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Spaghetti Diagram

Key Learning Points

1. Describe the importance of a Spaghetti Diagram.
2. Explain how to create a Spaghetti Diagram.
3. Utilize Spaghetti Diagrams in improvement projects.

What is a Spaghetti Diagram?

A spaghetti diagram is a graphical representation of a facility layout depicting the processing path of a product or service. This tool is used in developing current state and future state value stream maps.

Few Examples Necessary

Invaluable information can be obtained in just a few observations.

Show Sources of Transport Waste

Separate diagrams may be prepared for the flow of customers, items and operators. This helps with understanding various sources of transport waste.

Expose Delays and Lost Time

The hidden waste, unnecessary time and distance required to perform a task is displayed. This helps reveal sub-optimal locations of machines, storage of equipment, and work operations.

Steps in Creating a Spaghetti Diagram

1. Begin with a blueprint of the area being assessed. The project team can either create their own sketch using a pen and paper, or software if available, or they can use an actual architectural blueprint if accessible.

2. Explain to the team you are analyzing the flow or work, not observing them for effectiveness or efficiency.

   Identify who or what is being followed through the process.

3. Determine a start and end point. This may be based on time, or it could be based on distinct beginning and end points in a process. For example, follow a sales associate through their daily routine for 20 minutes, or track a customer's loan application through an approval process.

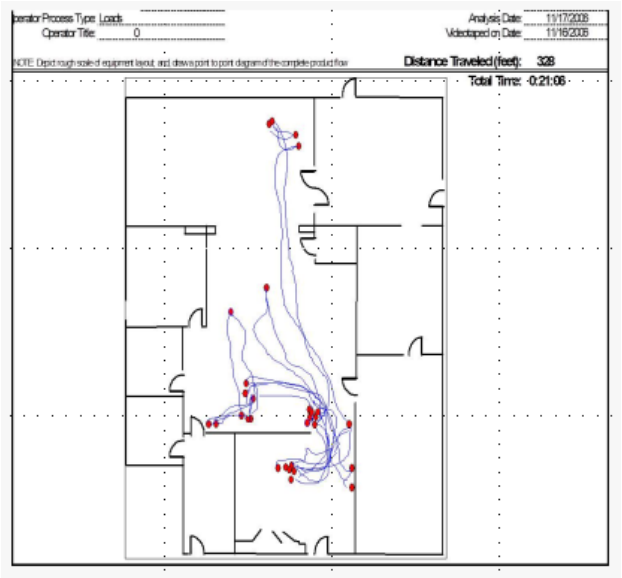
4. Map the flow of work. It may be helpful to number the order of process steps. Connect the stops along the flow with a continuous line that follows the actual walk path.

5. Take measurements. Measure the distance in steps or with a measuring wheel. You may want to break down individual segments by feet and seconds.

