



**BARRICK**

Partnering with  
Production to  
improve Loader  
efficiency



# What is Kaizen?

- The word kaizen is from the Japanese root words KAI and ZEN (改 善)

Kai = Change



Zen = For the Better

# What is a Kaizen Event?



- A Kaizen Event is a focused 3-5 day improvement workshop with specific targets and goals.



# The Team

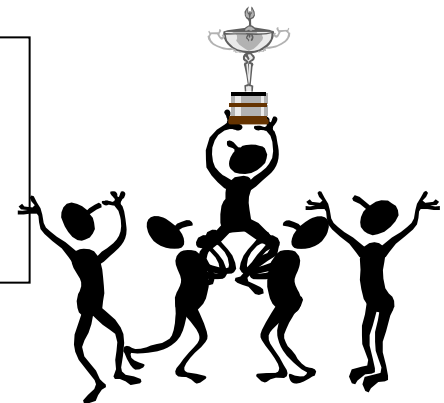


L to R (Standing)

Kent Cook, Matt Riley, Craig McCulloch, Frank Reed, Laura Moore, Ryan Kent,  
Gavin Bywaters,

L to R (Seated)

John Andrews, Ken Perks, Fern Schanbel, Mano Wickramaratna, Rob Kelly,  
Gideon Yowa



# Kaizen Charter



Kaizen Charter			
<b>Event Start Date:</b>	12th May 2010	<b>Mine Site:</b>	Kanowna
<b>Event End Date:</b>	14th May 2010	<b>Kaizen Area:</b>	Raleigh Underground Loader operation
<b>Number of Days:</b>	3	<b>Kaizen Sponsor:</b>	Ryan Burns
Problem Statement			
<p>Currently loader utilization is averaging 260 hr per month which is significantly lower than industry standard of 400 hrs The low loader utilisation is a bottle neck to achieving production targets consistently. Contributing factors include long shift change over times due to travel times and non standardised preshift meetings Opportunity now exist to through this Kaizen event to improve loader utilisation by an additional 60 hours per month by reducing the loader idle and waiting time.</p>			
Goal Statements			
To reduce total idle/waiting time per shift by one hour for uptime improvements			
Standardise preshift meeting process			
Enhance the current handover communication process			
Scope			
<b>Beginning Boundary</b>		<b>Ending Boundary</b>	
Raleigh operators shift start time		Operator entry to heading to commence work	
<b>What is in the scope?</b>		<b>What is not in the scope?</b>	
Loader non-productive times, idle/waiting times		Unscheduled break down	
Team Members			
<b>Facilitator:</b>	Mike Murphy	<b>Participant:</b>	Ryan Kent
<b>Team Leader:</b>	Fern Schanbel	<b>Participant:</b>	Ken Perks
<b>Co-Leader</b>	Mano Wickramaratna	<b>Participant:</b>	Gavin Bywaters
<b>Participant:</b>	Craig McCulloch	<b>Participant:</b>	Mat Reilly
<b>Participant:</b>	Rob Kelly	<b>Participant:</b>	Frank Reed
<b>Participant:</b>	Kent Cook	<b>Participant:</b>	Gideon Yowa
<b>Participant:</b>	Laura Moore	<b>Participant:</b>	John Andrews
Additional Comments			
Sponsor Signatur		Ryan Burns	Date: 4/28/2010

# Problem and Goal statements



## Problem Statement

Currently loader utilization is averaging 260 hr per month which is significantly lower than industry standard of 400 hrs. The low loader utilisation is a bottle neck to achieving production targets consistently. Contributing factors include long shift change over times due to travel times and non standardised preshift meetings. Opportunity now exist to through this Kaizen event to improve loader utilisation by an additional 60 hours per month by reducing the loader idle and waiting time.

