

# Improving Factory Logistics with Water Striders & ERP

**OWNER:**

Chris Keating

**PROJECT LEADER:**

Brian Brumley

Kim Coxon

**TEAM MEMBERS:**

Dr. Shahrukh Irani

Sachin Varkey

Vasudev Nalapat

Ramkumar Harikrishnakumar

# Project OGSM

## Objective

Improve flow and shop floor control by leveraging Lean logistics, train motivated employees to work as Water Striders, ERP-enabled job tracking and finite capacity-based release of jobs to the shop floor

## Goals

Improve shop floor data collection and real-time job tracking capabilities

Reduce Lead Times for New /Rebuild by at least 2 weeks

Have complete location awareness on each and every active job in the shop

Reduce the time that all machine operators waste being material handlers

## Strategies

Implement cells to facilitate inter-machine communications between employees

Give Water Striders the sole authority to move any and all jobs throughout the factory

Empower the Master Scheduler to oversee the Water Striders

Implement an electronic Order Tracking Board that is maintained by the Master Scheduler and Water Striders

Train machine operators to do Continuous Improvement projects during the time when they would have been moving jobs

## Measures

Lead time reduced by  $\approx$  2 weeks

Save  $\approx$  5-8 hours of employees' time daily because they no longer have to look for carts to move jobs, load/unload screws from their machines, etc.

# What a WS will do at Wear Tech

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- Brings a job (a set of screws) on a cart to a machine, fetches a bridge crane and unloads the screws from the cart to the IN saw horse at the machine
- Takes a job (a set of screws) to its next machine as soon as it is complete and loaded on the OUT saw horse at any machine
- Makes sure that no carts lie around the shop, *neither empty nor loaded with screws*
- Delivers tools to employees in any work centers
- Brings Job Traveler Packages from the office to the floor
- Ensures that the set of prints (LHL/RHL) for a set of screws is always on the cart carrying the screws

# Dispose Empty or Loaded Carts



The Water Strider makes sure that no carts, regardless of whether they are empty or loaded with screws, “lie around” the shop floor (as shown above)

# Prevent “Orphaning” of a Set of Screws



Every set of screws now moves as a pair when taken from any work center

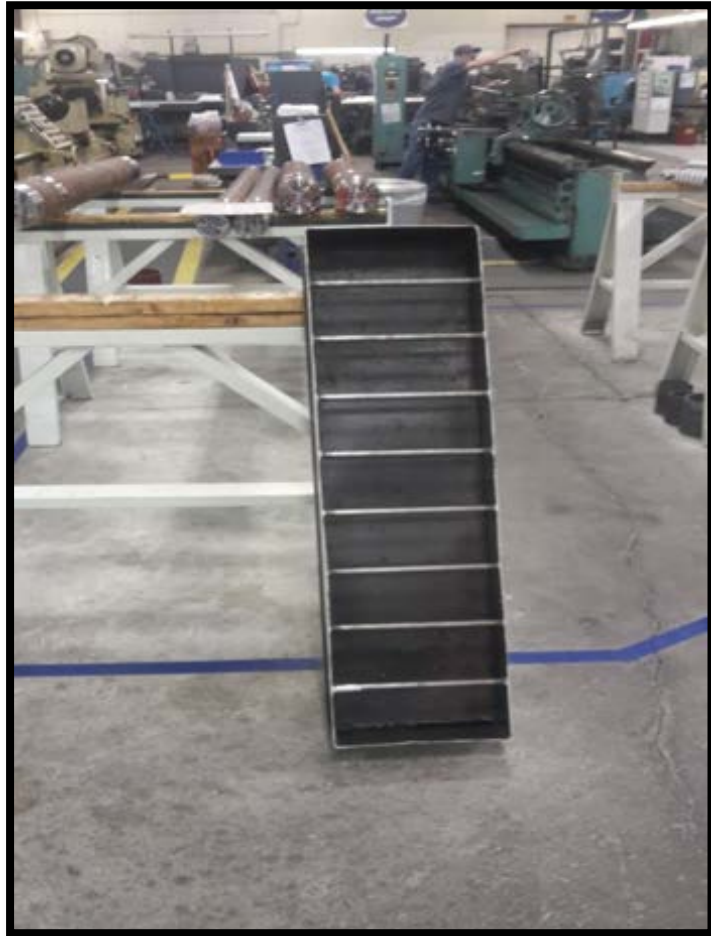
# What a WS will Not Do at Wear Tech

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- **Does not** unload a set of screws off any machine and place them on the OUT saw horse at that machine
  - **This is the Machine Operator's responsibility to get a bridge crane and perform this task**
- **Does not** operate any machine or perform other value-added work at any work center (unless cross-trained and certified)
  - **This is the Team Leader's responsibility**
- **Does not** do maintenance work on any machine
  - **This is the Team Leader's responsibility to arrange with Maintenance**