6. Repeat. Take multiple readings to create a valid average. Use multiple colors for clarity.

Spaghetti Diagram Examples

Pre Lean Implementation



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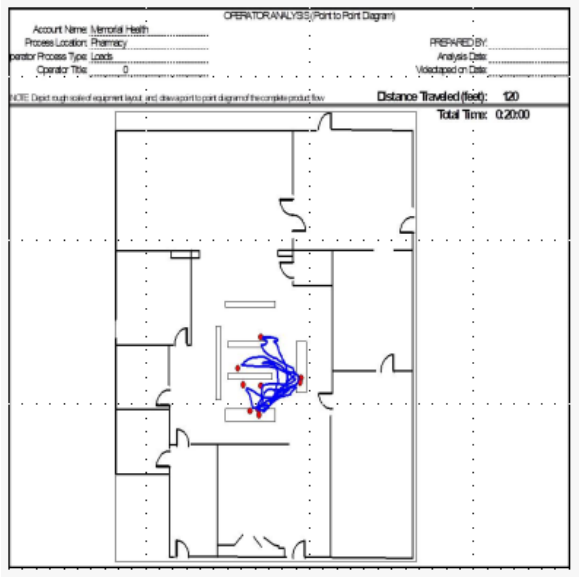
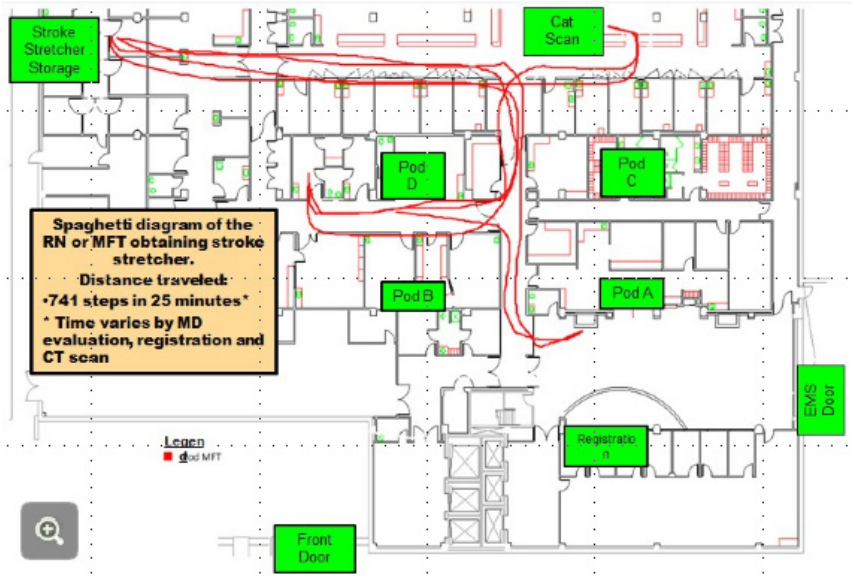
Post Lean Implementation



Emergency Room Spaghetti Diagram: Current State



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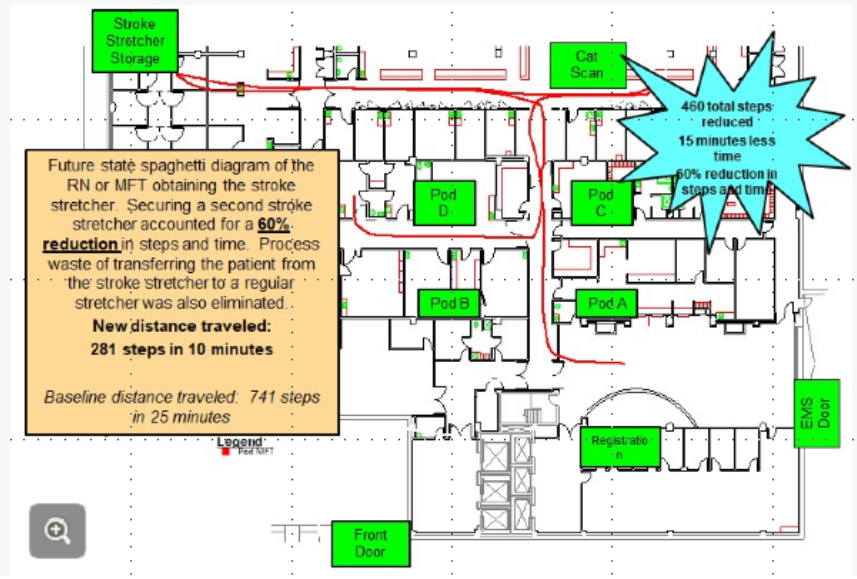
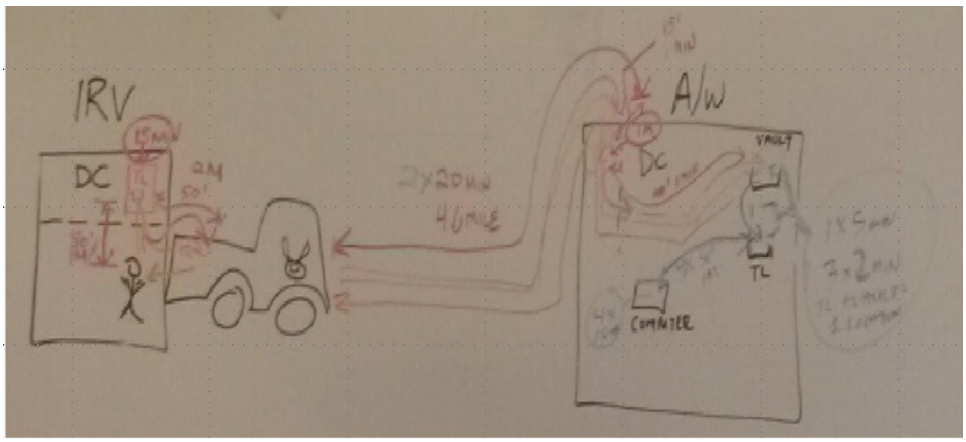
Emergency Room Spaghetti Diagram: Future State



