# FlowVision®

**The Lean Business & Supply Chain Company**


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Founding Partner

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# Improving Operational Efficiency


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The Lean Business & Supply Chain Company

# FLOWVISION

- Founded December 1998 by:
- Mike Henderson
- Dave Pytel
- Gerson “Gary” Cortes
- Manufacturing & Materials Professionals with a combined 250 years Lean Experience
- Worked with over 250 Growers
- Workshops & Implementation Programs provide Lean Implementation Toolset
- Implement and Educate Lean Flow throughout the world
- Core competency = Rapid Time to Value in Complex Manufacturing and Supply Chains
- 94+% of our  business comes from references

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# LEAN FLOW TOOLS AND TECHNIQUES

- Lean Flow is a process
- Lean Flow is based on Math
- Progressive Work – Henry Ford Assembly Line Technique
- Calculating Resources (Labor and Machine)
- Monitoring the Process
- Q & A

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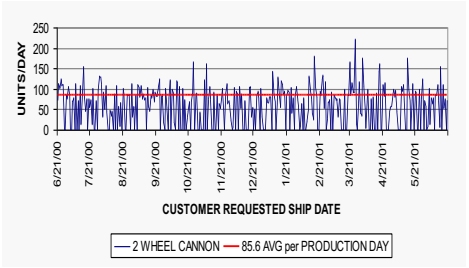


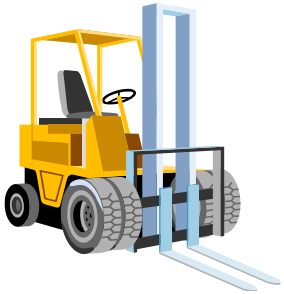

$$\text{Kanban Qty} = \Sigma(\text{Cust Reqts} \times \text{POU Qty}) \times \text{Delivery Time}$$

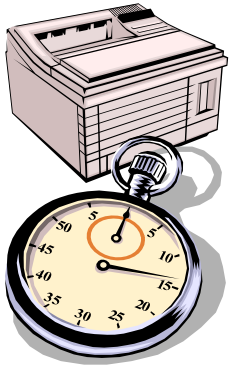
$$\text{Takt} = \frac{\text{Work Time/ Day}}{\text{Customer Requirements}}$$

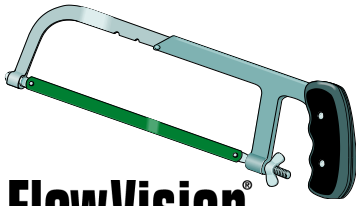
$$\text{OPS} = \sqrt{\frac{HCc * AU}{ICCR * PC * (Kc * .75)}}$$

$$\text{Std Wtd Time} = \frac{\Sigma(\text{Std Time} \times \text{Cust Reqts})}{\Sigma(\text{Customer Reqts})}$$

# Lean Flow Business Strategy







Rapid time to value

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# LEAN LINE DESIGN

- Create Process Flow Charts
- Develop Standard Operation Worksheets
- Define Product/Process Matrices
- Create Multi-Product Process Flow Charts
- Calculate Takt
- Calculate Standard Weighted Time
- Determine Resource Requirements
- Review Actual Requirements vs. Design
- Create a Block Diagram
- Develop Standard Operations
- Create the Facility Layout
- Define Cells

DATA

CALC.

LAYOUT


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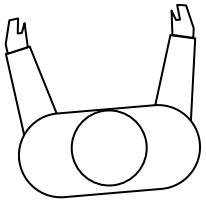
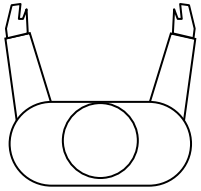
# FUNCTIONAL

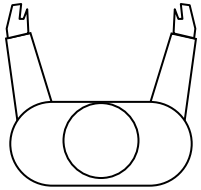
LABEL



FLAT FILL



SOW



Work Order 4
Qty. 75

Work Order 3
Qty. 100

Work Order 2
Qty. 50

Work Order 1
Qty. 50

50 Minutes | 50 Minutes | 50 Minutes

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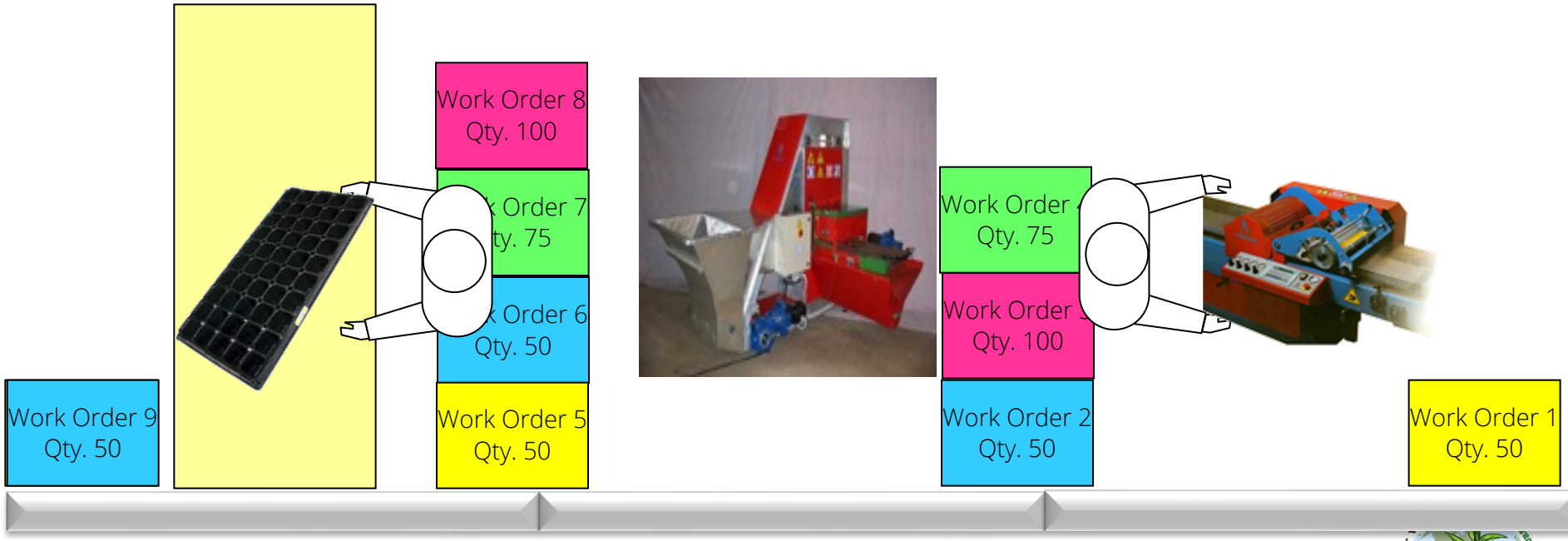
**150 Minutes**