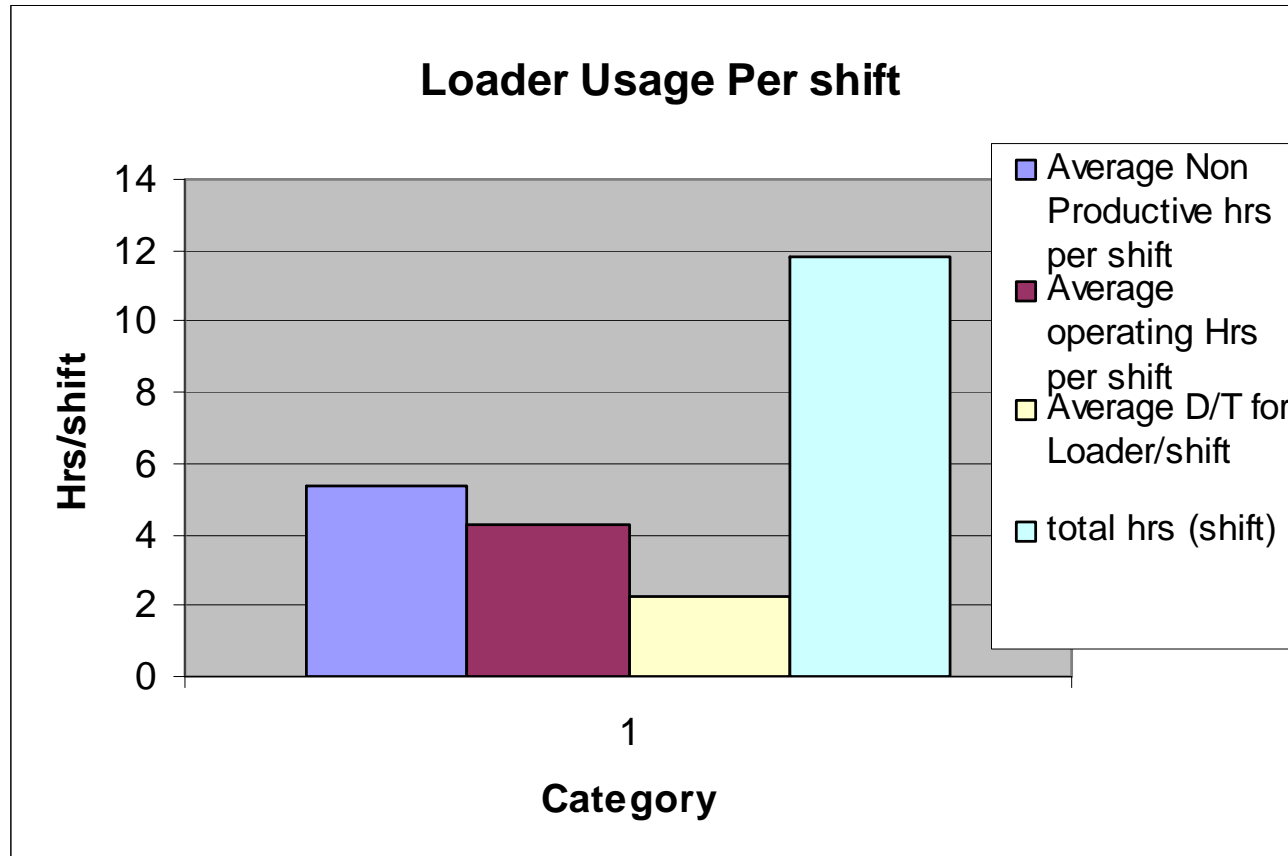
## Goal Statements

To reduce total idle/waiting time per shift by one hour for uptime improvements

Standardise preshift meeting process

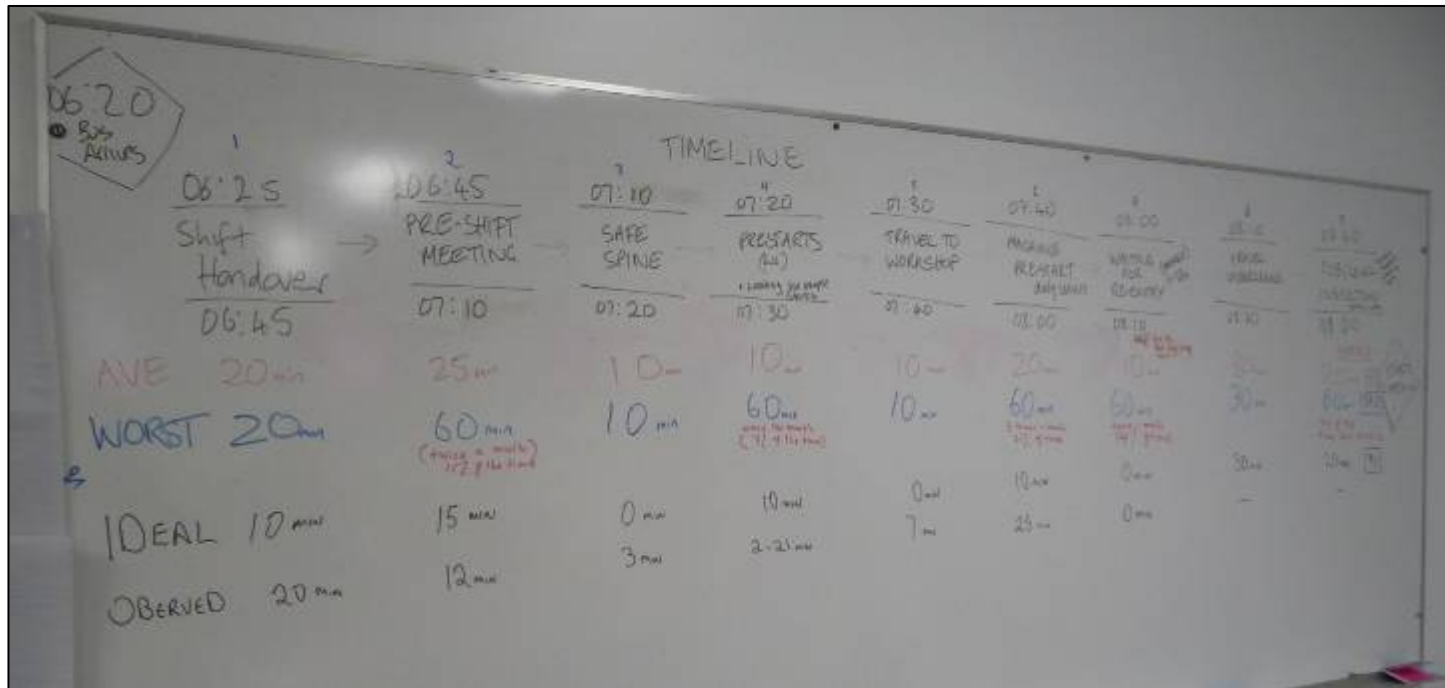
Enhance the current handover communication process

# Current State (Base Line)



- Idle time approximately 5 hours per shift

# Current State



- Mapped out current state.
- Estimated Avg time: 155 mins
- Estimated worst case scenario: 370 mins

