-yr	29%		19430
	JB HUNT	Custom, significant qty	11%		7370
	HOLMK501	Holland Mark V	7%		4690
	SAF01	SAF Holland Atlas 65	6%		4020
	WERNER	Custom, significant qty	5%		3350
	Check		100%	0	67000
Other Fab	DVCVHCP	Standard van	53%		35510
	DVDBHCP	Pup	21%		14070
	DVVDHCP	Heavy duty	17%		11390
	DVLSHCP	"Light spec" (alpha)	9%		6030
	Check		100%		67000

Capacity Reporting

Three Types of Capacity

- Machine
 - Utilization %
 - Equipment Balancing
- Labor
 - Shifts running per week
 - Required employee count
- Material
 - Outside of project scope

		Lasers			Benders		
		TruL 1	TruL 2	TruL 3	TruB 320T	TruB 320T	750T
Utilization	2022	99%	88%	62%	79%	50%	50%
	2023	107%	99%	70%	86%	56%	56%
	2024	107%	99%	70%	86%	56%	56%
Needed Shifts/Week	2022	15	14	10	12	8	8
	2023	17	15	11	13	9	9
	2024	17	15	11	13	9	9
Required Operators / Day	2022	3	3	2	3	2	4
	2023	3	3	3	3	2	4
	2024	3	3	3	3	2	4

		Lasers	MF Flat	Benders	Total
Required Operators	2022	17	0	14	31
	2023	18	0	14	32
	2024	18	0	14	32

Key
Good with regular scheduling
Overtime required
Impossible even with overtime

The Bigger Picture

End-of-Project Status

- Metal Fab tool still needs some back-end data
- Flexible tool fully developed

The Impact on Wabash

- Integration of existing processes like SLOP (Sales, Inventory, and Operations Planning) + IBP (Internal Business Planning)
- Decision-Backing Data
 - Equipment purchasing investments (vs. running overtime)
 - Staffing requirement guidance

Questions?

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