Productivity Improvement Forum 2018

Productivity Practices Working Group: Best Practices Sharing from the Industry Members

Presented by:

Mr Hoo Chek

(Productivity Practices WG Member)

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SCIC SINGAPORE CHEMICAL INDUSTRY COUNCIL

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Contents

1. Introduction to the Working Group

Objective

- Develop list of productivity good practices in identified areas which requires minimum resource investment to implement.

Members

- Plant owners: ExxonMobil, Mitsui Phenols, Shell, SRC
- Contractors: Mun Siong, PEC, Rotary, Sankyu
- ASPRI

Approach

- Members to share current practices vs benchmark
  - Understand/challenge existing constraints of implementation (both owner and contractor)
- Rank the practices; **prioritize 1 or max 2 practices** for each area
- Implementation is voluntary.

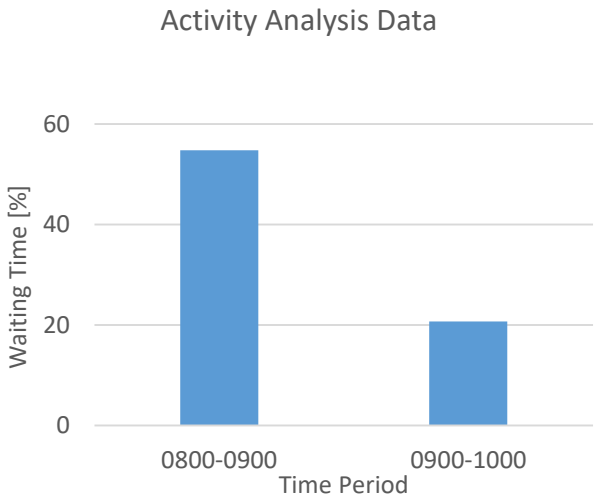
Focus Area

- Permitting, minimize break hours impact, reduce travelling time

2. Practice 1: Permitting

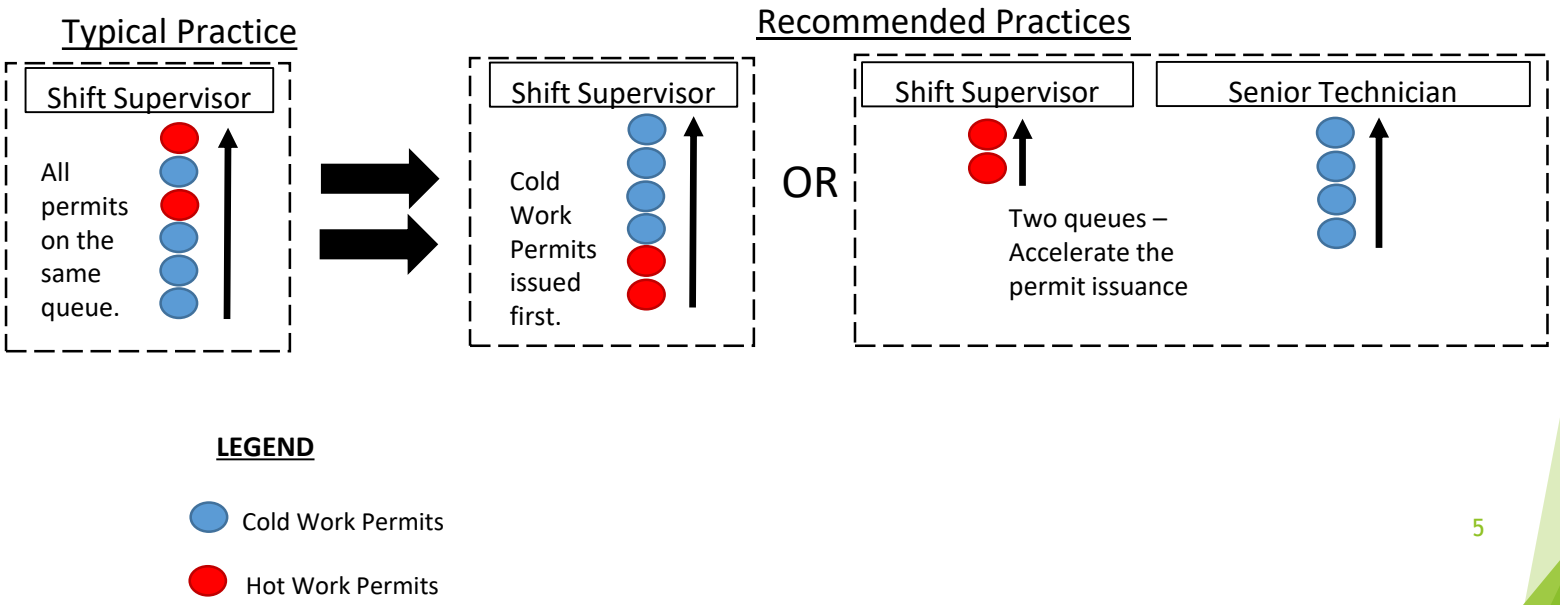
- ***Opportunity***
  - Significant waiting time for Work Permits issuance (0800-0900)