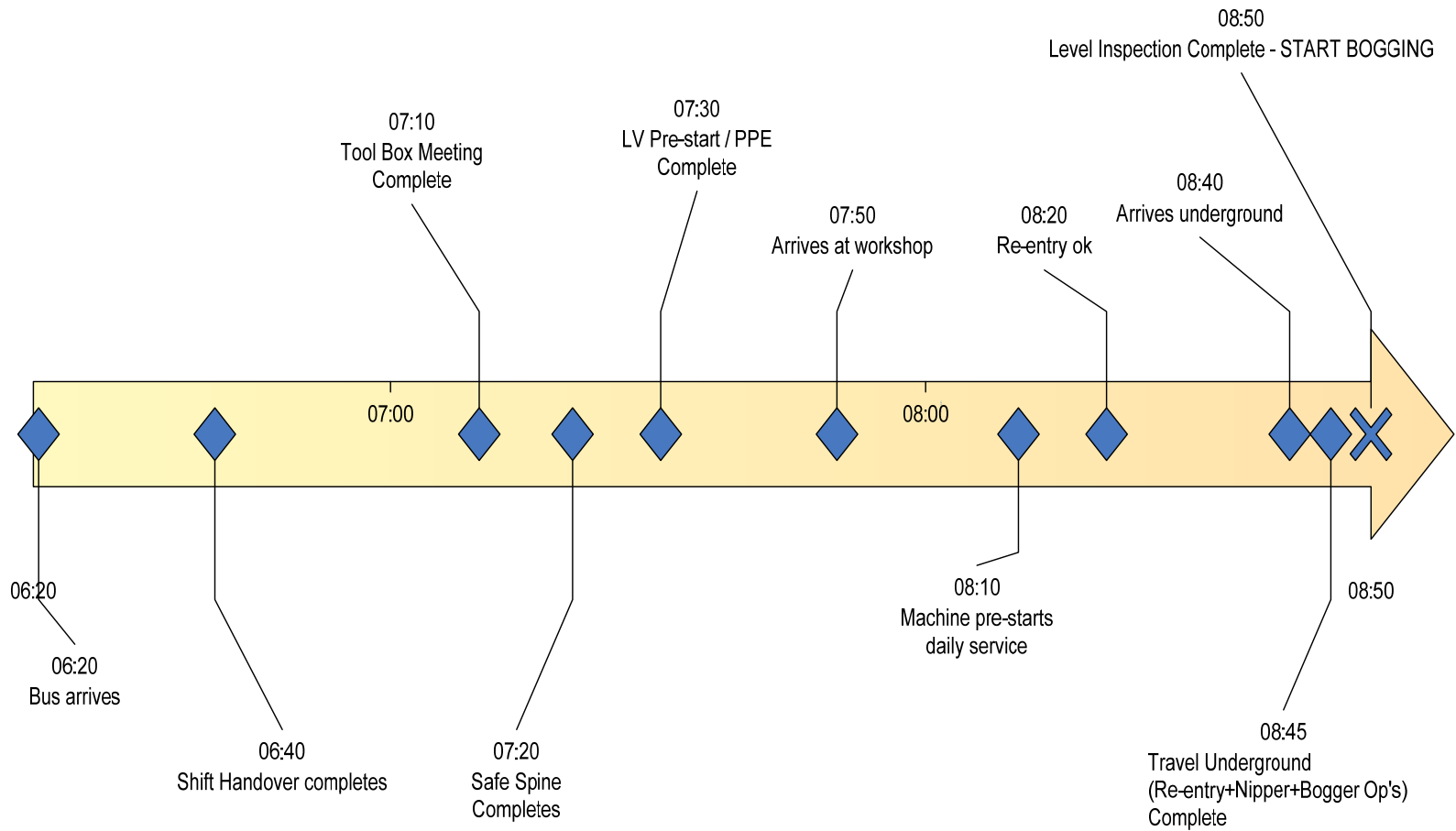
# Current Status



Step No	Process step	Time (mins)
1	Shift Handover	25
2	Pre Shift Meeting	15
3	Safe Spine	10
4	LV Pre Starts	10
5	Travel to Workshops	10
6	Machine Prestart/Daily Service	20
7	Waiting for Re-Entry	10
8	Travel Underground	30
9	Job Inspection/Workplace Prep	20
	Total time	150 mins



# Current Status Map and Time Line



# Key Waste Identified in Current State



## Process

Process step	Key Waste Identified
Shift Handover	Waiting for the shift to start and no formal process
Pre Shift Meeting	Off topic chatting and repeated information
Safe Spine	Not all stretches are required and waiting to start exercises
LV Pre Starts	Availability of LV on Mondays "to work with mechanical over weekend Waiting for others (getting gear, waiting for shift boss, etc...)
Travel to Workshops	Low ratio travelling - 3rd gear (20km/hr) Location of offices, stores, LV workshop, change rooms
Machine Prestart/Daily Service	Waiting for fitters to start servicing machine Greasing machine availability, Fitter availability etc.
Waiting for Re-Entry	Blast not going off, Ventilation damage, no vent, etc
Travel Underground	Traffic at ramp, bad communication, stopping at crib
Job Inspection/Workplace Prep	Watering down process, rolling bell wire, Vent bag inspection, waiting for service crews, waiting for tech services

# Key Kaizen Breakthrough



Identified Issue	Process Change in Kaizen
Excessive wait time and inefficiencies during shift changeover.	Change shift start and end times while standardizing shift handover process
Pre-shift meeting does not set the tone for the shift	Modify and standardize the pre-shift meeting process
Safe Spine session is not efficient and not achieving the desired results.	Streamline and standardize the Safe Spine session.
Delays occur while determining who is in which LV	Assign dedicated LVs
Excessive travel time of bidders at shift changeover.	Underground fuel bay is in plan
Re-entry is delayed at times when the fans come on prematurely damaging the vents.	Install remote fan starters
Lost loader utilization as a result of operator needing to water down ore/waste piles	Dedicated Resources to prepare the heading for stope or development bogging to increase loader utilization
Re-entry is delayed at times when the fans come on prematurely damaging the vents.	Install telemetry for remote fan starters
Lost loader utilization as a result of operator needing to water down ore/waste piles	Dedicated Resources to prepare the heading for stope or development bogging to increase loader utilization

# Heat Map



- Prioritized opportunities for improvement

# Change Shift Times



Current State	Proposed State
06:20 – 06:45 Shift Handover	06:20 – 06:30 Shift Handover
06:45 – 07:10 Toolbox Meeting	06:30 – 06:40 LV Pre-Starts/PPE
07:10 – 07:20 Safe Spine	06:40 – 06:45 Safe Spine
07:20 – 07:30 LV Pre-Starts/PPE	06:45 – 07:00 Toolbox Meeting
7:30 Drive to Workshop	07:00 Drive to Workshop

Leave offices 30 minutes earlier!!