## What a WS will Not Do at Wear Tech (contd.)



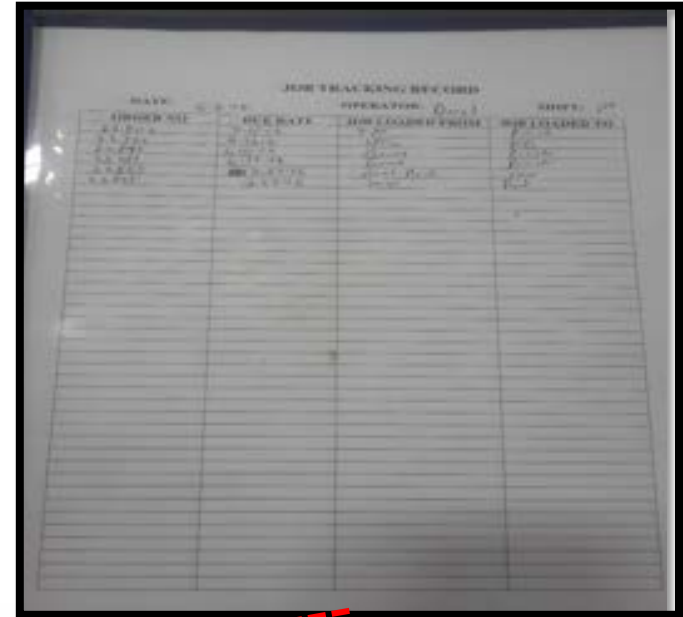
WS will not remove items such as these found near the TOS Lathes. It is the responsibility of the Team Leader of the Machine Shop to return them to their “home locations”.

# Completed Activities for Water Striders



# Maintaining a Log Sheet of all Job Movements

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The water striders are given a sheet which has job #, due date of job, pick-up and drop-off location of the job, etc. Jobs that are near to their due dates can be easily tracked on the shop floor.

# Returning Empty Carts to Parking Lots

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**Separate parking lots have been created to which the Water Striders return empty carts**

# Floor Markings for IN and OUT Saw Horses

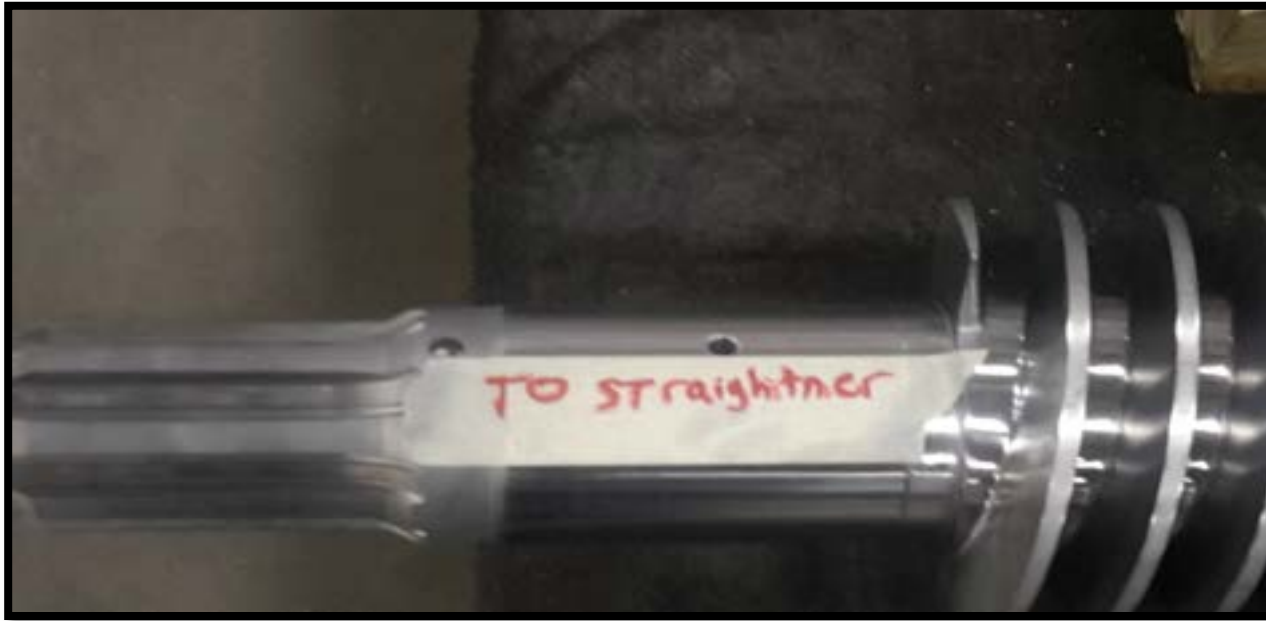
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**The locations of the INbound and OUTbound saw horses are marked in every work center. Water Striders know where to pick-up or drop-off a cart at any work center.**