Server Backup Spaghetti Diagram: Current State



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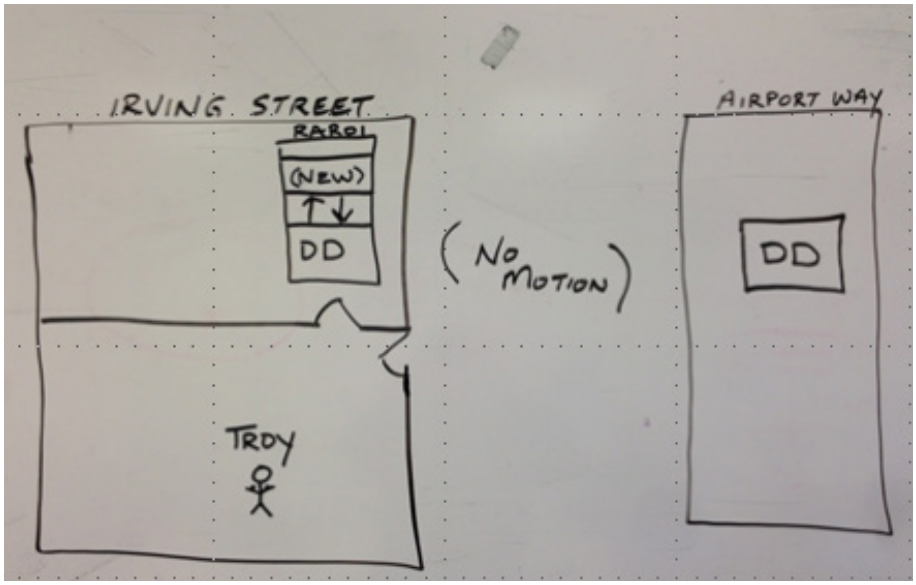
Server Backup Spaghetti Diagram: Future State



Analyzing Spaghetti Diagrams

1. First, notice how "busy" the image looks now that you have followed and traced the steps of the process (the steps of an employee). Does it look like a lot or a little distance has been covered in the given time frame? How many stops were made? Is the amount of distance that was covered necessary?

2. Identify areas that can be either cut out of the process or moved? Does the supply closet or shelf need to be where it is? Can it be moved closer to where the supplies are used? Identify ways of decreasing the amount of distance traveled on a daily basis.

3. After making changes throughout the process, create a future state spaghetti diagram by following the same employee (if possible) through the new environment. Has the distance decreased? Does the diagram look less cluttered and "busy"?

When Should A Spaghetti Diagram Be Used?

Spaghetti diagrams are usually completed before current state value stream maps. By completing a spaghetti diagram, a project team will be able to identify all travel times and distances. These are a critical part of the data needed to fully understand waste in the current state value stream.

Pitfalls to Avoid

- Each spaghetti diagram is a unique and specific event. Some diagrams may inadvertently record a "non-typical or non-normal" process/event which could over or under dramatize the average process. Be sure to use multiple samples to avoid false conclusions.

- When trying to calculate distance traveled, a diagram can become overly

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cluttered and challenging to isolate the number of passes through an area. If the team is using the diagram to simply visualize the complexity of the process without analysis of the distance, then a "busy" image is ok. For more detail, use a side spreadsheet of distances and times per work segment.

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