**New Shift Schedule: 06:30 – 06:30**

## Key Points to Pass on to Cross shifts

- Job Location/Equipment Location
  - Job status
  - Equipment status/Condition
    - Dangers/Hazards
- Gear or Equipment Required

- To ensure that all key information is communicated during crossover, the required information is standardized

# 15 Minute Pre-shift Meeting



1. Accidents/Incidents past 24 hours
2. Best FLRA from previous crews
3. Safety topics/other topics
4. Manager's/Foreman's comments
5. **Re-entry Crew instructions and depart**
6. Development
  - a) Crew Jobs
  - b) Comments/Issues
7. Production
  - a) Crew Jobs
  - b) Comments/Issues

**15 minutes is the standard!**

# Safe Spine



**5 minutes is the standard!**

- Moved to 6:40am
- Alarm to signal start of session
- Run for set max time – 5 mins.
- Play one song to aid time keeping.
- Update stretches – tailored to Raleigh UG Mining

# Dedicated LVs



- LVs to be allocated to each group on crew.
- Define list of LV label (stickers) and send to Raleigh administrator (Kirstie)
- Purchase LV identification stickers (e.g. Service Crew, etc).
- Shift bosses will allocate LVs to different groups according to the day's scheduled activities.
- Consider LV workshop weekend manning requirement.

Dedicated LVs will reduce time organizing rides in the morning and increase accountability.

# Underground Fuel Bays



- Machines will be at the work area at the start of each shift.
- Productivity of boggers increased. Tonnes per machine hour will increase. Boggers not used to tram – LVs can be used.
- Less tramming (NVA activity) from surface to UG. This will save significant time at start and end of shift.
- The opportunity is to refuel and service boggers UG while operators have crib. This will require flexibility and good communication.

Fuel Bay is already planned. Team acknowledges that this is a great idea and will save a tremendous amount of time!



## Opportunity:

Frequent delays take place after firing impacting on re-entry times and leading to poor productivity of Boggers and other equipment. Opportunity exists to minimise this delay by implementing an automated telemetry system to operate fans by the shift boss from the surface

## Key Milestone

- Review existing scope of project
- Establish revised capital requirement
- Consult stakeholders for additional requirements/cost
- Capital approval and execution