# Visual Guidance for Moving a Job to the Next WC

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**On every screw the succeeding work center is marked. This makes the job of the Water Strider easier and prevents carts being taken to wrong work centers.**

# Customized Material Handling Carts

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These are the two designs of a customized material handling cart. Each cart will carry only one set of screws. They were tested by the water striders and the cart on the right has been selected.



# Customized Material Handling Carts (contd.)



**Small Screws**



**Medium Screws**





# Water Striders' Issues Board

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## WATER STRIDER ISSUES

(7.14.16)

1. Do Not take carts from other areas out going Area  
(we try to keep a empty cart in every area)
2. 2<sup>nd</sup> and 3<sup>rd</sup> shift need to empty carts if they move them.
3. ~~to~~ When we bring carts to incoming try to empty in timely Manner

# **Future Activities for Water Striders**

# Future Activities

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- The Water Striders need to be continuously coached and mentored to ensure that they fully understand their job responsibilities
- Implement a flagging system that machine operators will use to communicate with the Water Striders if neither of them is in the immediate vicinity to pick up completed jobs
- The Water Striders must be trained (and authorized) to update ***daily*** the locations of jobs (with dates when they were delivered to those locations on the Order Tracking Board
- Machine operators have to utilize their freed-up time to execute Continuous Improvement projects
  - **Any employee seen walking around the factory away from their machine or work station must have a legitimate reason to be doing so!**
  - **Every Team Leader must show clear evidence of active CI projects that his team is working on**

# Tuggers to Improve Work Efficiency and Safety

Type of Screw	Weight of Screw
Small	100 lbs
Medium	360 lbs
Large	1600 lbs



SKU .NO	Capacity	Price
MT-5000-3012	5000 lbs	\$4829.00

# Improve Utilization of the Water Striders

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We will continue the Time Studies and Work Sampling to collect data that helped to assess the current workload of the two

- **The goal is to not overload them (especially given the strenuous work they do) beyond an 80% Efficiency Factor**

Some of the additional value-added activities that the WS could be asked to do are:

- Driving jobs to/from Chrome Plate
- Performing Saw operation for jobs
- Removing discarded/scrapped screws from the warehouse
- Stacking incoming bar stock on the external steel racks when the delivery trucks arrive
- Finding parts that have to be included with any set of screws that are being shipped
- Boxing screws for shipment