# FUNCTIONAL

LABEL

FLAT FILL

SOW




550 Minutes

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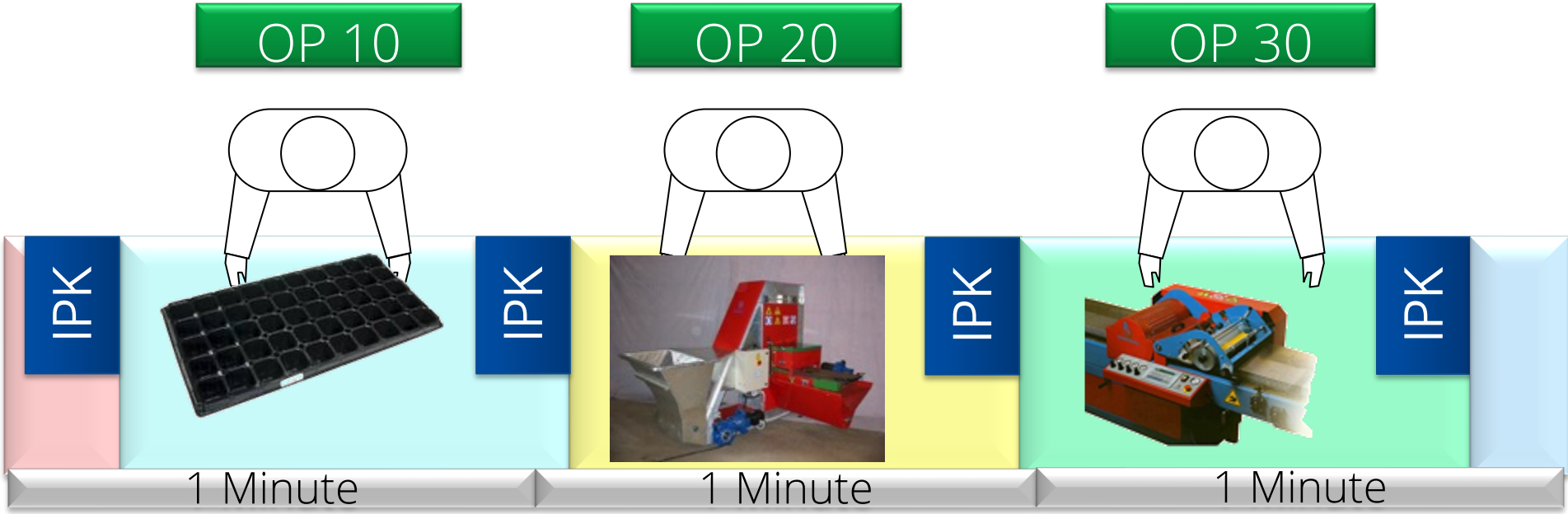
# LEAN FLOW




# 3 Minutes

# MATHEMATICALLY BASED

1) Calculate Takt

$$\frac{\text{Work time/day}}{\text{Customer Requirements}}$$

2) Calculate Standard Weighted Time

$$\frac{\sum (\text{Std.Time X Req.})}{\sum (\text{Req.})}$$

3) Calculate People & Machine Reqs.