# Project Charter



Initiative ID:		Site:Raleigh		<b>PROJECT CHARTER</b>				
Revision Number:								
Revision Date:								
Start Date:								
<b>PROBLEM / OPPORTUNITY</b> <small>(what is the problem/opportunity?) (what is the impact to the business?) (how long has it been a problem?)</small>	<b>Project Title</b>		Telemetry Installation for Under ground fans					
	<b>Problem / Opportunity Statement</b>		Presently frequent delays take place after firing impacting on re-entry times and leading to poor productivity of Boggers and other equipment. Opportunity exists to minimise this delay by implementing an automated telemetry system to operate fans by the shift boss from the surface.					
	<b>Driver</b> <small>(cost, throughput, quality)</small>		throughput and cost					
<b>BUSINESS CASE</b> <small>(does it make strategic sense to address this problem?) what is the focus of the project team?</small>	<b>Business Case</b> <small>(Does this Project aligns with other business initiatives?)</small>		By Installing a telemetry system will allow instant fan starting immediately after firing there by allowing blast fumes to be expelled from mine more efficiently. Hence focus of this project will be to assess and implement appropriate telemetry system to improve mine productivity.					
<b>TEAM</b> <small>(who is accountable for the project?) (who will lead the project?) (who are the people that work with and know the process?)</small>	<b>Sponsor</b> <small>(accountable)</small>		Rob Nicholas/Ryan Burns					
	<b>Team Leader</b> <small>(responsible)</small>		Nick Murphy					
	<b>Team Members</b> <small>(know the process)</small>		Mano Wickramaratna	Craig McCulloch	Scott Marsden			
<b>DEFINITION or PROJECT SCOPE</b> <small>(process boundaries - start &amp; stop) (what is in scope / out of scope?) (any constraints, limitations, assumptions that may affect the project success)</small>	<b>Process Boundaries</b>		<b>Start:</b>	N/A				
	<b>Project Scope</b>		<b>Stop:</b>	N/A				
			<b>In:</b>	Raleigh underground				
<b>GOALS</b> <small>(desired outcomes - Specific, Measurable, Achievable, Relevant, Time bound &amp; Agreed to)</small>	<b>Project Goal</b> <small>(what are the deliverables to be produced?) (what are you looking to achieve?)</small>		<b>FROM</b>		<b>TO</b>			
	<b>KPI for Success</b>	<b>Primary Metric</b>	Bogger utilization xxx	yy				
		<b>Secondary</b>	Improve uptime hrs xxx					
		<b>Benefit</b>	Improve uptime hrs of mining equipment	Link to calculation, chart, driver tree				
		<b>Energy KPI</b>	Include energy metric if applicable	Energy metric (GJ/T of ore, GJ/BCM etc)				
<b>RISKS / CONSTRAINTS</b> <small>(what risk is there if the project fails/is not done? Likelihood and Consequence) (what may cause the project to fail?)</small>	Buy in from stakeholders							
	Resource availability							
<b>MILESTONES</b> <small>(key achievements along the way to attaining goal)</small>	<b>Expected dates for delivery of key project outcomes</b>	<b>Milestone</b>			<b>Planned</b>	<b>Actual</b>		
		1	Review existing scope of project					
		2	Establish revised capital requirement					
		3	Consult stakeholders for additional requirements/cost					
		4	MOC					
		5	Capital approval and execution					
<b>COSTS</b>	<b>Total cash to be spent:</b> 220000 (2009 estimate)		<b>Budgeted:</b>		No			
	<b>Capital component:</b> \$ -		<b>AFE has been approved:</b>					
<b>STAKEHOLDER SIGNO</b>	<b>Project Sponsor</b>		<b>Sign on:</b>		<b>Date:</b>			
			<b>Sign off:</b>		<b>Date:</b>			
					<b>Date:</b>			

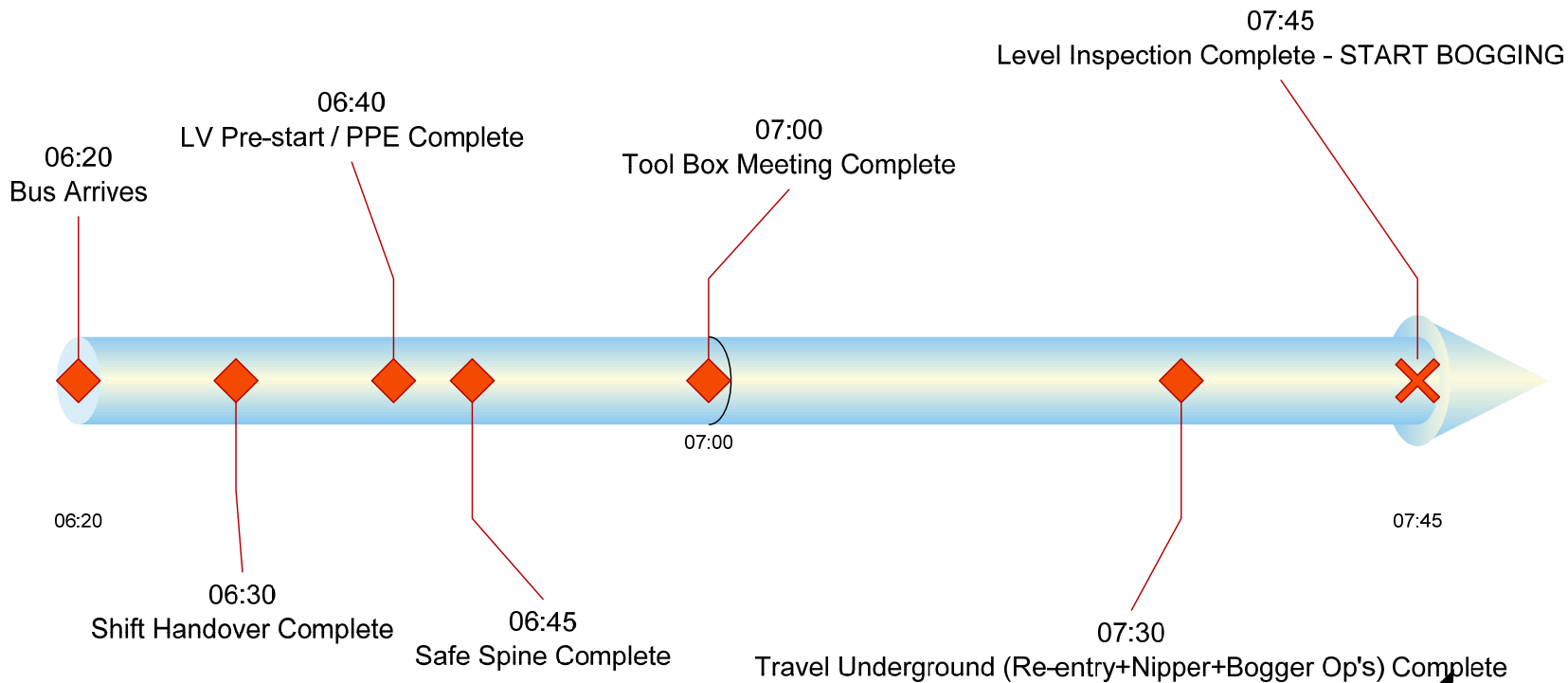
Project Charter developed!

# Dedicated Resource



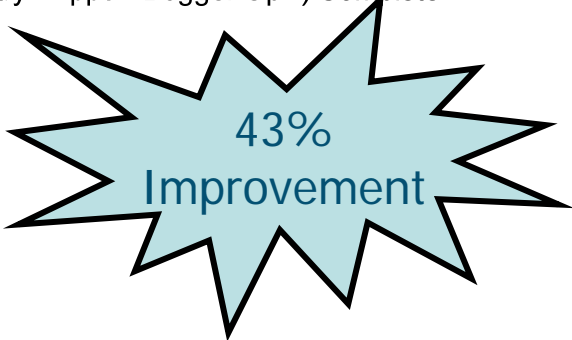
- Dedicated Resources to prepare the heading for stope or development bogging to increase loader utilization.
- Shiftboss must assigned a person daily from the following groups in this order:
  - Nipper
  - Re-entry /Charge crew
  - Service Crew
  - Sampler
  - Any available Operator waiting for equipment service
- Assigned Person must be written on Daily Shift/Handover sheet and can be verbally changed during shift.
- Improved Communication between persons performing this task must occur once the task is completed or re-entry is finalized.
  - Example: Vent bag on ground, equipment damaged, services or ground support etc must be relayed to supervisor and assigned persons doing the task.

# Future State



**New Process = 85 mins**

**Improvement Opportunity = 65 mins**



# Kaizen 30 Day To-Do List



## Kaizen 30 Day To Do List

**Kaizen Area** Raleigh Underground Loader operation

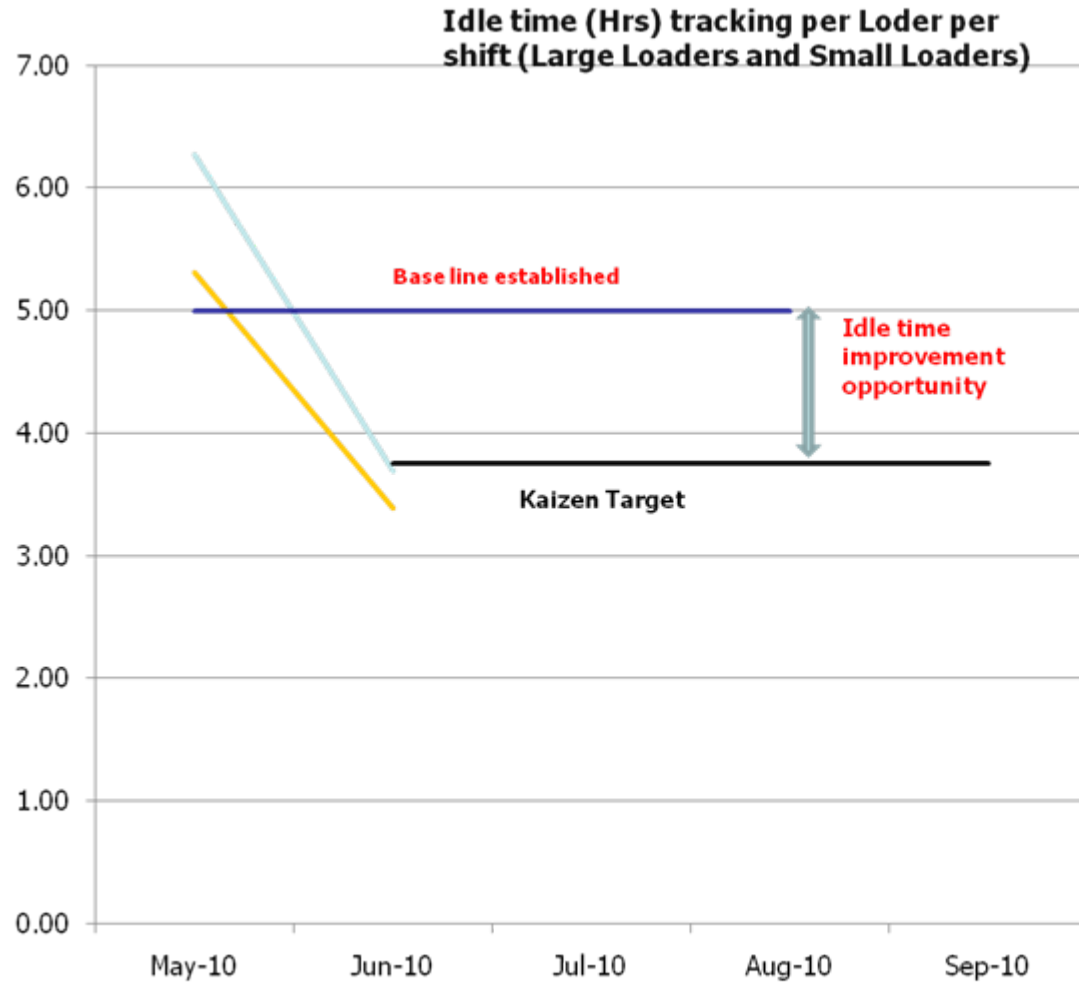
**Kaizen Team Leader** Fern Schanbel

### LEGEND

	On Schedule
	Minor Issues, behind but recoverable
	Major Concerns, due date compromised

Issue / Item	Owner	Actions	Start Date	Percent Complete					Due Date	Completion Date
				20	40	60	80	100		
Change start shift time	Fern	Review firing times - executing the change							14/06/2010	No change
	Fern	Evaluate over-all implications to other work groups							14/06/2010	In Progress
	Fern	Establish change over process / time line ( MOC )							14/06/2010	In Progress
Standardize pre-shift meeting	Frank / Eddie	Establish meeting format document							21/05/2010	complete
	Frank / Eddie	Communicate change to other department supervisors	Reniforce again						21/05/2010	complete
Stream-line Safe Spine Session	Fern	Ash & his team to re-visit existing exercise routine at Raliegh to 5 min.							28/05/2010	In Progress
	Fern	Ash & His team to develop a plan to re-educate existing leaders and potential new ones							14/06/2010	In progress
	Frank / Eddie	Establish the horn signal / music protocal							28/05/2010	No progress
Assigned dedicated LV's	Frank / Eddie	Assign LV's to each group							28/05/2010	Inprogress
	Frank / Eddie	Labelling organized.							7/06/2010	In progress
	Frank / Eddie	Communicate to each supervisor							14/06/2010	completed
Underground Fuel Bay work finalized	Mano	Ensure x-functional team establishes procedures for use.							14/06/2010	??
Install Trimetry Fan starters	Fern	Review existing scope of project.							14/06/2010	
	Fern	Establish revised capital reqd and approval							14/06/2010	
	Fern	Consult stakeholders on additional requirements							14/06/2010	
Dedicated Resources for heading Prep	Frank	Communicate to shift bosses about change and how to execute							21/05/2010	complete
Line ups for ice	Frank	Install Water tap							28/05/2010	no Progress
Wasted time looking for PPE	Ryan	PPE container stocked daily/store man to run it (							14/06/2010	complete
Need to develop a change management plan for this Kaizen event	Ryan	Develop a communication plan to roll out the Kaizen changes							14/06/2010	In Prgress

# Raleigh Kaizen Idle Time Tracking



- Idle Actual (Large Loaders)
- Idle Actual (small Loaders)
- Taget Idle (Kaizen)
- Base line all loaders

# QUESTIONS