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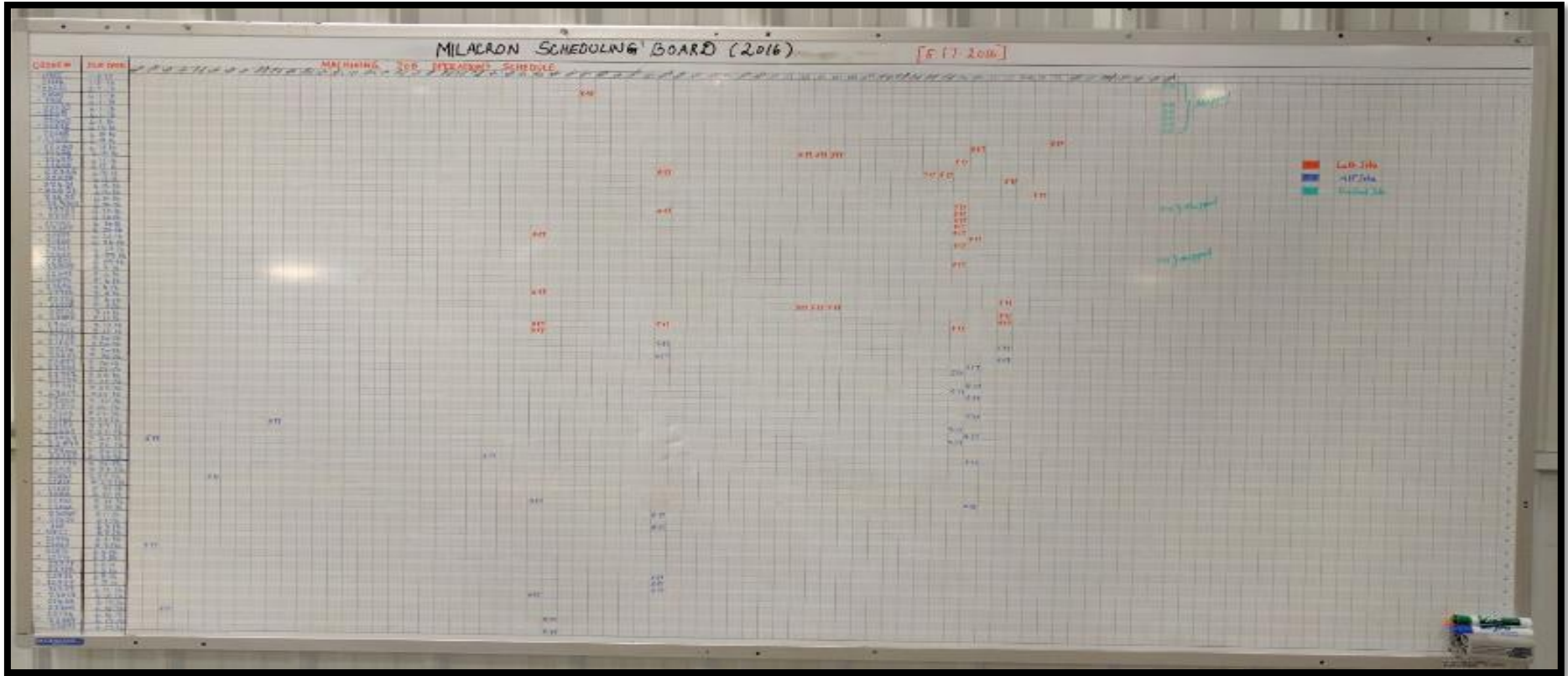
# Completed Activities for Order Tracking Board

# What an Order Tracking Board Will Do at Wear Tech

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- This board will consolidate into ONE board the order status information that is currently maintained on all the different gemba boards in various departments.
- This board will separate scheduling and order progressing information from other performance information (SQDIC) on the current gemba board of each department.
- This board will coordinate the efforts of all Team Leaders because they will work on a single priority dispatch list of orders.
- **This board will be maintained by the Water Striders and Master Scheduler who will update the status of different orders that are moved in every shift.**

# Older (Manual) Version of Order Tracking Board



The Water Strider will update the Order Tracking Board daily

# Current (Electronic) Version of Order Tracking Board

ORDER #	ORDER DATE	CUSTOMER NAME	CUSTOMER	MACHINE TYPE	MACHINE	RELEASED	START ON TIME	END ON TIME	STOP	JOB	JOB #	JOB DATE	JOB TIME	JOB DATE	JOB TIME	JOB DATE	JOB TIME	JOB DATE	JOB TIME
1000000001	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000002	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000003	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000004	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000005	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000006	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000007	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000008	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000009	2010-01-01	ABC COMPANY	ABC	1000	1000														
1000000010	2010-01-01	ABC COMPANY	ABC	1000	1000														

The manual board was replaced by an electronic board. This saves a lot of time and helps to track down the jobs more easily.

