

Notes:

What is Lean?

Key Learning Points

1. Recognize what Lean Improvement is, and how it can be used to improve processes.
2. Identify different tools used in the Lean methodology.
3. Explain why different tools are used.

Lean Drives Out Waste

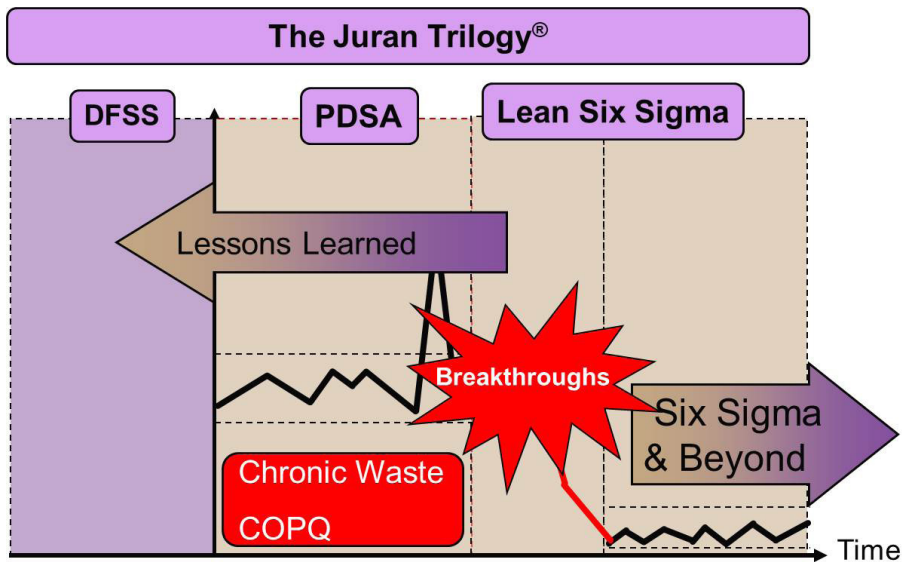


- Lean is a methodology used to reduce lead time, increase throughput, and

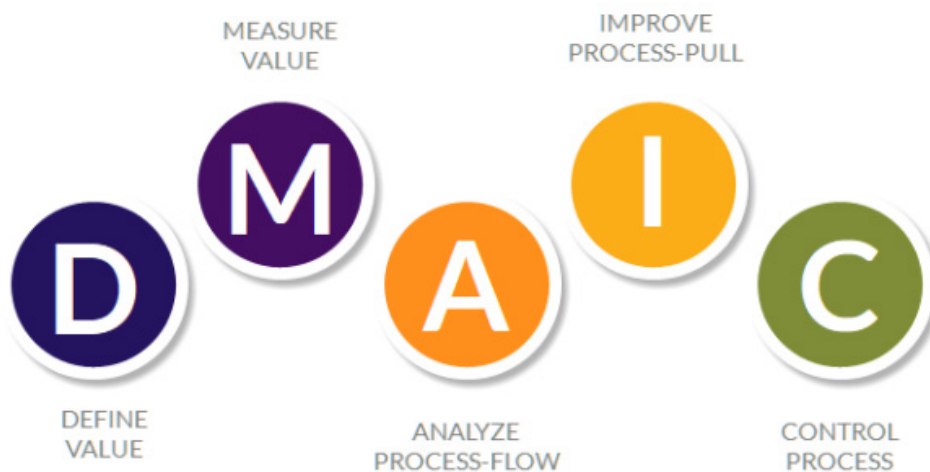
eliminate waste.

- Lean provides value to customers.
- Lean creates greater profitability.
- Lean improves delivery time.

