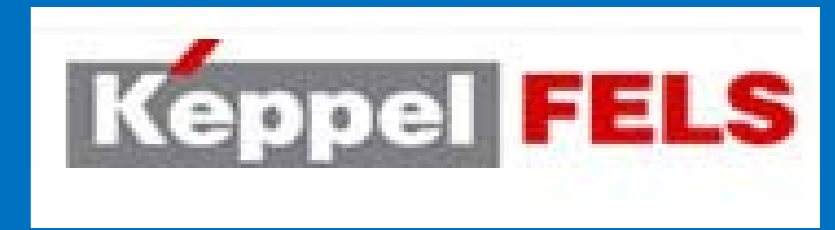


Optimization of blasting hall utilization and manpower (continuation from the previous project)

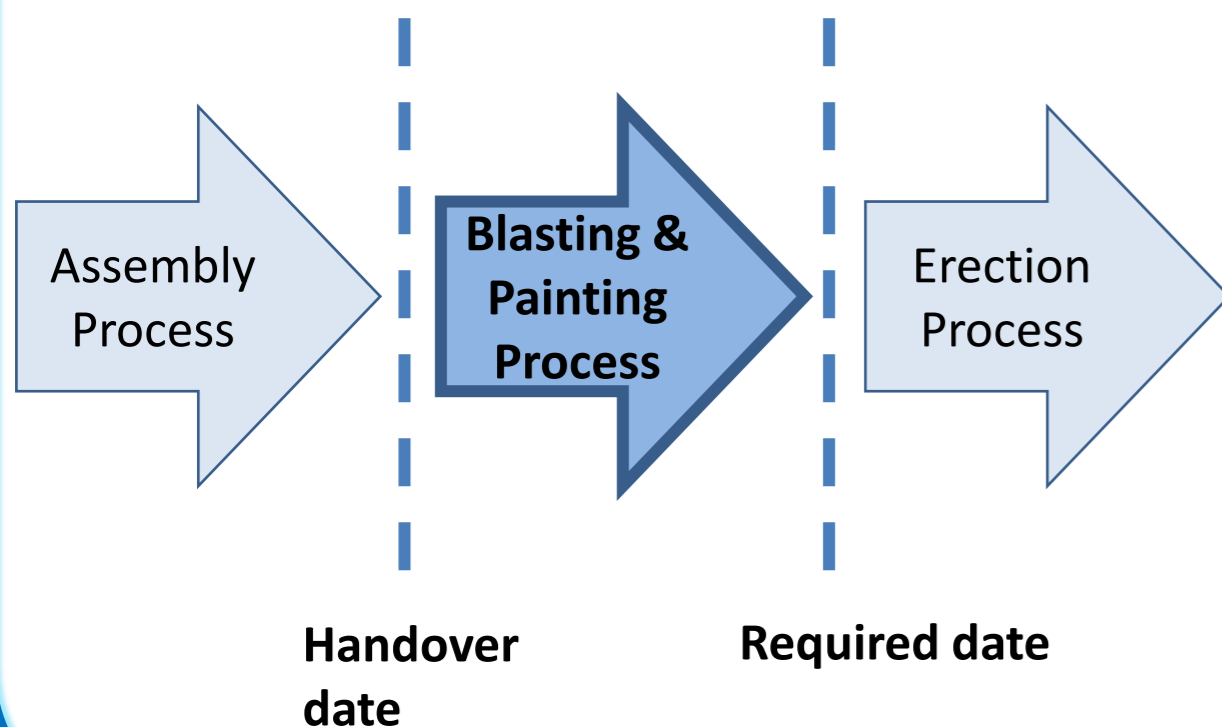


Team: Chew Zhi Hui Alicia, Chong You Zhen, Wei QianQian, Yu Yue
 Supervising Professors: Prof. Chia Eng Seng Aaron, Prof. Rashmi Jain
 Industry Supervisor: Mr. Andy Ng, Mr. Daryl Lim, Mr. Selvam Utterapathy



Phase I: Problem & Objective

Scope



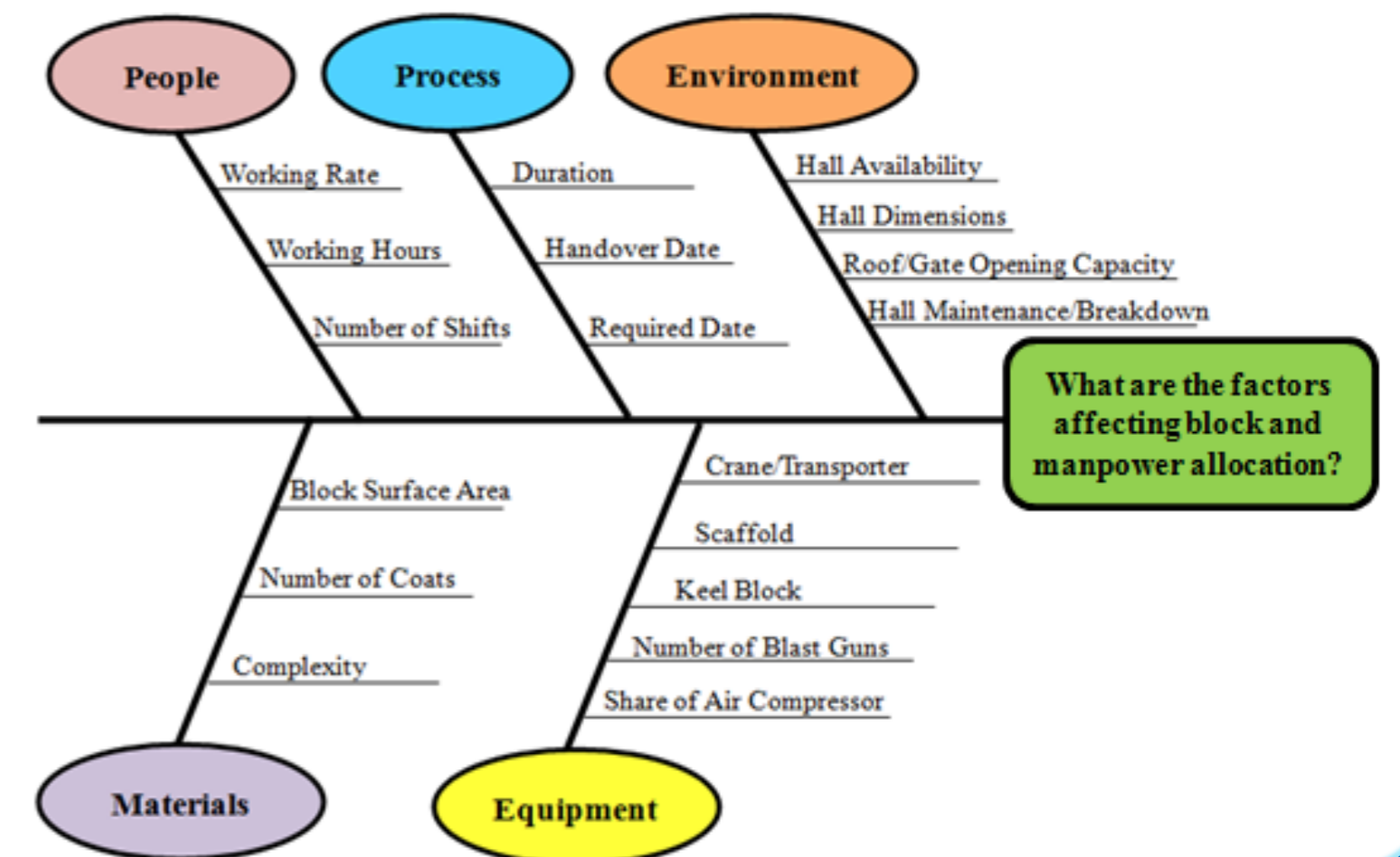
Problem

- Manual planning process is tedious
- Lack of visibility of work progress against manpower allocation

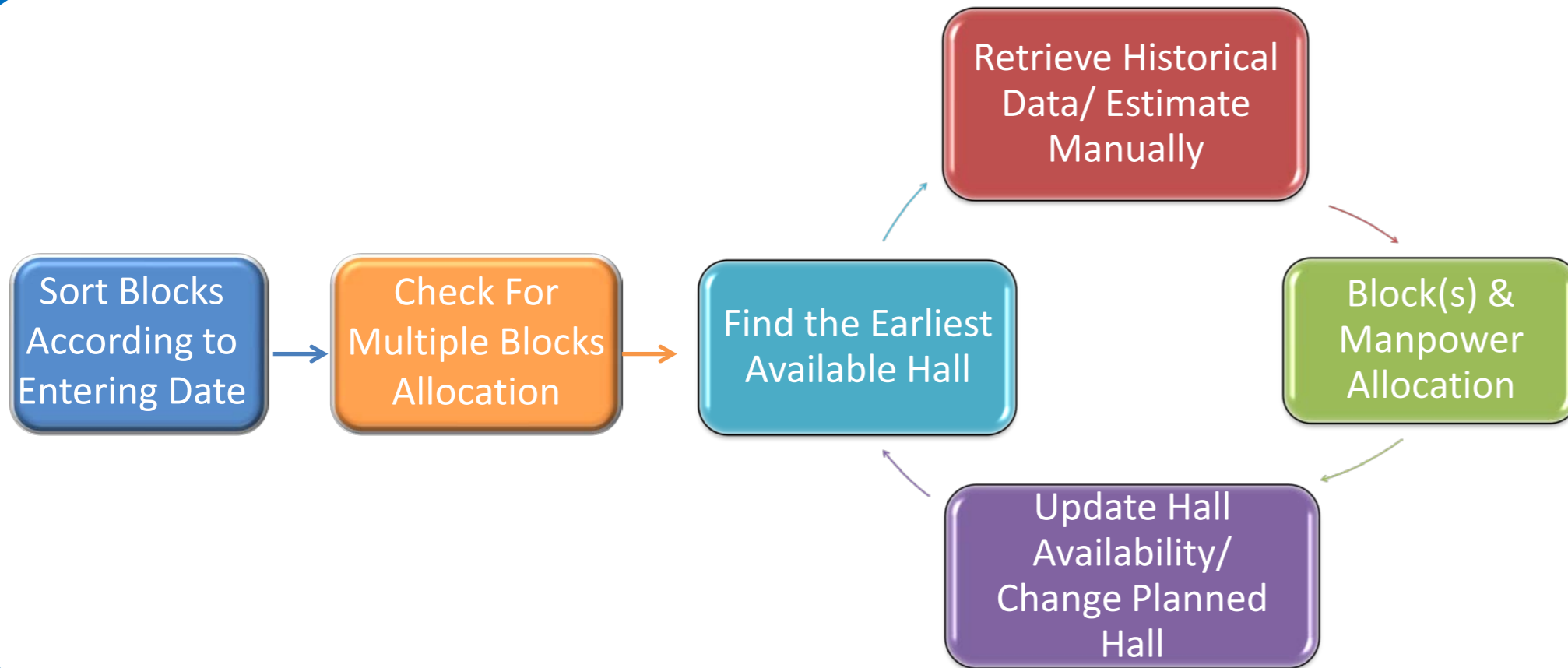
Objectives

- 1) Handle multiple blocks allocation
- 2) Incorporate manpower allocation
- 3) Improve the user-friendliness of existing operation platform
- 4) Improve visibility of job productivity for work-in-progress / completed blocks

Problem Analysis



Phase II: Methodology



Heuristic Approach

- ✓ Experience-based technique
- ✓ Feasible solution obtained in minimal time
- ✓ Consistency in data recording
- ✓ Re-plan based on daily updates

Operation Platform

- Excel Visual Basic for Applications (VBA) platform*
- ✓ User-friendly
 - ✓ Compatible with existing planning process
 - Semi-automated planning process

Phase III: Implementation

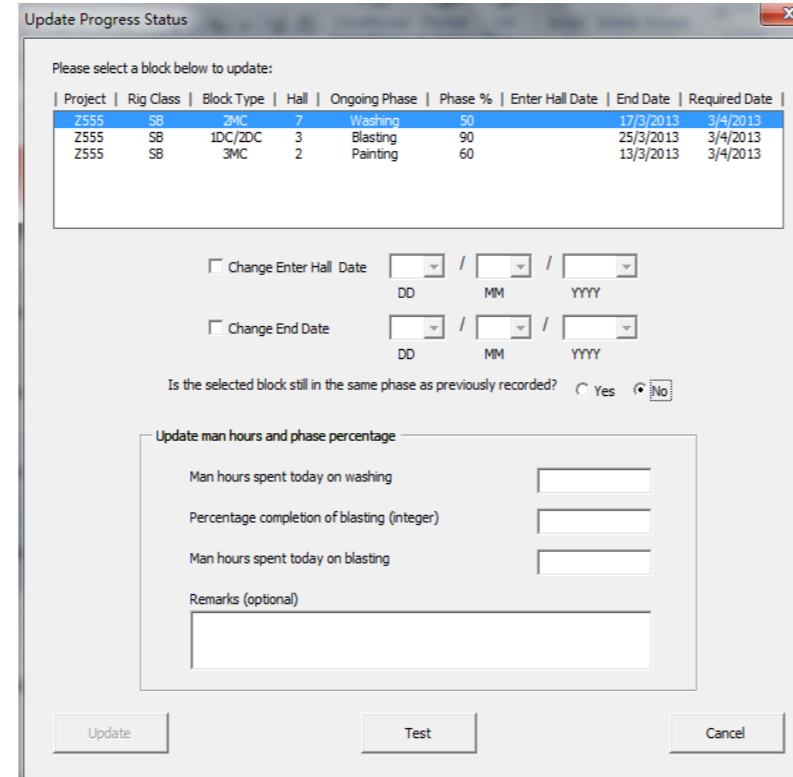
User Functions

Keppel FELS Ltd
 Block Scheduling and Workforce Planning for Blasting Halls

Click to start

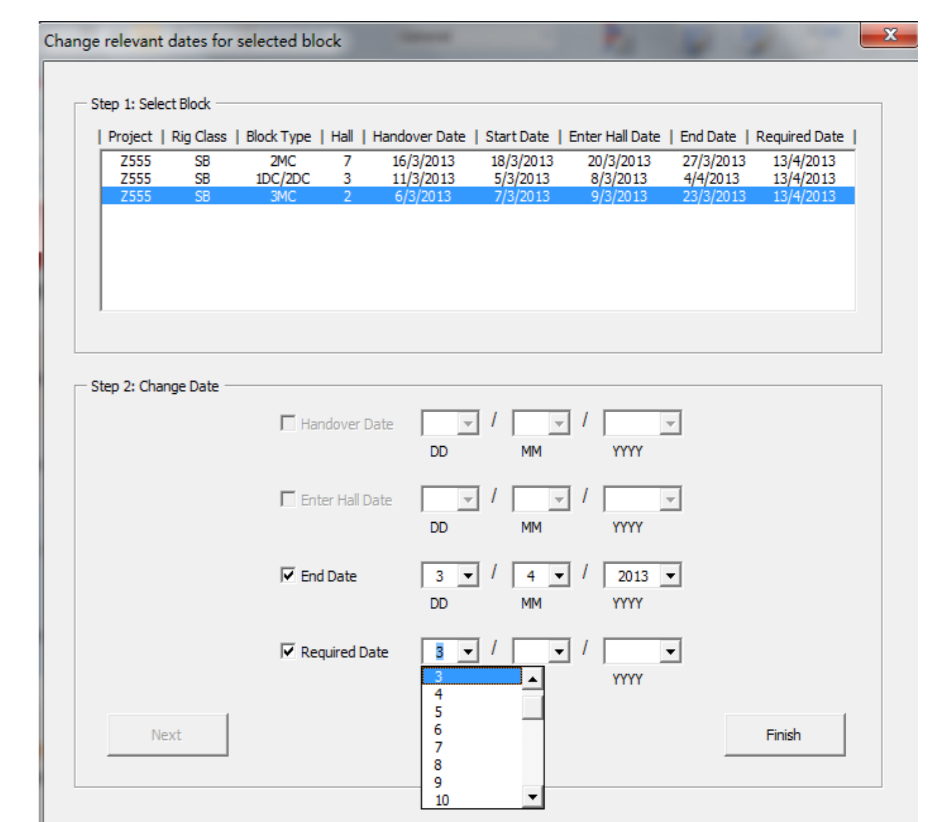
- Edit Planned Schedule**: Update project or system variables to replan schedule.
- Update Progress Status**: Perform daily update of in-progress blocks to replan schedule.
- View Planned Schedule**: View block schedule in a specified time period.
- View Reports**: Generates hall utilisation, block duration and manpower statistics.

User Interface



User-friendly Features

- ✓ Mistake-proofing features in the interface
- ✓ Short control-tips
- ✓ Help and error messages
- ✓ Subsequent controls are temporarily disabled and are enabled only after predecessor fields are entered accurately



Output Schedule and Report

As of 18/3/2013

Halls	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
Hall 1	18/3	19/3	20/3	21/3	22/3	23/3	24/3	25/3	26/3	27/3	28/3	29/3	30/3	31/3	1/4	2/4	3/4	4/4	5/4	6/4	7/4	8/4	9/4	10/4	11/4	12/4	13/4	14/4	15/4
Hall 2	2666-1DC																												
Hall 3	2555-3MC				2555-1DC/2DC												2888-1MC												
Hall 4	2555-2MC												2777-1DC																
Hall 7	365-3DC																												
Hall 8																													
Hall 9																													

Project	Rig	Block	Total Surface Area	Handover Date	Required Date	Hall	Start Date	Entering Hall Date	End Date	Projected / Actual Final KPI	Target KPI
Z866	CJ	3DC	3000.00	5/3/2013	18/3/2013	8	6/3/2013	9/3/2013	18/3/2013	1.35	1.4

	Duration				Man Hours							
	Washing	Blasting	Painting	Misc	Total with Misc	Total w/o Misc	Washing	Blasting	Painting	Misc	Total with Misc	Total w/o Misc
Planned	3	6	5	N.A	N.A	14	200	800	900	N.A	N.A	1900
Actual	3	5	5	N.A	N.A	13	200	750	850	N.A	N.A	1800

Duration Comparison

Man Hours Comparison

Hall Utilization of Year 2013

Long Term Sustainability

- ✓ All parameters can be updated
- ✓ New halls and blocks can be added

Validation

Modes of Validation	Remarks
Test Cases	Inputted specific test cases to check for the accuracy of specific outputs
What-if Analysis	Carried out what-if analysis to test the robustness of the program
Comparison with Historical Data	Inputted historical data to compare the level of consistency
Feedback from Company	Continuous communication with industry supervisors for feedback

Phase IV: Future Direction

Future Direction

- ✓ Explore other approaches to achieve an improved solution
- ✓ Address the assumptions made for further improvement
- ✓ Develop from a semi-automated to a fully automated system