



Maintenance Excellence

Using Lean to Drive Maintenance
Excellence and Productivity

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TAKING
YOU **HIGHER**

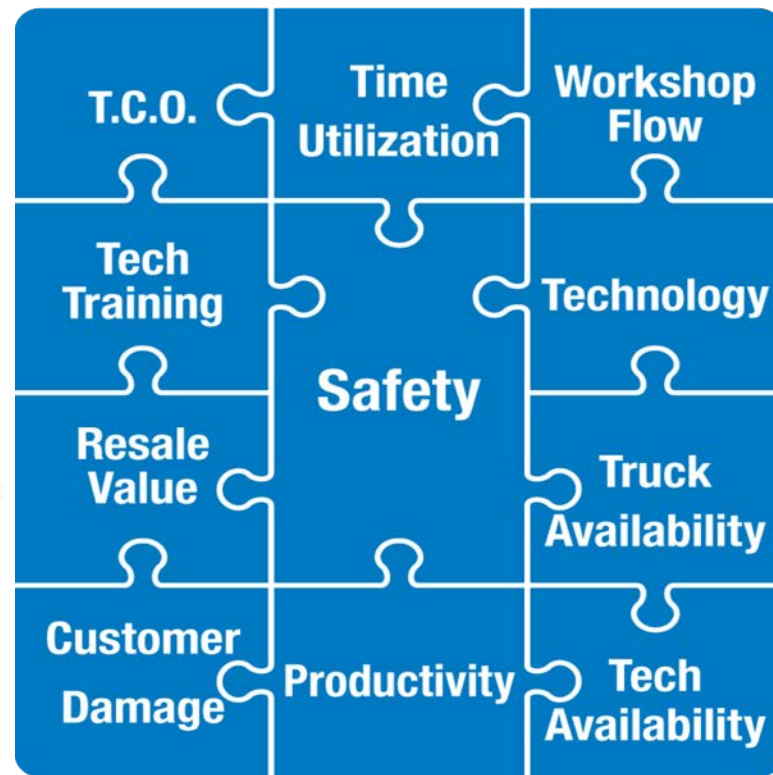
I. Basics

- 1) Fleet Maintenance
- 2) Lean Principles
- 3) Examples of How To Apply Lean

II. New Technology

- 1) Fleet Maintenance
- 2) Applying Lean

Maintenance Is Integral To Fleet Productivity & ROI



RIGOROUS MAINTENANCE COMBINED WITH TECHNOLOGY CAN PROPEL YOUR BUSINESS

Maintenance Formula For Success



**Trained
Technicians**



**Standardized
Maintenance**



**“Purposeful”
Technology**



▲ **Safety: In Workshops & Field**

- Recordable Rate

▲ **Technician Productivity**

- Hours/task
- Revenue/Employee
- Wrench Time

▲ **Asset Productivity**

- Time Utilization
- % Rental Ready

Basics Of Maintenance Excellence

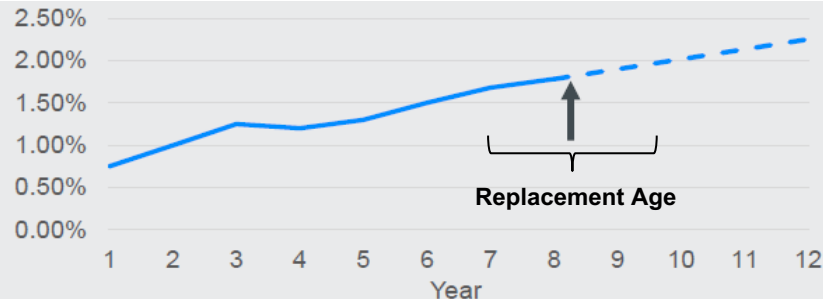
SERVICE TECH TRAINING:

- Standardized training plan
- Specify 40-80 hours/year per tech
- Include “Operating” training
- Automated tracking and scheduling
- Use OEM’s, online and company training

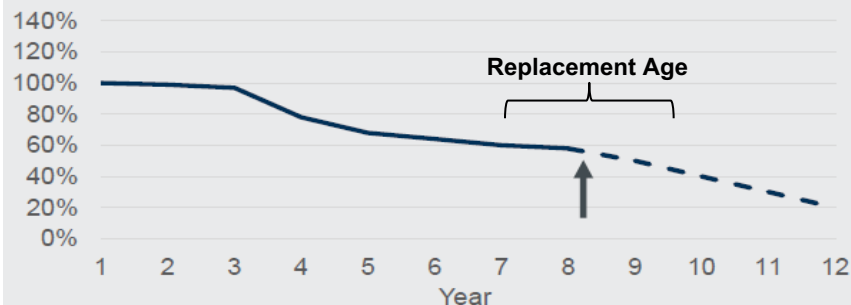
STANDARDIZED MAINTENANCE:

- P.M. plans by asset
- P.M.’s performed and documented after each rental
- Automated P.M. check lists
- Advanced parts ordering
- Standard turn times

Maintenance Cost



Resale Value



APPLY STANDARDIZED PROCESS TO BASICS THEN AUTOMATE TO DRIVE EFFICIENCY

The Basics of Lean

1. Lean is based on the respect and engagement of **people**

The key to lean is how people think

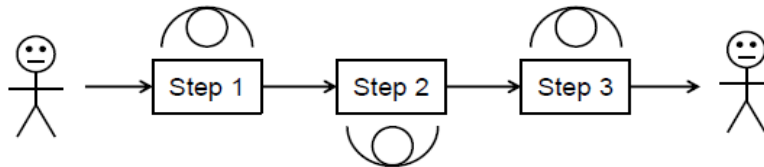


2. The goal of lean is for **people** to increase **value** for the customer

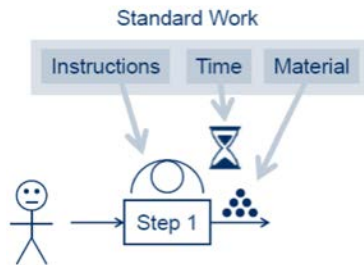
$$\text{Value} = \frac{\text{Benefits}}{\text{Costs}}$$

Waste is everything that does not add **value** for the customer

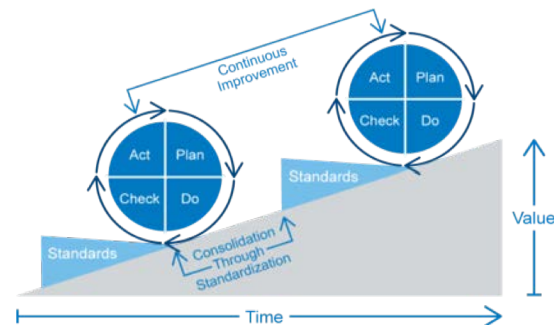
3. Process is how people create **value** for the customer



4. Standards are how **people** define **value** for the customer




5.



Lean Basics To Maintenance

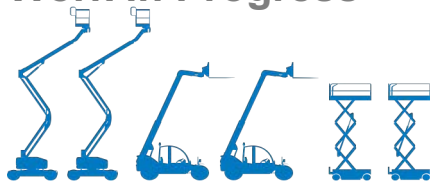
TRAINING PLAN

TRAINING HOURS								
 WORKER	Q1		Q2		Q3		Q4	
	PLAN	ACT	PLAN	ACT	PLAN	ACT	PLAN	ACT
Stage 1	10	●						
Stage 2			5	●	5	●		
Stage 3							10	●

5S & VISUAL MANAGEMENT



Work In Progress



Rental Ready

STANDARDIZED MAINTENANCE



Instructions



Target Times



Required Parts

LEAN BASICS CAN BE EASILY TAUGHT AND APPLIED TO MAINTENANCE PROCESSES

Applying Lean To Annual Inspections

LEAN ASSEMBLY LINE



Units queued for inspection

Tech A running concurrent first steps (first step cycle time is half second step)

Tech B running second step

Completed Unit



Visual management for level loading



5S for each work area

New Technology for Fleet Maintenance



The Need For Maintenance

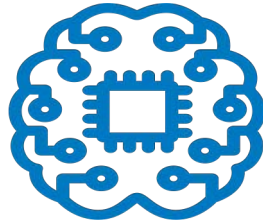
Descriptive



“What is happening?”

- Hours
- Location
- Machine idle time
- Faults

Predictive



“What will happen?”

- Predict failures before they occur

Prescriptive



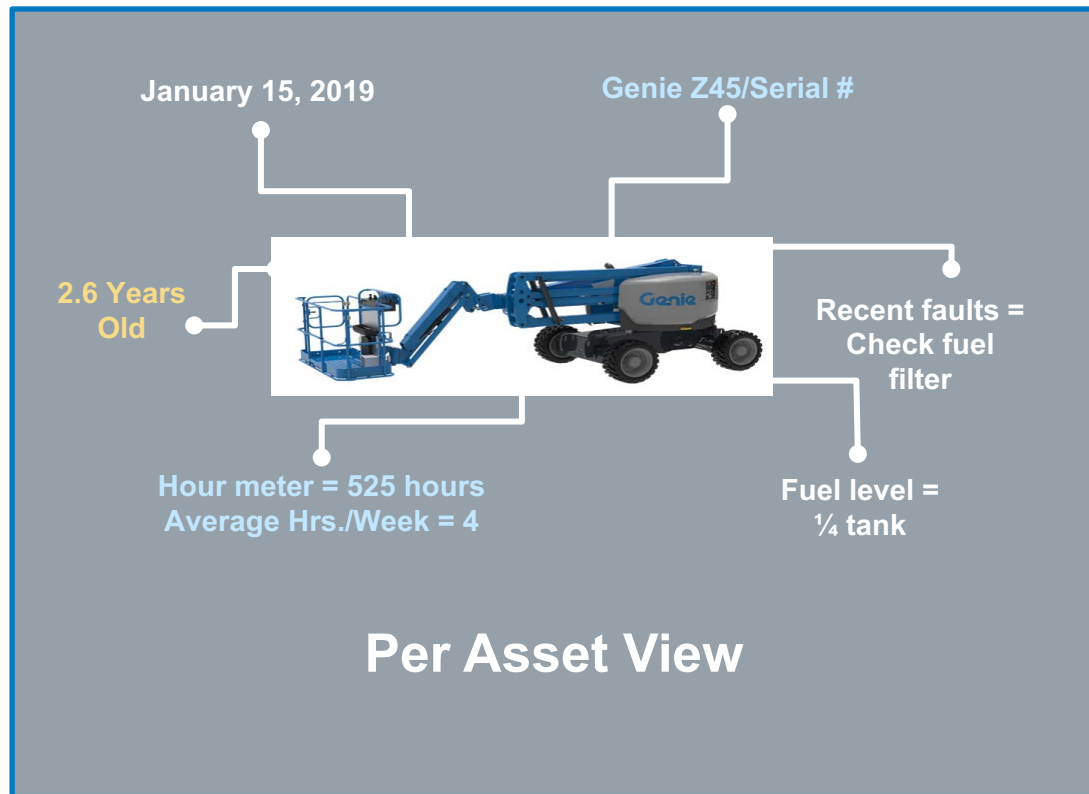
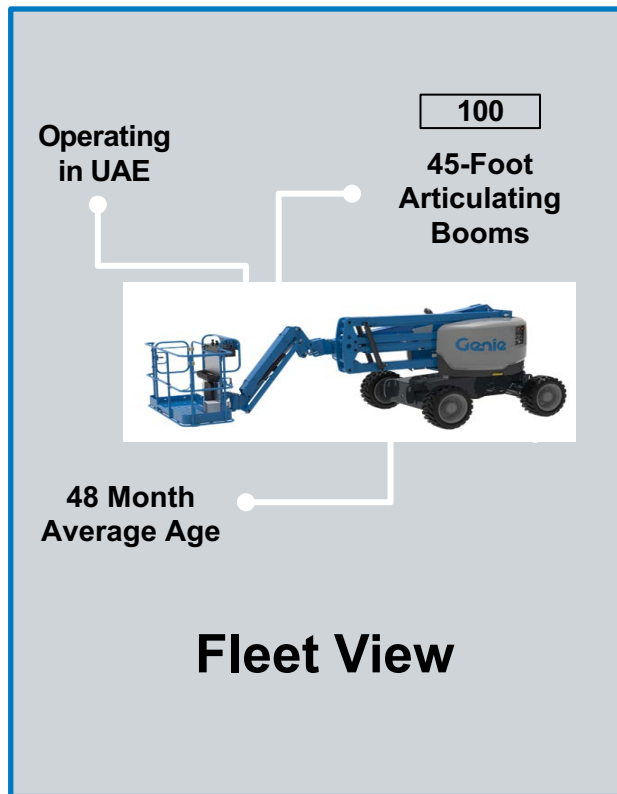
“What do I need to do?”

- Recommend action to be taken

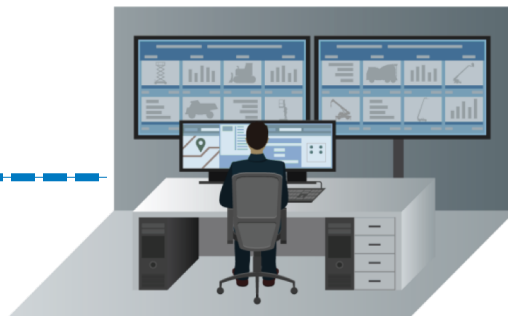
Future – Cooperating Machines



Moving From “Fleet View” To “Asset View”



MOST COMMON FAILURES CAN NOW BE PREDICTED



Maintenance Plans

- Pre-loaded Maintenance Plans
- Hourly and Calendar based (Quarterly, etc)
- Customers can add their assets to these plans
- Customers can create plans of their own
- Genie plans also provide part numbers for parts required to complete service

Actionable information – Maintenance Due

- Customers can indicate how far in advance of a scheduled interval they would like to be notified (hours or calendar based)
- Dashboards visually highlight machines coming due and over due
- Service Managers can prioritize work based on what is coming due

Maintenance Records/History

- Customers can record completed maintenance in the portal
- Allows customers to capture:
 - Work order number
 - Who completed the service
 - Hour meter reading at the time of service
 - Notes/Comments on what was done
- Maintenance History for any maintenance completed via the portal

Augmented Reality (AR)

AR = AN INTERACTIVE MIX OF THE REAL WORLD ENVIRONMENT WITH SUPERIMPOSED OBJECTS



Augmented reality will reshape maintenance and training in the near future.

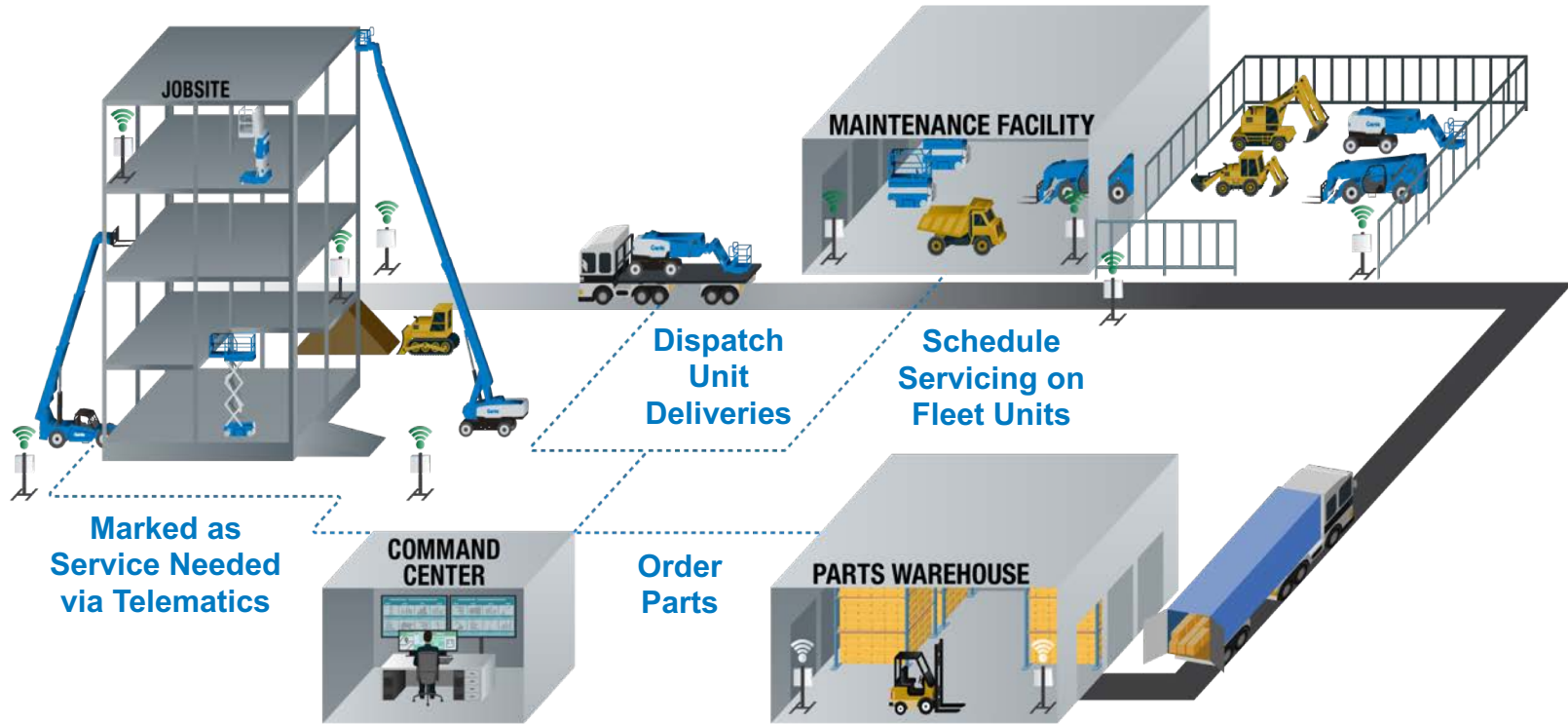


Ability to download schematics

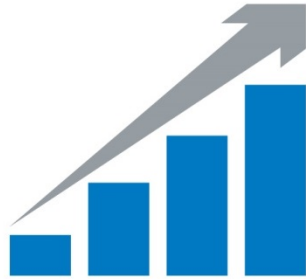


Live Remote Help

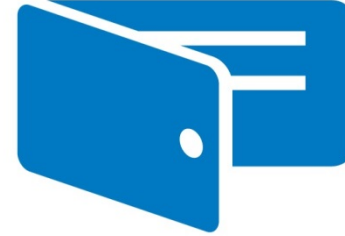
Telematics and Fleet Management



Questions?



**Productivity
Increased**



**Increased
rROIC**

Less equipment downtime translates to:

- **More productivity, equipment utilization**
- **Increased rROIC**

Thank you

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