$$\frac{\text{Std. Weighted Time}}{\text{Takt}}$$

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# PROGRESSIVE WORK – HENRY FORD ASSEMBLY LINE

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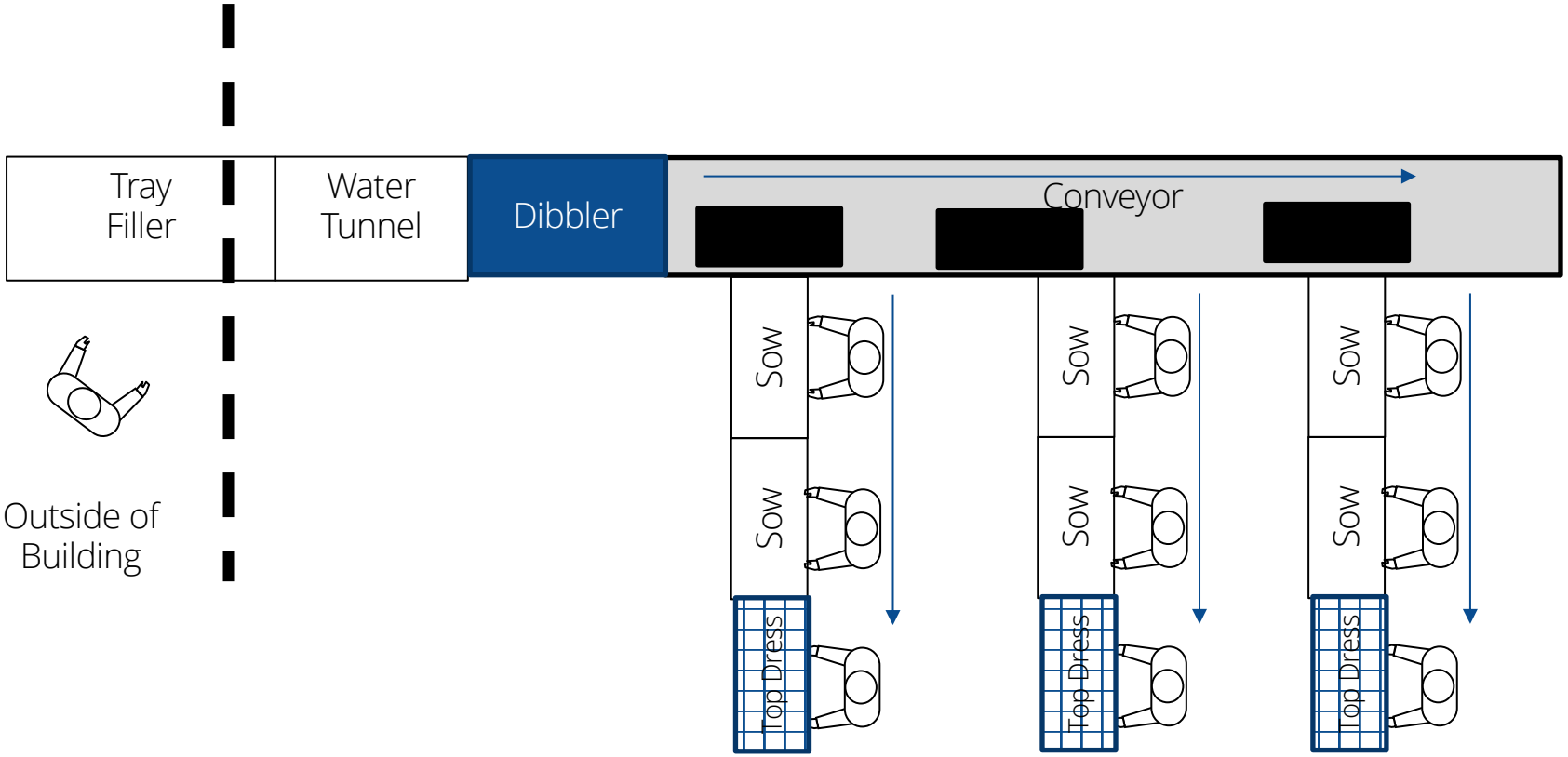
# CL SOWING CONCEPTUAL LINE DESIGN




Top Dress = Table with expanded metal top to allow soil to fall into a bucket below.

| Hour | Production Planned | Actual | Variance | Comments |
|---|---|---|---|---|
| 1 | 200 | 200 | 0 | |
| 2 | 200 | 218 | 18 | |
| 3 | 200 | 180 | -20 | |
| 4 | 200 | 190 | -10 | |
| 5 | 200 | 203 | 3 | |
| 6 | 200 | 190 | -10 | |
| 7 | 200 | 219 | 19 | |
| 8 | 200 | 200 | 0 | |
| Total | 1600 | 1600 | 0 | |

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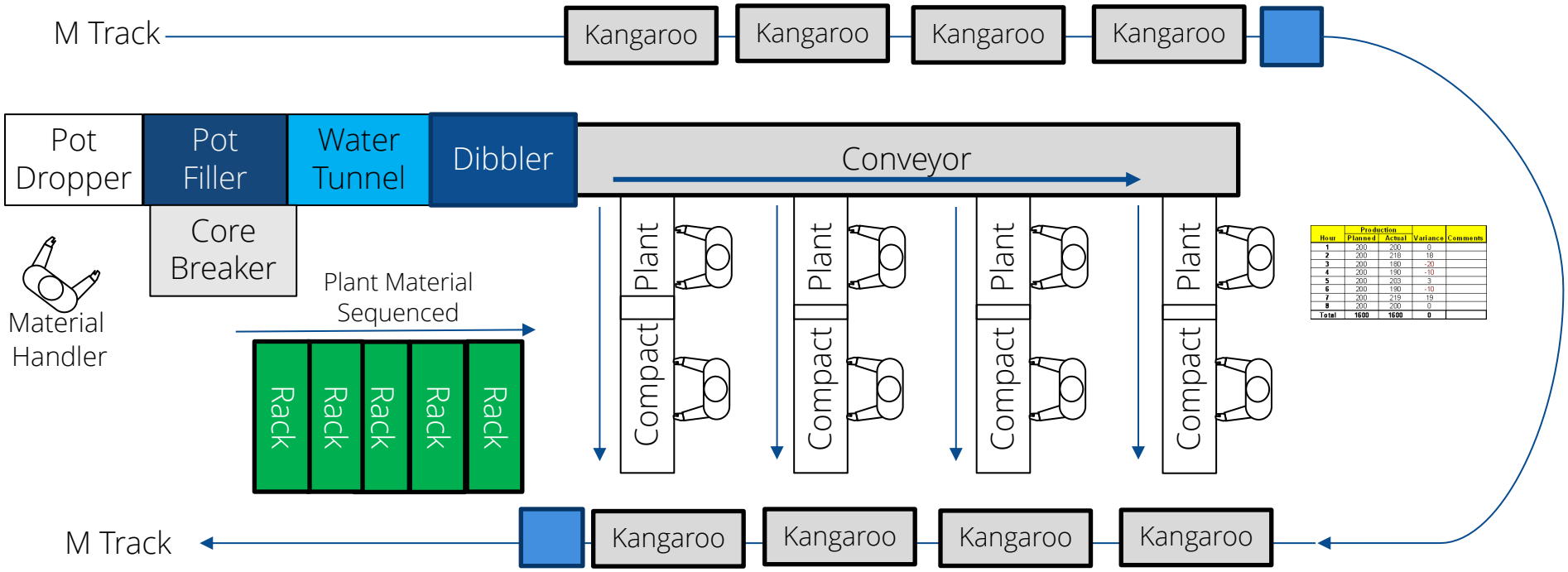
# LEAN FLOW PROGRESSIVE LP POTTING CONCEPTUAL DESIGN