How to Think About Lean

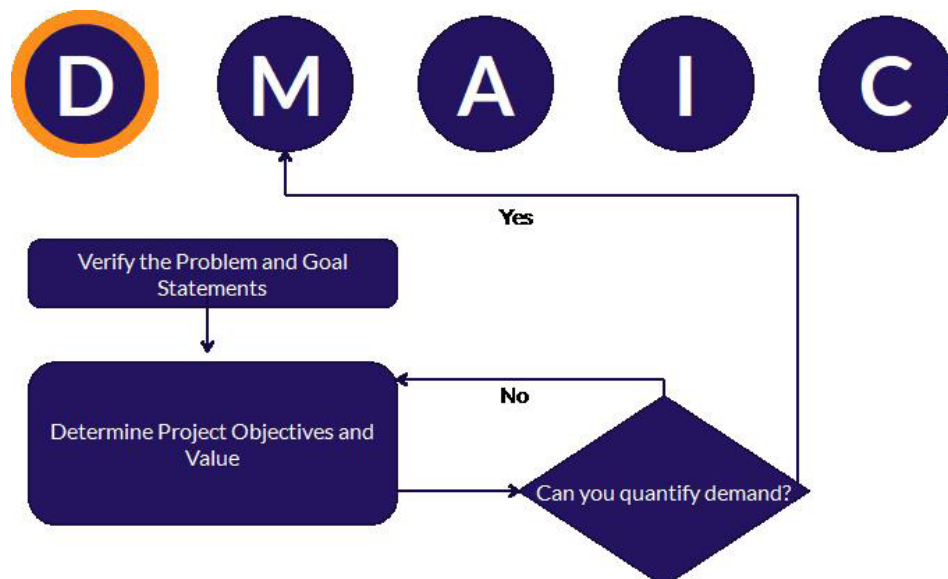


Lean Steps

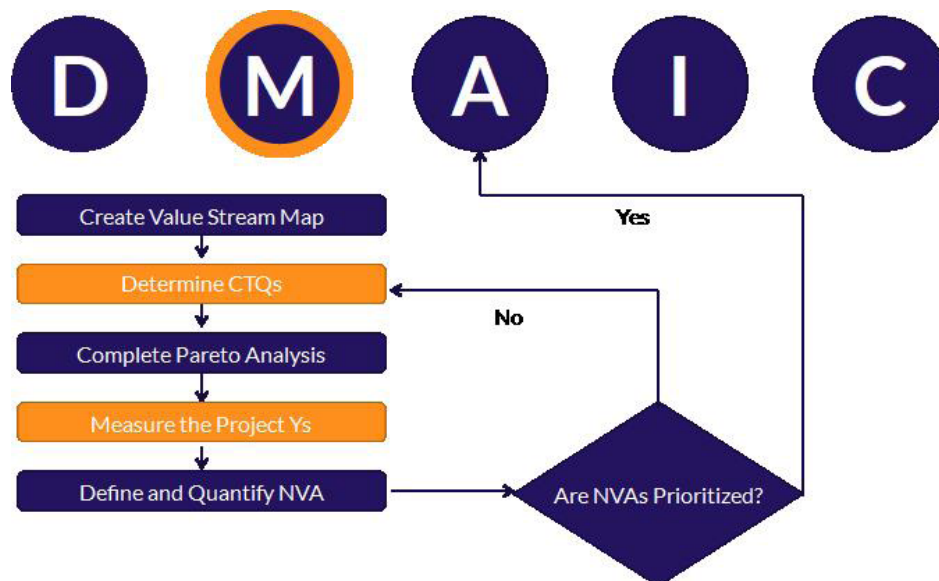


Notes:

