Standardizing Best Practices For Tugboat Dispatching

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Introduction and Background

- Crowley Maritime is a **marine solutions, energy, and logistics service company**.
- Dispatch office **monitors and allocates tugboats** to both **assist and escort** ships as they come into the harbour in the
  - **PNW**: Pacific Northwest
  - **LA/LB**: Los Angeles/Long Beach, and San Diego areas.

	Plan Ahead	Longest Distance	Fleet Size	# Jobs per Day	Avg Job Time
PNW	24 hr	12 hr	6	10	1 hr 37 m
LA/LB	2 hr	2.5 hr	4	9	1 hr 27 m

The dispatchers consider **numerous factors** to **optimize** the **allocation of tugs** and minimize the overall cost for Crowley Maritime

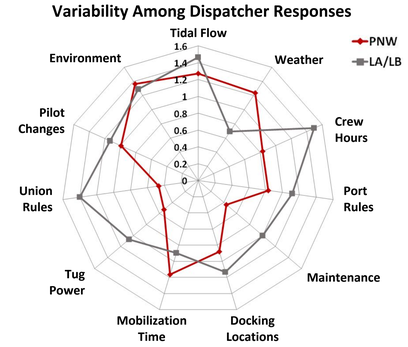
- Including: current schedule, geography, tide, job requirements, port regulations, weather, tugboat capacities, and much more.

Current State

Scheduling jobs is based on **experience** and **intuition,** resulting in vastly different solutions from one dispatcher to the next.

There is **little documentation** on how to make dispatching decisions, and a lack of performance metrics to evaluate the success of a dispatcher.

Variability Among Dispatcher Responses



Dispatcher Survey Responses
Standard deviations from a dispatcher survey were plotted to highlight the variability in what dispatchers deem most important when scheduling jobs.

Project Goal Statement

Define a **standard set of rules** for dispatchers to follow in all scheduling scenarios based off of their **current best practices.**

Use this to create a **foundation for a scheduling tool** that can be used in the future to minimize scheduling conflicts, maximize profits for Crowley, and keep Crowley's customers happy.

Scope

Crowley's Seattle Dispatch team

- Both day shift and night shift
- PNW and LA/LB

Objectives

Document	Analyze	Determine	Develop	Train
Document current dispatcher behavior	Perform **data analysis** and incorporate data into decision making	**Determine** and **rank** importance of all job scheduling factors and decisions	**Develop** a comprehensive and detailed description of desired dispatch behavior	Create a **training** package for new dispatchers

Methodology

1 Form Plan

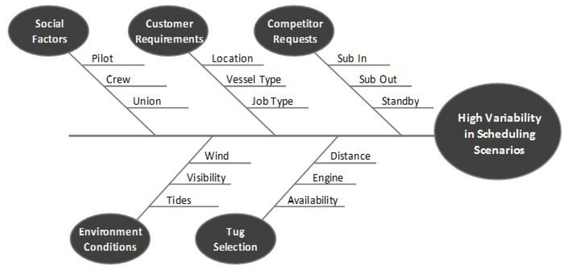
In order to create the foundation for a scheduling tool for Crowley, we had to learn how to dispatch, and understand all factors that go into scheduling a job. Accomplished by:

Collecting Initial Information
- On site observations
- Q&A sessions
- Dispatch survey

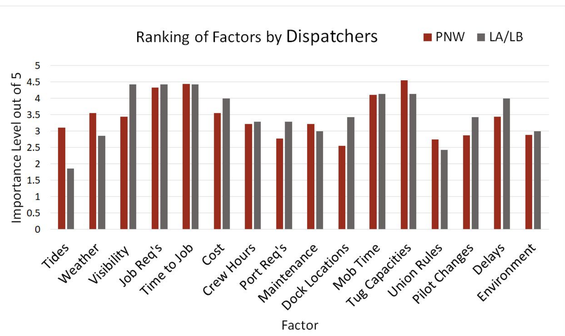
Analyzing the Results
- Ishikawa diagram
- Communication diagram
- Job data analysis
- Quantifying survey responses

This uncovered 3 requirements essential to the success of a scheduling tool, defining what our deliverables needed to be:

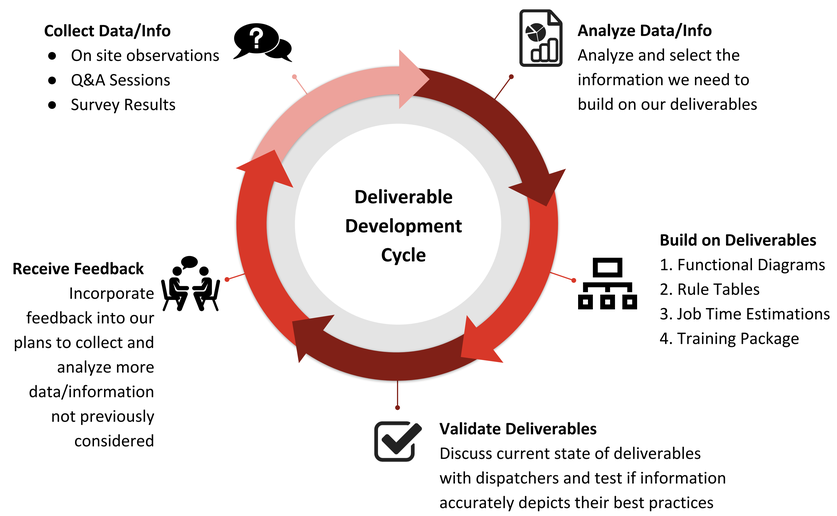
1. A **documented process** to indicate when decisions must be made
2. A standard set of **best decisions,** and their exceptions for every scheduling scenario
3. **Historical data** to back up decisions and reduce variability in dispatcher's judgement



Ishikawa Diagram
A diagram of major factors affecting Crowley dispatcher decisions.



2 Execute Plan



Collect Data/Info
- On site observations
- Q&A Sessions
- Survey Results

Analyze Data/Info
Analyze and select the information we need to build on our deliverables

Build on Deliverables
1. Functional Diagrams
2. Rule Tables
3. Job Time Estimations
4. Training Package

Validate Deliverables
Discuss current state of deliverables with dispatchers and test if information accurately depicts their best practices

Receive Feedback
Incorporate feedback into our plans to collect and analyze more data/information not previously considered

3 Close Out Project

- Hand Off Deliverables
- New Dispatcher Training Package
- Dispatcher Feedback Survey
- Provide Future Recommendations

Results

1 Functional Diagrams	2 Rules Table	3 Job Time Estimations	4 Training Package
• Provides overview of all aspects of dispatch job • Clearly outlines all steps of the job scheduling process	• A detailed compilation of best practices when dispatching • Provides order to what is most important when scheduling, executing, and strategizing jobs	• References to historical information offering data driven solutions • Provides easy way to identify travel time for all jobs, taking multiple factors into consideration	• Provides all tools (Deliverables 1-3) along with detailed documentation • Enables proficiency in best dispatching practices at Crowley

Immediate Benefits:

Reduced Dispatch Learning Curve ⇩

Creates Basis for Performance ✓

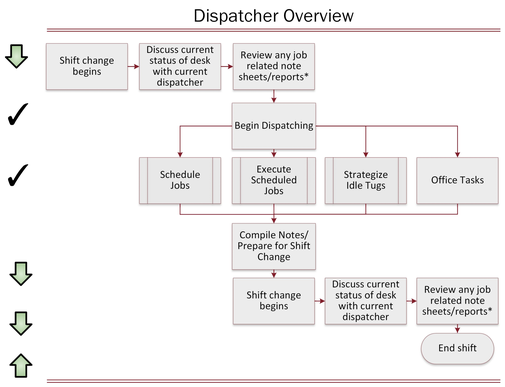
Enables Continuous Improvement ✓

Long Term Benefits:

Job Delays Down ⇩

Sub Outs Down ⇩

Tug Utilization Up ⇧



Conclusion

Recommendations to Crowley:
- Add new rules to the rules table as novel scenarios arise
- Update the functional diagrams as Crowley's dispatching process changes.
- Train new hires using the rules tables and functional diagrams
- Develop a software tool to assist the dispatch team using our deliverables and data

Potential Software Products:

1 Travel Time Calculator	• Generates Tug travel time considering: ○ Speed, Weather, Tide Direction, Traffic, Tug Type
2 Job Time Estimator	• Generates job time based on: ○ Job Type, Harbor or Berth, Ship, Tug Type
3 Scenario Suggestions	• Offer several suggestions for tug allocation • Ranks suggestions
4 Potential Job Finder	• Analysis of competitors tugs positions and future commitments • Alert when a Sub-In is possible

Acknowledgements

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