| Production | | | | |
|---|---|---|---|---|
| Hour | Planned | Actual | Variance | Comments |
| 1 | 200 | 200 | 0 | |
| 2 | 200 | 218 | 18 | |
| 3 | 200 | 180 | -20 | |
| 4 | 200 | 190 | -10 | |
| 5 | 200 | 203 | 3 | |
| 6 | 200 | 190 | -10 | |
| 7 | 200 | 219 | 19 | |
| 8 | 200 | 200 | 0 | |
| Total | 1600 | 1600 | 0 | |

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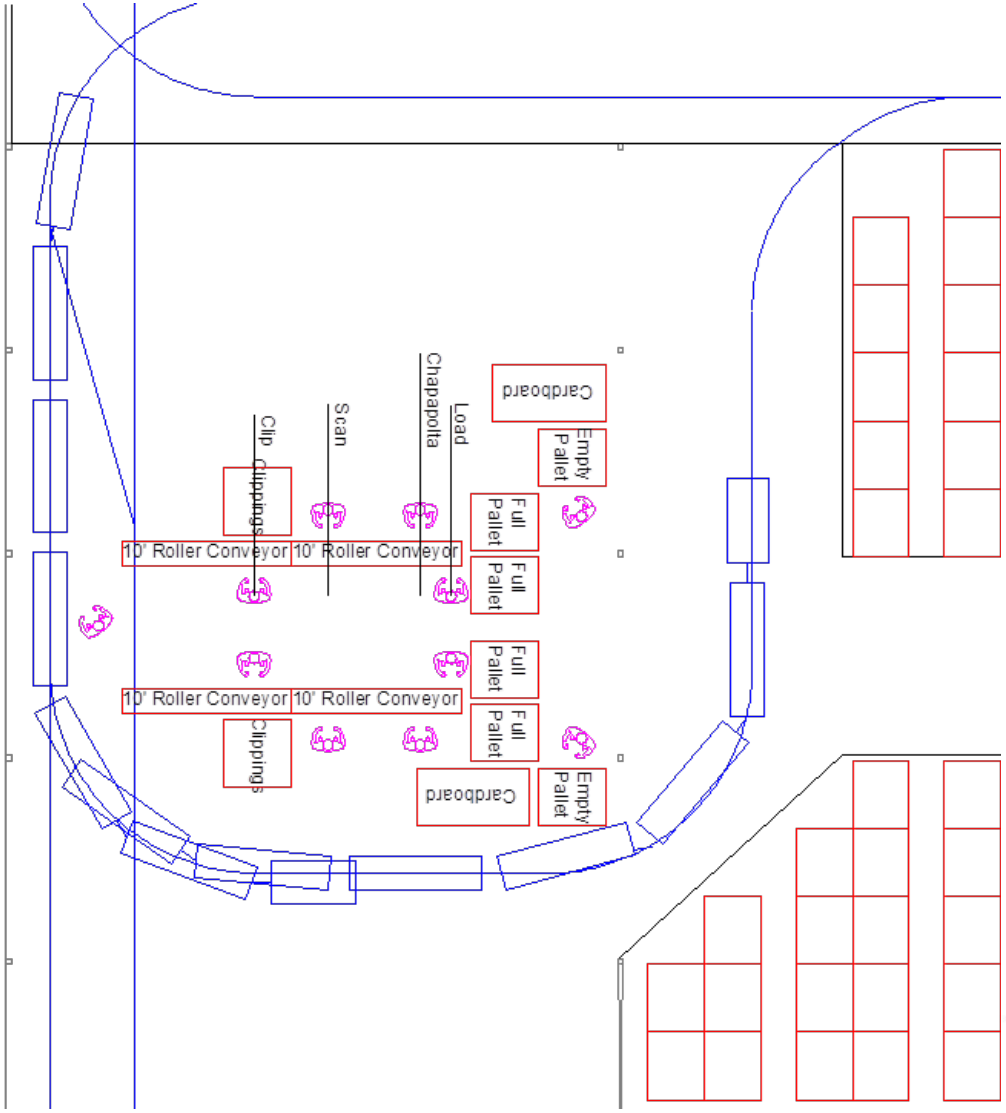
# LP LINER SHIPPING

## LP Liner Shipping

- M-Trak delivers LP trays from the greenhouses
- LP unloaded to the Roller Conveyor
- LP transfers to the cutting station
- Liner is trimmed
- Liner is transferred to the scan station
- Liner cones are scanned
- Liner is transferred to the sealing station
- Liner is sealed
- Liner is transferred to the unload station
- Liner is unloaded to a Gaylord for shipping
- Shipping pallet is then staged for truck

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# PROGRESSIVE WORK – SHIPPING LP LINERS