Define Value

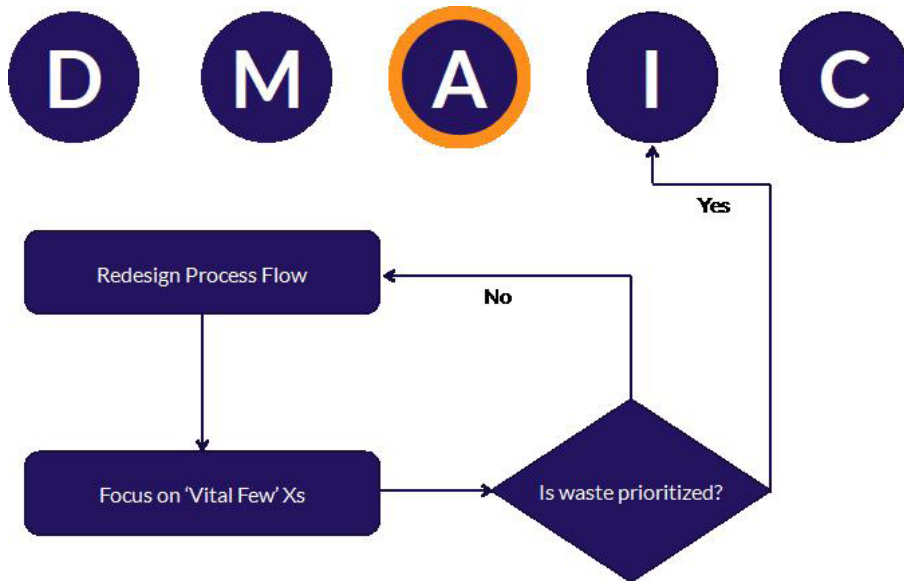


Measure Value

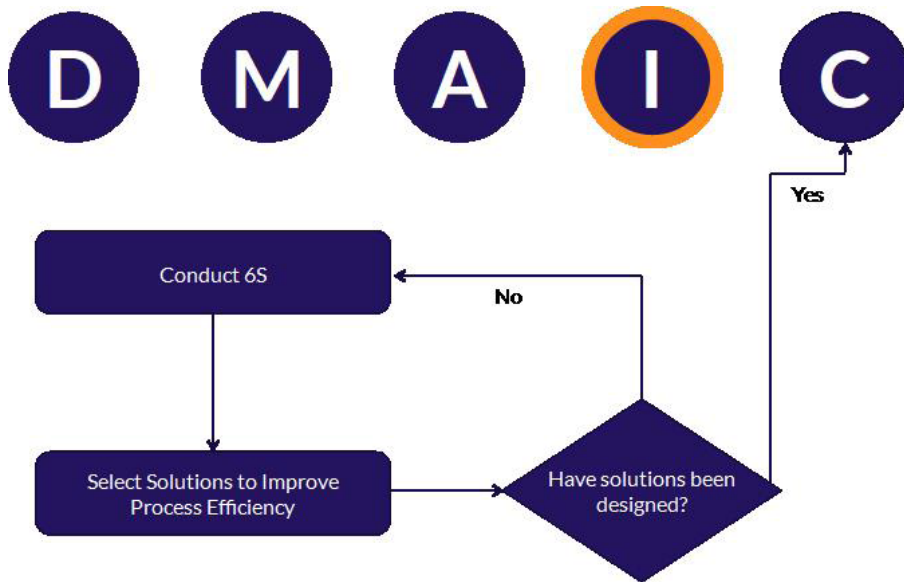


Notes:

Analyze Process-Flow

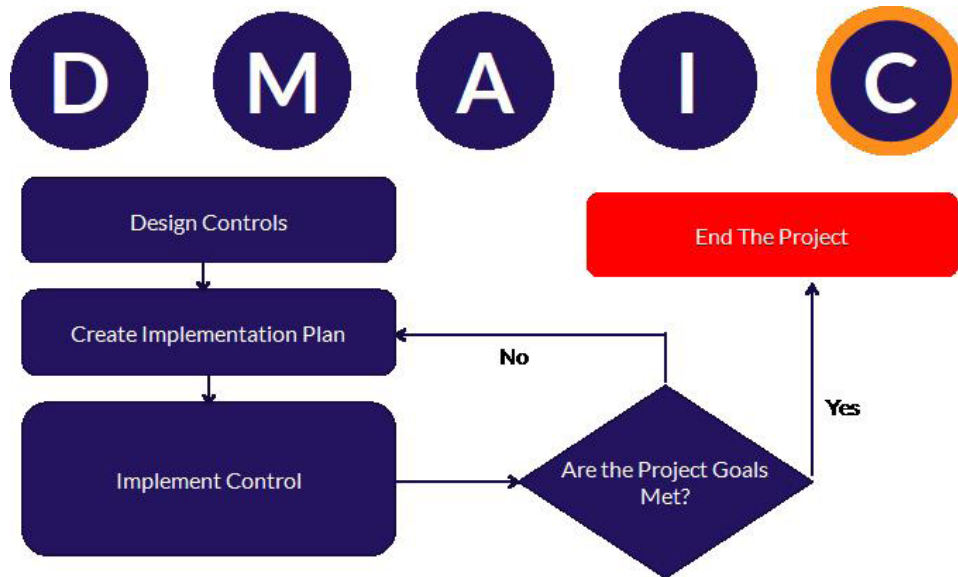


Improve Process-Pull



Notes:

Control Process



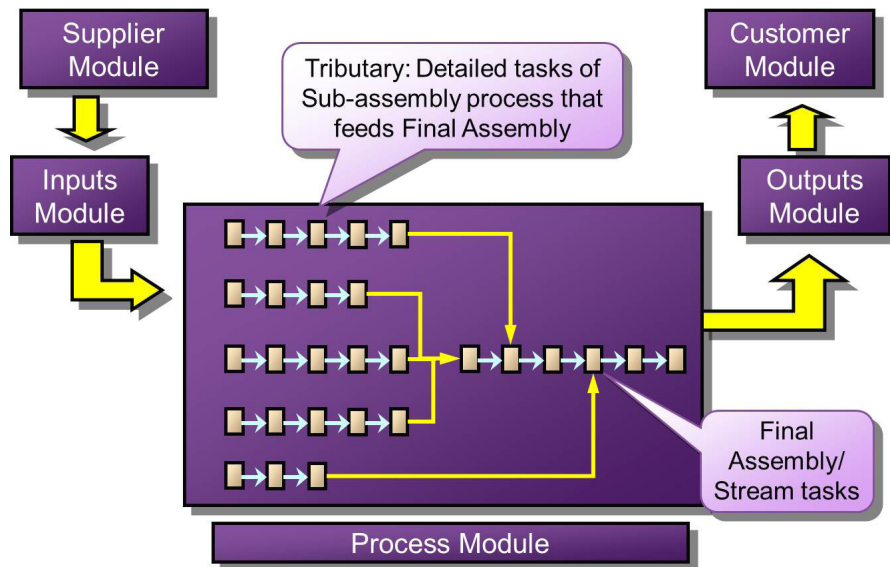
Notes:

Lean Tools

There are many tools used in Lean projects, such as:

- Value Stream Mapping
- VA/NVA Analysis
- TPM
- Theory of Constraints
- Takt Time
- Supermarkets
- SMED
- 6S
- Reliability Centered Maintenance
- Product Routing Analysis
- Control Boards
- Process Modeling
- Kanban
- Push vs. Pull Production

Value Stream Attribute Map



Notes:

6S

S1: Sort

- Step 1: Set standards for deciding what is needed.
- Step 2: Identify unneeded items.
- Step 3: Apply red tags and send to control area.
- Step 4: Disposition items in the control area.
- Step 5: Make sure that no unneeded items are brought into the facility.

S2: Set in Order

- Step 1: Arrange needed items so they are easy to find and use.
- Step 2: Label items so their storage sites are easily understood by anyone.
- Step 3: "A place for everything and everything in its place."
- Step 4: Implement visual control.

S3: Sweep and Shine

- Step 1: Remove dirt, grime, and dust from the workplace.
- Step 2: Keep everything swept and clean.

S4: Standardize

- Step 1: Decide upon standard practices for the process as a team.
- Step 2: Present standard practices so that anyone can understand the standard method in a minimal amount of time.

- Step 3: Verify that standard practices are being followed—focus on facts!
- Step 4: Correct any non-conformances immediately.
- Step 5: Repeat steps 1 through 4 as needed.

S5: Self-Discipline

- Step 1: Maintain a high-level of 6S awareness—motivate through mottos, posters, and enthusiasm.
- Step 2: Create opportunities to improve the 6S process—schedule workshops, publish best practices, and start a suggestion program.
- Step 3: Create motivation to maintain and improve 6S practices—publish the company goal, the gap with competitors, and the improvements made.

S6: Safety

Implement behavioral-based safety processes and procedures that drive zero recordable injuries and zero lost time accidents. Behavioral-based safety practices are the foundation for all remaining 6S activities and must be ingrained in each activity.

Takt Time

Definition

- Produce at the customer's purchase rate.
- Ideally, make every 'product' every day.
- From the German word for meter, as in music, which establishes the pace, or beat, of the music
- The time which reflects the rate at which customers buy one unit
- 'Practical' Takt Time may need to be modified depending on the variability of the process.
- When modifying Takt Time beyond the simple equation, another name should be used, such as Cell Takt or Machine Takt.
- Although modifiers may be planned, they are still waste, or Planned Waste.