# **Future Activities for Order Tracking Board**

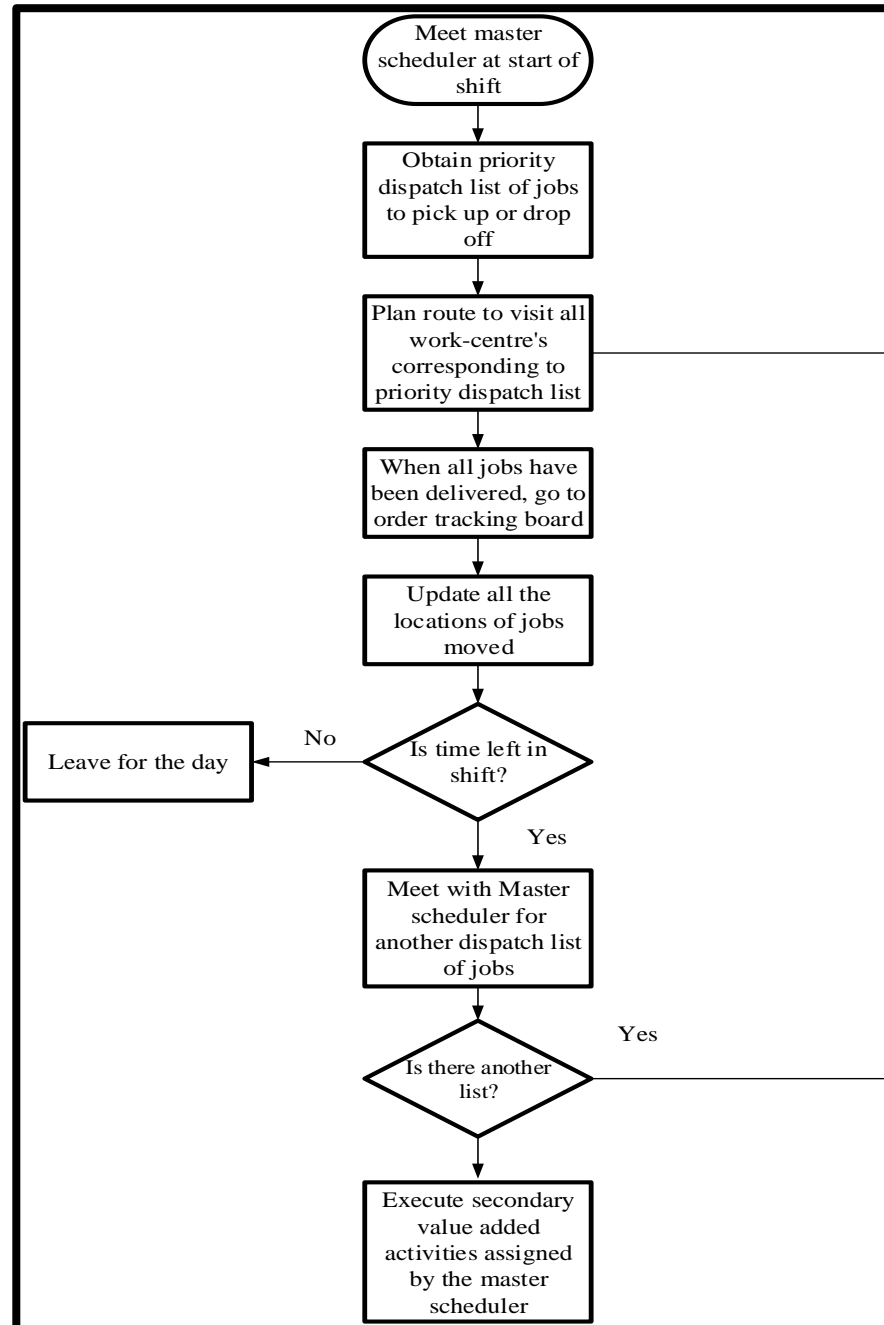
# Develop Daily Routes that the WS will Follow

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- **Wear Tech is a job shop where the schedule is subject to change almost daily! Still, without a daily schedule being available, how will the Water Striders know where to pick up (or drop off) jobs in any shift?**
- The WS will receive their daily priority dispatch list from the Master Scheduler.
- We are in the process of developing a systematic schedule for a Water strider to execute a priority dispatch list of pick up or drop off of jobs, This sequence will minimize
  - (1) Total distance that the water strider has to push loaded carts and
  - (2) Total distance that the water strider walks empty handed between any two consecutive delivery locations



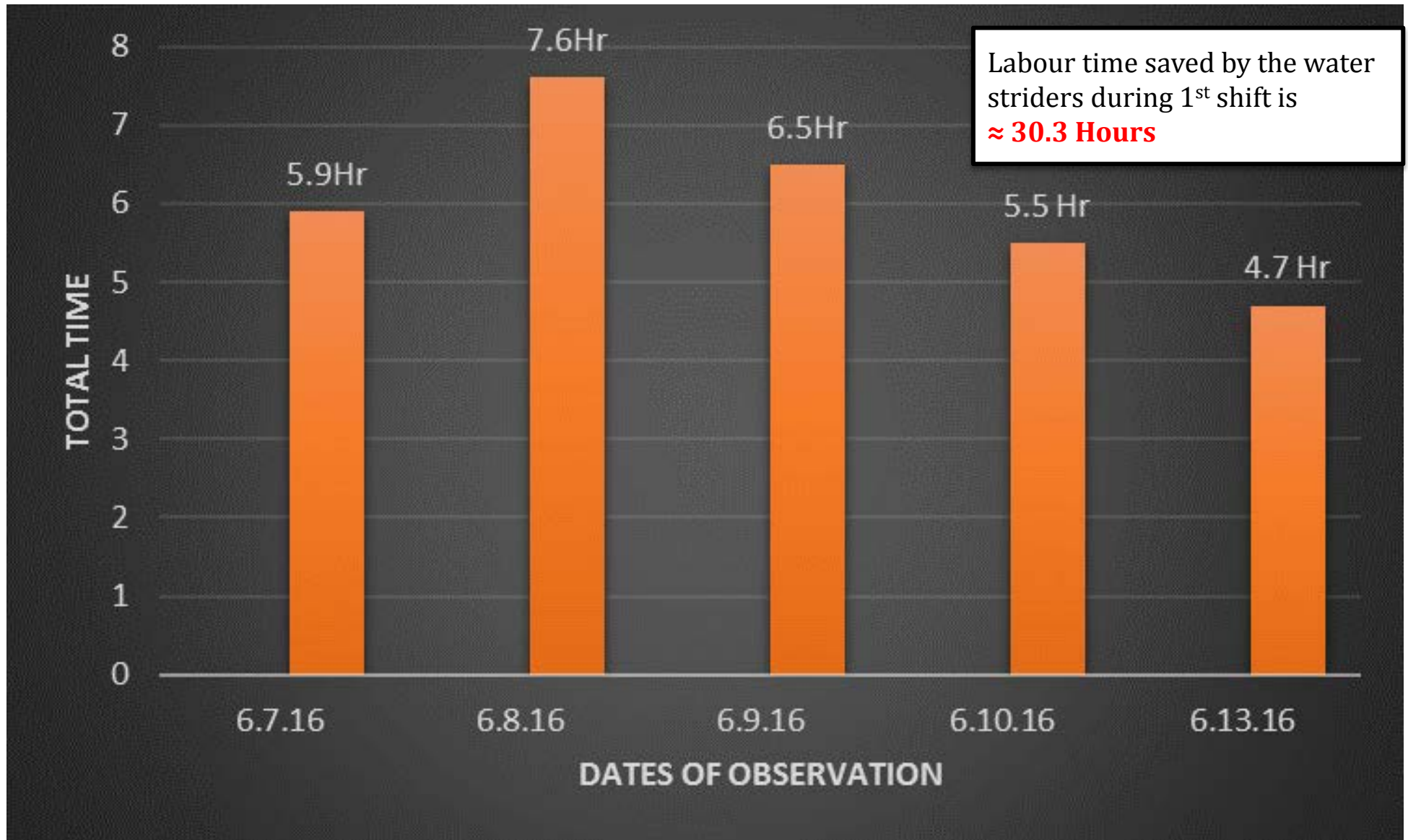
# Develop Flowchart for Daily Routine of WS



Note: Breaks, especially rest periods, are taken appropriately throughout the shift

# Cost-Benefit Analysis

# Employees' Time Saved by the WS



## Employees' Time Saved by the WS (contd.)

<b>DATE</b>	<b>TIME SPENT ON MOVING JOBS</b>	<b>TIME SPENT ON OTHER ACTIVITIES</b>	<b>TOTAL TIME SPENT BY WS</b>	<b>LABOR \$ SAVED FOR 1<sup>st</sup> SHIFT</b>
6/7/16	1.9 Hr	4.0 Hr	5.9 Hr	\$631.46
6/8/16	2.2 Hr	5.4 Hr	7.6 Hr	\$832.63
6/9/16	2.5 Hr	4.0 Hr	6.5 Hr	\$703.88
6/10/16	2.1 Hr	3.4 Hr	5.5 Hr	\$593.20
6/13/16	1.9 Hr	2.9 Hr	4.8 Hr	\$510.47
<b>Total employee time and cost saved per 1<sup>st</sup> shift</b>			<b>30.3 Hrs</b>	<b>\$ 3272</b>

# Annualized Labor \$ Saved by the WS



# Summary of Project

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**Total time- cost savings of the water strider project**

<b>Time period</b>	<b>Labour time saved (Hours)</b>	<b>Labour cost saved (\$)</b>
<b>WEEK</b>	<b>30.3 Hrs</b>	<b>\$ 3272</b>
<b>MONTH</b>	<b>≈120 Hrs</b>	<b>\$ 12,840</b>
<b>YEAR</b>	<b>≈1440 Hrs</b>	<b>\$ 154,080</b>