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# PROGRESSIVE STICKING

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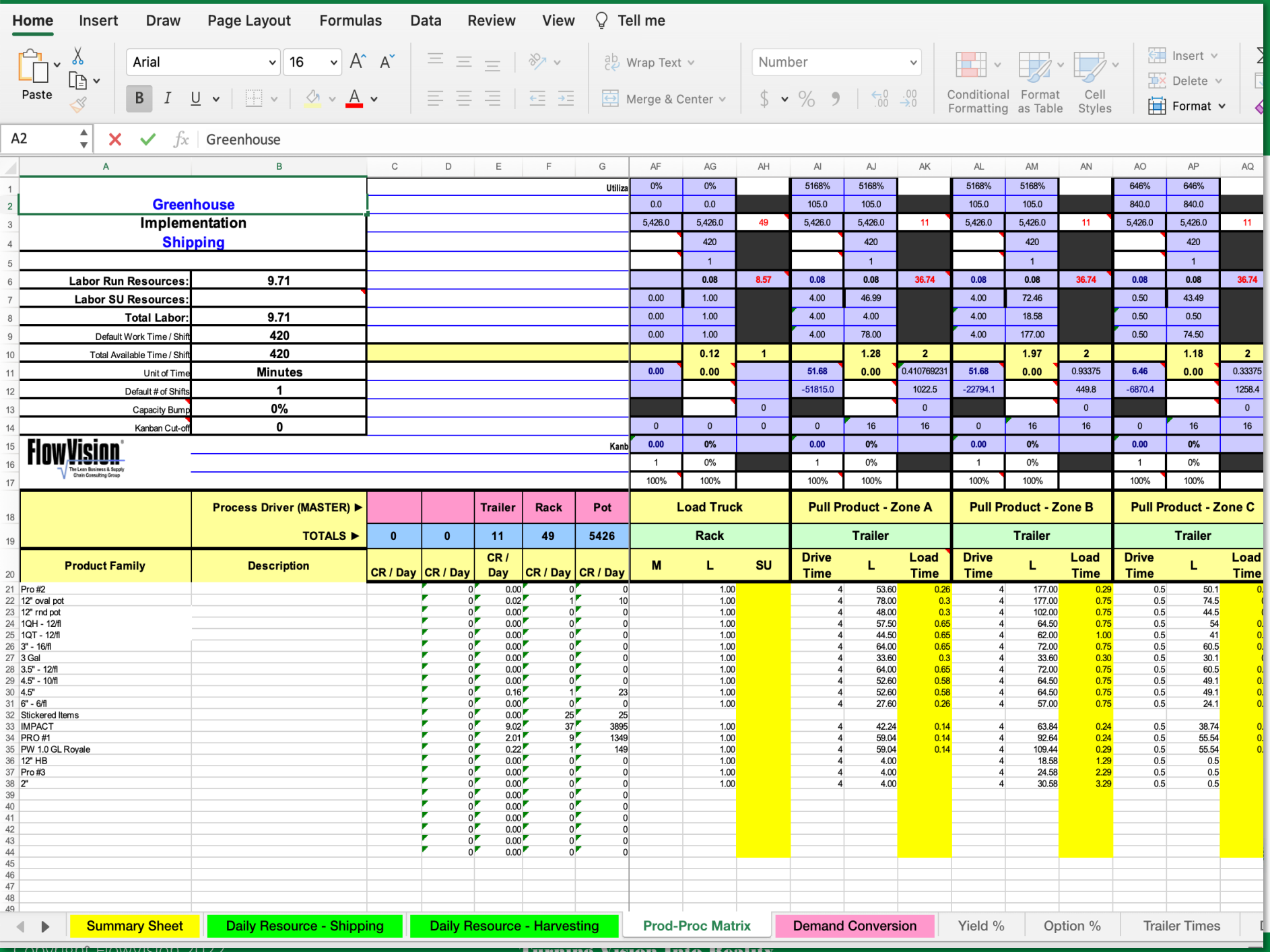

Home Insert Draw Page Layout Formulas Data Review View Tell me

Paste Arial 16 Wrap Text Number Conditional Formatting Format as Table Cell Styles Insert Delete Format

A2 Greenhouse

| | A | B | C | D | E | F | G | AF | AG | AH | AI | AJ | AK | AL | AM | AN | AO | AP | AQ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | Utiliza | 0% | 0% | | 5168% | 5168% | | 5168% | 5168% | | 646% | 646% | |
| 2 | Greenhouse | | | | | | | 0.0 | 0.0 | | 105.0 | 105.0 | | 105.0 | 105.0 | | 840.0 | 840.0 | |
| 3 | Implementation | | | | | | | 5,426.0 | 5,426.0 | 49 | 5,426.0 | 5,426.0 | 11 | 5,426.0 | 5,426.0 | 11 | 5,426.0 | 5,426.0 | 11 |
| 4 | Shipping | | | | | | | | 420 | | | 420 | | | 420 | | | 420 | |
| 5 | | | | | | | | | 1 | | | 1 | | | 1 | | | 1 | |
| 6 | Labor Run Resources: | 9.71 | | | | | | | 0.08 | 8.57 | 0.08 | 0.08 | 36.74 | 0.08 | 0.08 | 36.74 | 0.08 | 0.08 | 36.74 |
| 7 | Labor SU Resources: | | | | | | | 0.00 | 1.00 | | 4.00 | 46.99 | | 4.00 | 72.46 | | 0.50 | 43.49 | |
| 8 | Total Labor: | 9.71 | | | | | | 0.00 | 1.00 | | 4.00 | 4.00 | | 4.00 | 18.58 | | 0.50 | 0.50 | |
| 9 | Default Work Time / Shift | 420 | | | | | | 0.00 | 1.00 | | 4.00 | 78.00 | | 4.00 | 177.00 | | 0.50 | 74.50 | |
| 10 | Total Available Time / Shift | 420 | | | | | | | 0.12 | 1 | | 1.28 | 2 | | 1.97 | 2 | | 1.18 | 2 |
| 11 | Unit of Time | Minutes | | | | | | 0.00 | 0.00 | | 51.68 | 0.00 | 0.410769231 | 51.68 | 0.00 | 0.93375 | 6.46 | 0.00 | 0.33375 |
| 12 | Default # of Shifts | 1 | | | | | | | | | -51815.0 | | 1022.5 | -22794.1 | | 449.8 | -6870.4 | | 1258.4 |
| 13 | Capacity Bump | 0% | | | | | | | | 0 | | | 0 | | | 0 | | | 0 |
| 14 | Kanban Cut-off | 0 | | | | | | 0 | 0 | 0 | 0 | 16 | 16 | 0 | 16 | 16 | 0 | 16 | 16 |
| 15 | | | | | | | Kanb | 0.00 | 0% | | 0.00 | 0% | | 0.00 | 0% | | 0.00 | 0% | |
| 16 | | | | | | | | 1 | 0% | | 1 | 0% | | 1 | 0% | | 1 | 0% | |
| 17 | | | | | | | | 100% | 100% | | 100% | 100% | | 100% | 100% | | 100% | 100% | |

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| | | | | | | | Load Truck | | | Pull Product - Zone A | | | Pull Product - Zone B | | | Pull Product - Zone C | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | | Process Driver (MASTER) ▶ | | | Trailer | Rack | Pot | | | | | | | | | | | | |
| 19 | | TOTALS ▶ | 0 | 0 | 11 | 49 | 5426 | Rack | | | Trailer | | | Trailer | | | Trailer | | |
| 20 | Product Family | Description | CR / Day | CR / Day | CR / Day | CR / Day | CR / Day | M | L | SU | Drive Time | L | Load Time | Drive Time | L | Load Time | Drive Time | L | Load Time |
| 21 | Pro #2 | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 53.60 | 0.26 | 4 | 177.00 | 0.29 | 0.5 | 50.1 | 0. |
| 22 | 12" oval pot | | | 0 | 0.02 | 1 | 10 | | 1.00 | | 4 | 78.00 | 0.3 | 4 | 177.00 | 0.75 | 0.5 | 74.5 | ( |
| 23 | 12" rnd pot | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 48.00 | 0.3 | 4 | 102.00 | 0.75 | 0.5 | 44.5 | ( |
| 24 | 1QH - 12/fl | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 57.50 | 0.65 | 4 | 64.50 | 0.75 | 0.5 | 54 | 0. |
| 25 | 1QT - 12/fl | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 44.50 | 0.65 | 4 | 62.00 | 1.00 | 0.5 | 41 | 0. |
| 26 | 3" - 16/fl | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 64.00 | 0.65 | 4 | 72.00 | 0.75 | 0.5 | 60.5 | 0. |
| 27 | 3 Gal | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 33.60 | 0.3 | 4 | 33.60 | 0.30 | 0.5 | 30.1 | ( |
| 28 | 3.5" - 12/fl | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 64.00 | 0.65 | 4 | 72.00 | 0.75 | 0.5 | 60.5 | 0. |
| 29 | 4.5" - 10/fl | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 52.60 | 0.58 | 4 | 64.50 | 0.75 | 0.5 | 49.1 | 0. |
| 30 | 4.5" | | | 0 | 0.16 | 1 | 23 | | 1.00 | | 4 | 52.60 | 0.58 | 4 | 64.50 | 0.75 | 0.5 | 49.1 | 0. |
| 31 | 6" - 6/fl | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 27.60 | 0.26 | 4 | 57.00 | 0.75 | 0.5 | 24.1 | 0. |
| 32 | Stickered Items | | | 0 | 0.00 | 25 | 25 | | | | | | | | | | | | |
| 33 | IMPACT | | | 0 | 9.02 | 37 | 3895 | | 1.00 | | 4 | 42.24 | 0.14 | 4 | 63.84 | 0.24 | 0.5 | 38.74 | 0. |
| 34 | PRO #1 | | | 0 | 2.01 | 9 | 1349 | | 1.00 | | 4 | 59.04 | 0.14 | 4 | 92.64 | 0.24 | 0.5 | 55.54 | 0. |
| 35 | PW 1.0 GL Royale | | | 0 | 0.22 | 1 | 149 | | 1.00 | | 4 | 59.04 | 0.14 | 4 | 109.44 | 0.29 | 0.5 | 55.54 | 0. |
| 36 | 12" HB | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 4.00 | | 4 | 18.58 | 1.29 | 0.5 | 0.5 | |
| 37 | Pro #3 | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 4.00 | | 4 | 24.58 | 2.29 | 0.5 | 0.5 | |
| 38 | 2" | | | 0 | 0.00 | 0 | 0 | | 1.00 | | 4 | 4.00 | | 4 | 30.58 | 3.29 | 0.5 | 0.5 | |
| 39 | | | | 0 | 0.00 | 0 | 0 | | | | | | | | | | | | |
| 40 | | | | 0 | 0.00 | 0 | 0 | | | | | | | | | | | | |
| 41 | | | | 0 | 0.00 | 0 | 0 | | | | | | | | | | | | |
| 42 | | | | 0 | 0.00 | 0 | 0 | | | | | | | | | | | | |
| 43 | | | | 0 | 0.00 | 0 | 0 | | | | | | | | | | | | |
| 44 | | | | 0 | 0.00 | 0 | 0 | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | |
| 46 | | | | | | | | | | | | | | | | | | | |
| 47 | | | | | | | | | | | | | | | | | | | |
| 48 | | | | | | | | | | | | | | | | | | | |
| 49 | | | | | | | | | | | | | | | | | | | |

Summary Sheet | Daily Resource - Shipping | Daily Resource - Harvesting | Prod-Proc Matrix | Demand Conversion | Yield % | Option % | Trailer Times

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# Shipping Resources

**2.69**
**Total Resource**

## *Shipping*

| Process | Work Hours | Option % | Planned Volume | Total Manpower: 2.69 Labor Resource |
|---|---|---|---|---|
| Stage Supermarket | 9 | 100% | 49.00 | 0.00 |
| Cart Prep | 8 | 100% | 49.00 | 0.00 |
| Clean | 8 | 100% | 49.00 | 0.02 |
| Pick Orders | 8 | 100% | 49.00 | 1.17 |
| Sticker | 8 | 50% | 24.50 | 1.17 |
| Shrink Wrap | 8 | 100% | 49.00 | 0.18 |
| Stage for Shipping | 8 | 100% | 49.00 | 0.04 |
| Load Truck | 8 | 100% | 49.00 | 0.12 |
| | | | | |

## *Harvesting*

| Process | Work Hours | Option % | Planned Volume | Total Manpower: 1.35 Labor Resource |
|---|---|---|---|---|
| Pull Product - Zone A | 8 | 100% | 0.16 | 0.02 |
| Pull Product - Zone B | 8 | 100% | 0.73 | 0.14 |
| Pull Product - Zone C | 8 | 100% | 1.83 | 0.23 |
| Pull Product - Zone D | 8 | 100% | 2.10 | 0.21 |
| Pull Product - Zone E | 8 | 100% | 0.56 | 0.10 |
| Pull Product - Zone F | 8 | 100% | 1.07 | 0.18 |
| Pull Product - Zone G | 8 | 100% | 0.00 | 0.00 |
| Pull Product - Zone I | 8 | 100% | 4.49 | 0.42 |
| Pull Product - Zone N | 8 | 100% | 0.00 | 0.00 |
| Pull Product - Zone S | 8 | 100% | 0.27 | 0.03 |
| Pull Product - Zone W | 8 | 100% | 0.22 | 0.03 |

## Additional Maintenance Resources

| | Work Hours | Addtional Labor |
|---|---|---|
| Clean Dock | 6 | |
| | 6 | |
| | 6 | |
| | 6 | |
| | | **0.00** |
| | | Total Add On Labor |

| | |
|---|---|
| 2.69 | Total Planned Labor |
| 0.00 | Total Add On Labor |
| **2.69** | Total Shipping Labor |

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# Flow Rate Board

- Hourly planned output vs. actual output

| Hour | Production | | Variance | Cummulative Variance | Comment |
|---|---|---|---|---|---|
| | Planned | Actual | | | |
| 1 | 200 | 200 | 0 | 0 | |
| 2 | 200 | 200 | 0 | 0 | |
| 3 | 200 | 180 | -20 | -20 | |
| 4 | 200 | 190 | -10 | -30 | |
| 5 | 200 | 210 | 10 | -20 | |
| 6 | 200 | 195 | -5 | -25 | |
| 7 | 200 | 200 | 0 | -25 | |
| 8 | 200 | 220 | 20 | -5 | |
| **Total** | **1600** | **1595** | **5** | **-5** | |

- Goal:
  - Set the plan
  - Hit the plan

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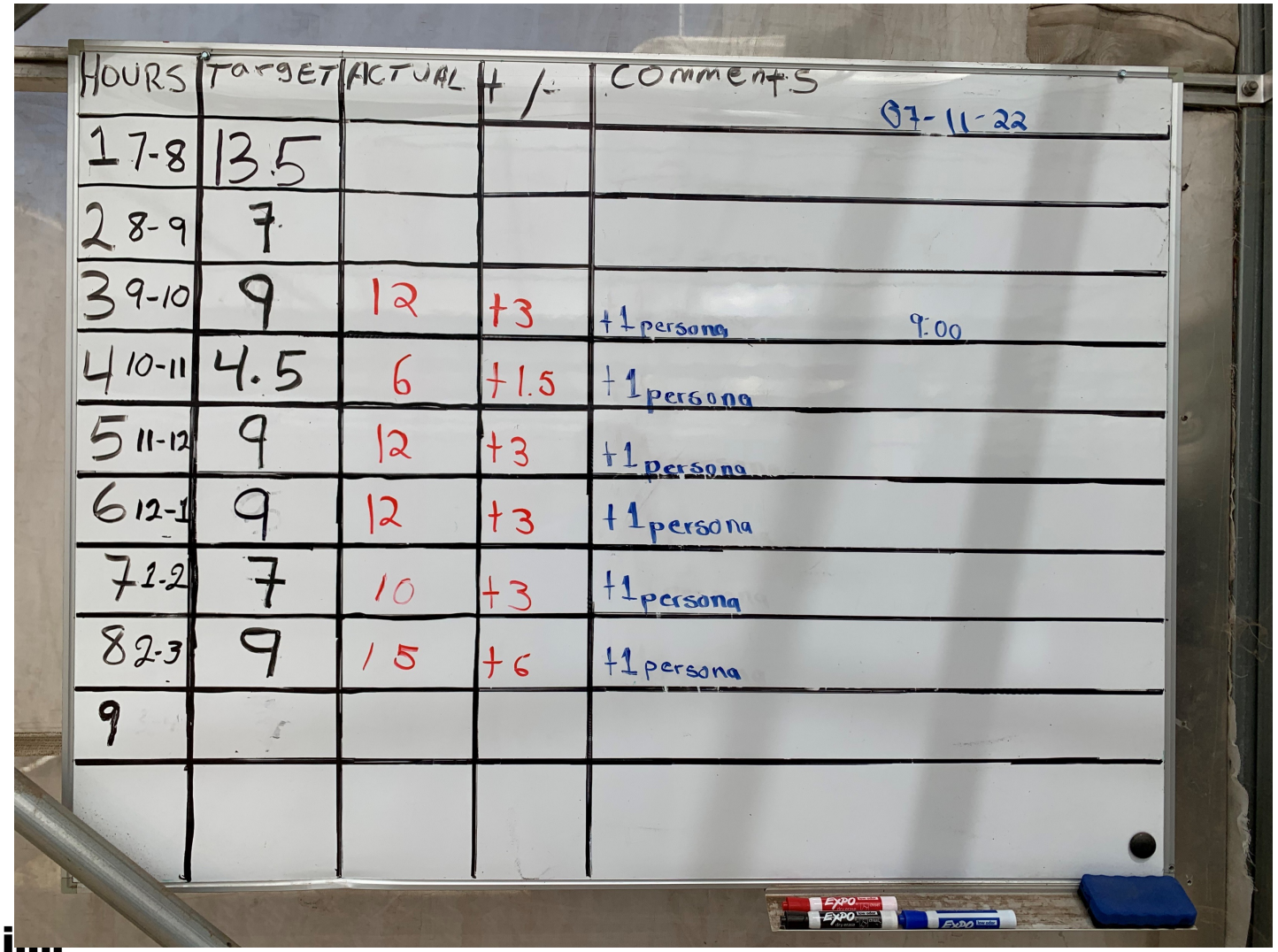
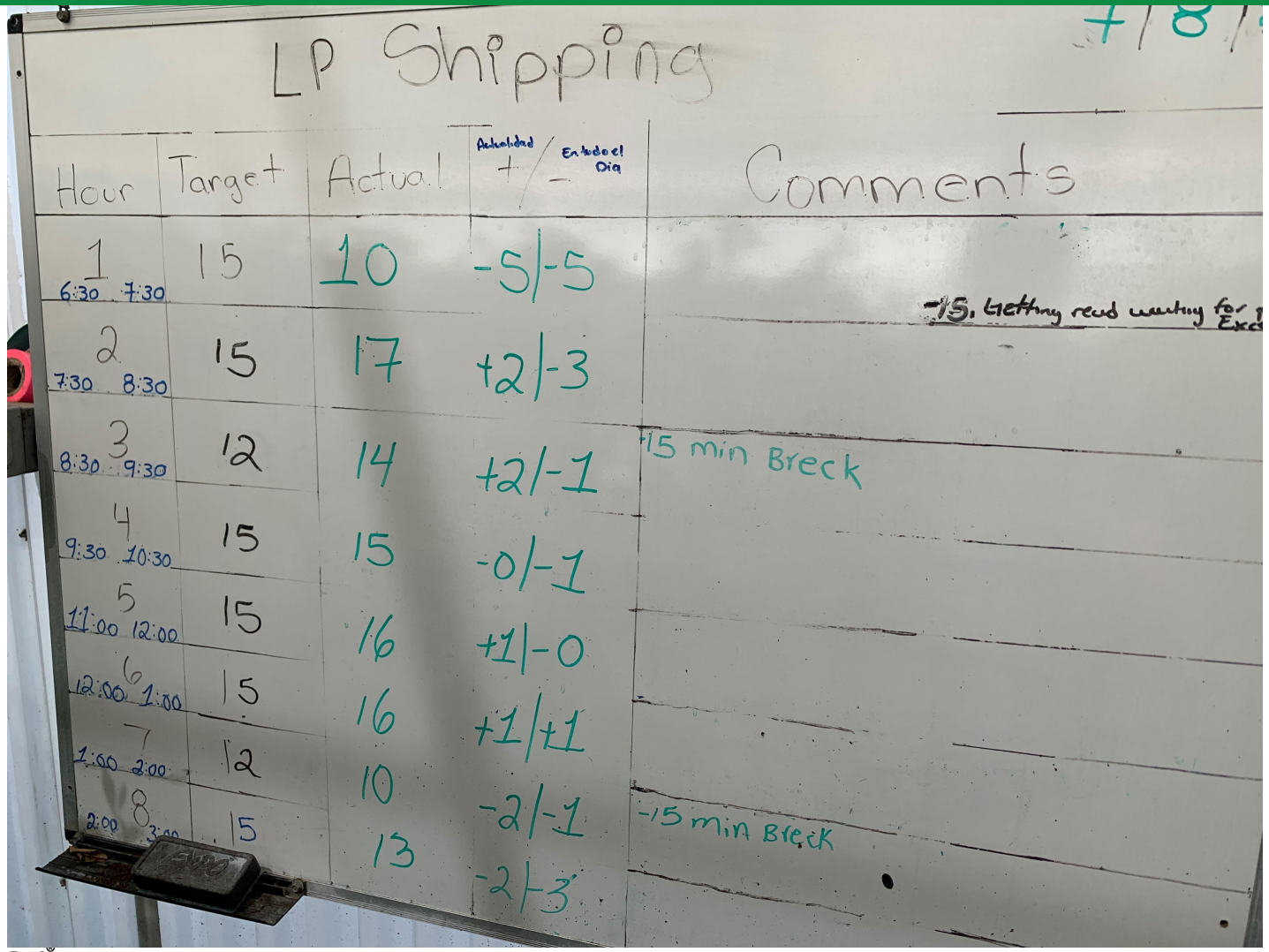
# MONITORING THE PROCESS – FLOW RATE BOARD



# MONITORING THE PROCESS – FLOW RATE BOARD

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# THE RESULTS

Typical savings seen in Lean Flow implementations:

- Productivity improvements 20 – 40%
- Floor Space savings of up to 30%
  - As high as 4 times the volume in the same floor space
- Reduced Shrink of up to 50%
- Reduced Credits/Claims
- Controlled environment
  - No more chaos during peak periods
  - Easier to manage
- Doesn't matter how small or large you are percentage wise the savings are same

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