Takt Time = Available Time in a day / Average Daily Demand

Pace

Pace = Time available in a set period / Average Demand

Notes:

Rules of Thumb

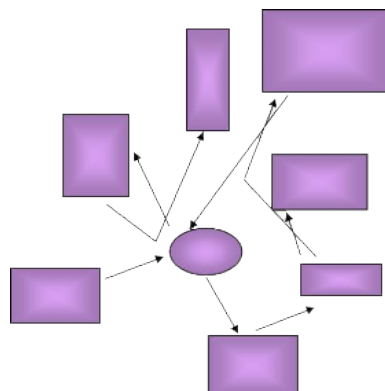
| Annual Demand | Approximate Takt Time |
|---------------|-----------------------|
| 1 million | 20 seconds |
| 300 thousand | 1 minute |
| 100 thousand | 3 minutes |
| 50 thousand | 6 minutes |
| 10 thousand | 30 minutes |
| 5 thousand | 1 hour |
| 1 thousand | 5 hours |
| 500 | 10 hours |

Table is based on working 50 weeks, 3 shifts a day, 5 days a week, for 7 hours a shift

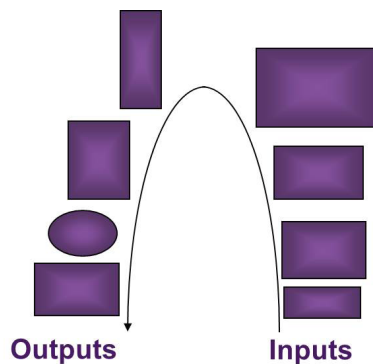
Proximity

Geographically concentrate process steps into a “cell” or “line.”

Before Lean Improvement



After Lean Improvement



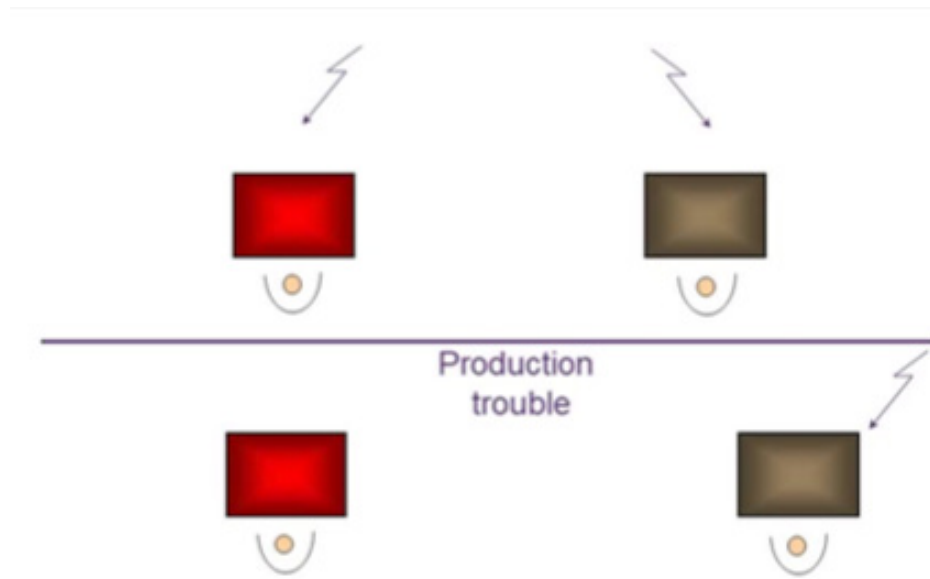
Notes:

Production Systems

Geographically concentrate process steps into a “cell” or “line.”

Push Production System

A push production system continues to make a product to schedule as long as resources and materials are available.



Push Production Trouble

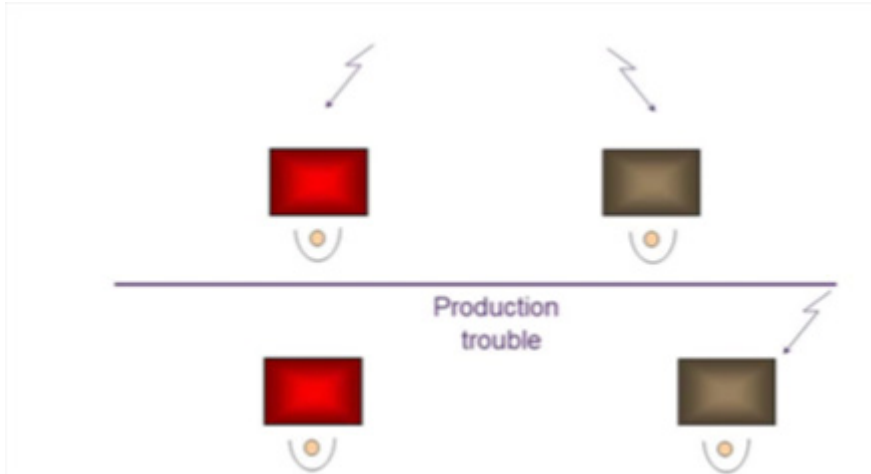
A push production system continues to make a product to schedule as long as resources and materials are available.