- ***Permit Survey***
  - Most plant owners with only one designated permit issuer per shift
  - Hot Work/Cold Work permits on the same queue, long waiting time.
  - Some plant owners with following good practices:
    - Structure in place to prioritize approving of non-critical cold work permit
    - Senior process technicians trained and qualified to approve permits



2. Practice 1: Permitting

- ***Recommended Practices***
  - Issuance of Cold Work Permit first before Hot Work Permits.
    - Cold work permits comprise bulk of permits, majority of workforce
  - Qualify Senior Technicians to issue Non-Critical Cold Work Permits.
    - More than one permit issuer will shorten waiting time



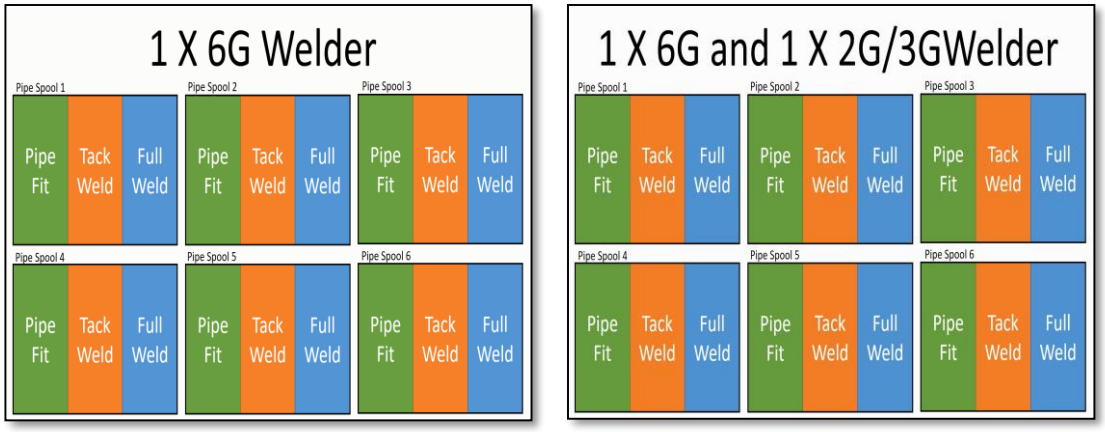
3. Practice 2: Tack Welding

- ***Opportunity***
  - 6G welding qualification a perceived requirement for tack welding during pipe fitting preparation work for the full weld
  - Higher demand for 6G qualified welders in projects and turnaround
    - Significant waiting time spent by 6G welders during pipe fitting preparation work.
    - 6G welding resource not fully optimized.
- ***Pipefitting & Welding Survey***
  - No requirement from ASME B31.3 on 6G welding qualification for tack welds.
  - Current Practice:
    - Plant Owners: 6G qualified welders for tack and full welding, conservative QC approach.
    - Contractors: Welders qualified for 6G; Most pipefitters can be qualified 2G/3G welders via multi-skilling.

3. Practice 2: Tack Welding

- ***Recommended Practices***
  - During TA/Projects which has significant volume of welding work:
    - 2G/3G welders to perform fit-up & tack weld, 6G welders to complete the weld
    - Robust QC overseeing

Current: 6G welder wait for pipe fit up completion to tack weld (~35% of his time), before the full weld



Comparison between current practice and proposed practice

Propose: Piper fitter complete Tack weld during fit-up, 6G welder fully utilised on completing the full weld

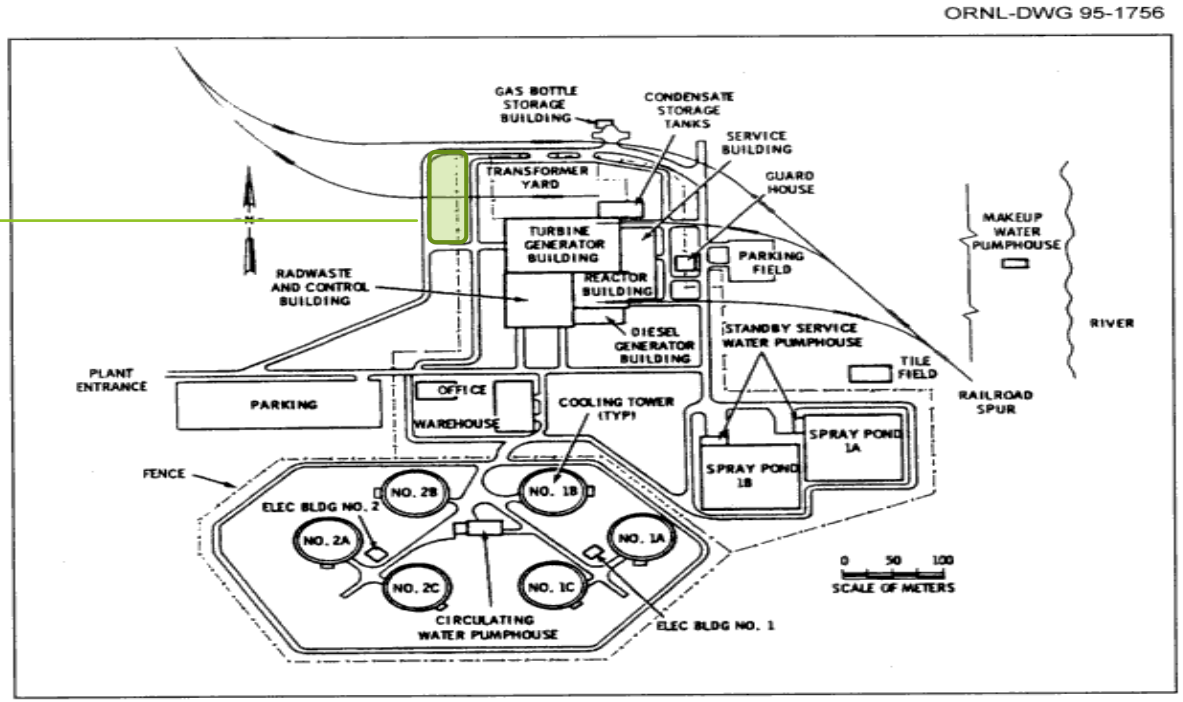
4. Practice 3: Equipment Mobilization

- ***Opportunity***
  - Waiting time significant from 0800 to 1000 hrs
  - Opportunity identified: “Worker waiting for equipment”
  - Common equipment such as generator set, air compressor, welding machine a distance from job site
- ***Mobilization Survey***
  - 6 plant owners and 4 contractors, 9 responded
  - Allocation of laydown areas near process unit varies:
    - Plant layout and emergency response requirements
    - Adhoc requests led to inconsistent evaluation
    - Poor housekeeping impact allocation
    - Scaffold material laydown area common
  - Mobilisation time savings with laydown area near process unit

4. Practice 3: Equipment Mobilization

- ***Recommended Practices***
  - Plant owner: One time evaluation and allocation of designated equipment laydown areas near process unit
  - Contractor: To implement robust and sustainable housekeeping program for laydown areas

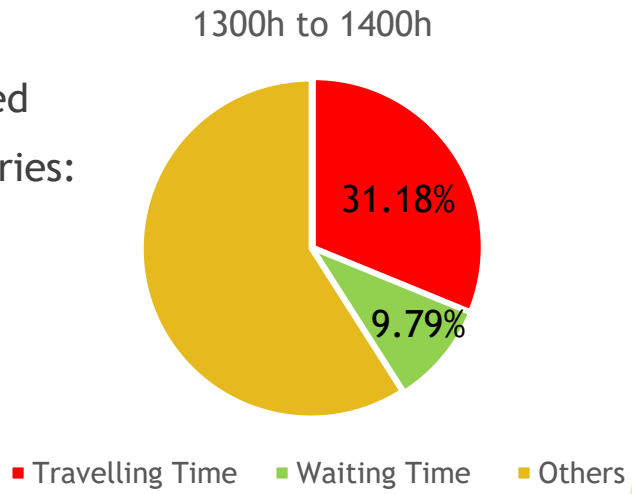
Designated Laydown Area



Example of Site Layout, with a designated laydown area

5. Practice 4: Lunch Hours

- ***Opportunity***
  - Significant waiting and travelling time to job site after lunch (1300 to 1400): 41 %
  - Opportunities identified: Discipline lunch schedule and efficient mobilisation of workers back to job site.
- ***Lunch Hours Survey***
  - 6 plant owners and 4 contractors, 10 responded
  - Timely mobilisation of workers back to site varies:
    - Contractor supervisor Oversight
    - Availability of Transportation
  - 1 Plant Owner uses PA system:
    - Announce end of lunch time (1245)
    - Reminder to leave jobsite (1255)
  - 4 plant owners receptive to using existing PA system
  - Multiple trips to mobilise workers at larger sites



5. Practice 4: Lunch Hours

- ***Recommended Practices***
  - Using Public Address(PA) system to trigger worker movement after lunch
  - Explore transportation options to achieve single trip

6. Success Story Sharing