Notes:

Pull Production System

A pull production system only makes a product when the upstream customer needs it.

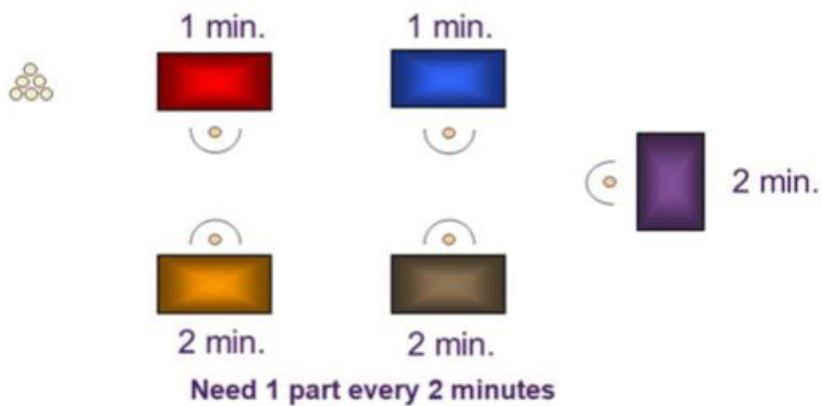


Notes:

Balancing the Process

Geographically concentrate process steps into a “cell” or “line.”

Unbalanced Process

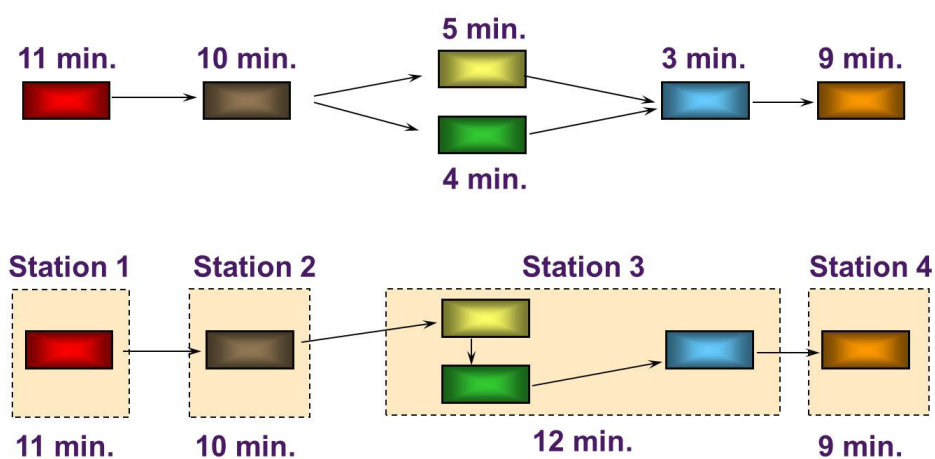


Balanced Process



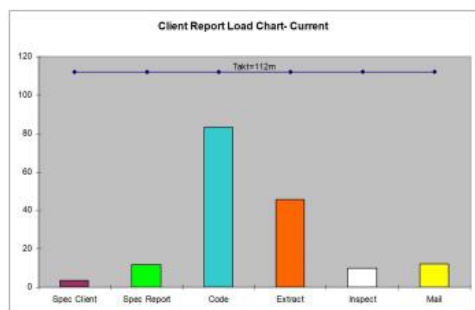
Notes:

Balancing the Flow

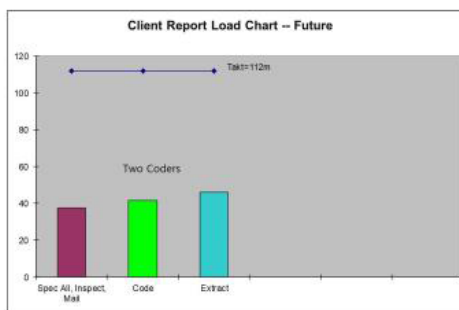


Load Charts

Original Process



New Process with Combined Work



Notes: