

# Reduction in Blockjoint Failure Practical Problem Solving Activity

## 1. Objective

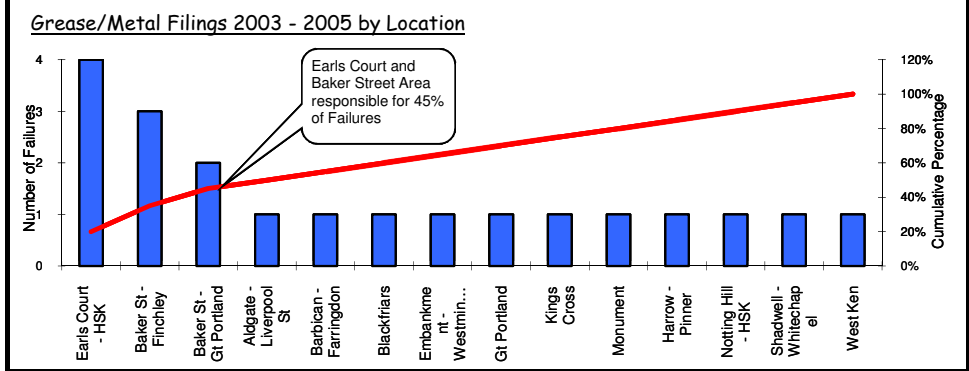
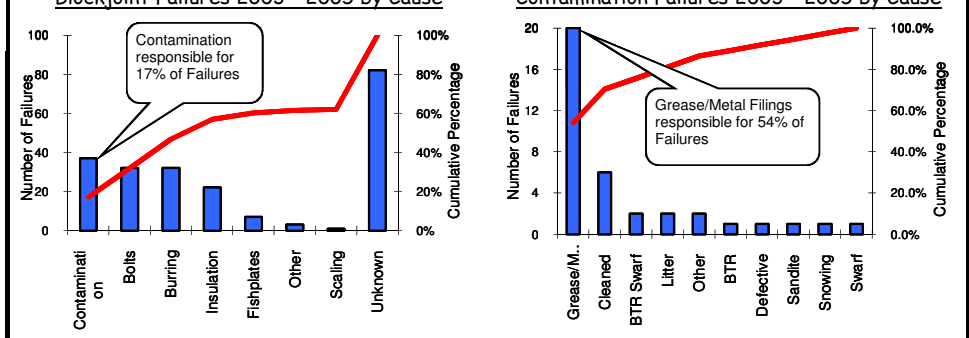
Blockjoint Failure has been identified as the biggest cause of Track Lost Customer Hours  
 The target improvement for this activity is to reduce Lost Customer Hours by 10% based on data taken from Period 1104 through to and including Period 1005. Reduction of 2698LCH

## 2. Original Problem Perception

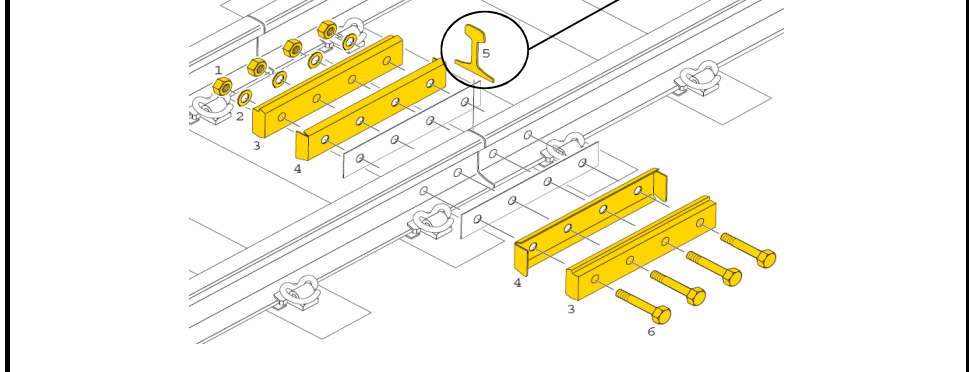
The Average Lost Customer Hours Per Period for Blockjoint Failure is 26976  
 Blockjoint Failure has been consistently the biggest cause of LCH  
 The Blockjoint Failure Data includes Scaling Failures

## 3. Problem Clarification

\* There is no correlation between failures and Month (Supporting Data available)



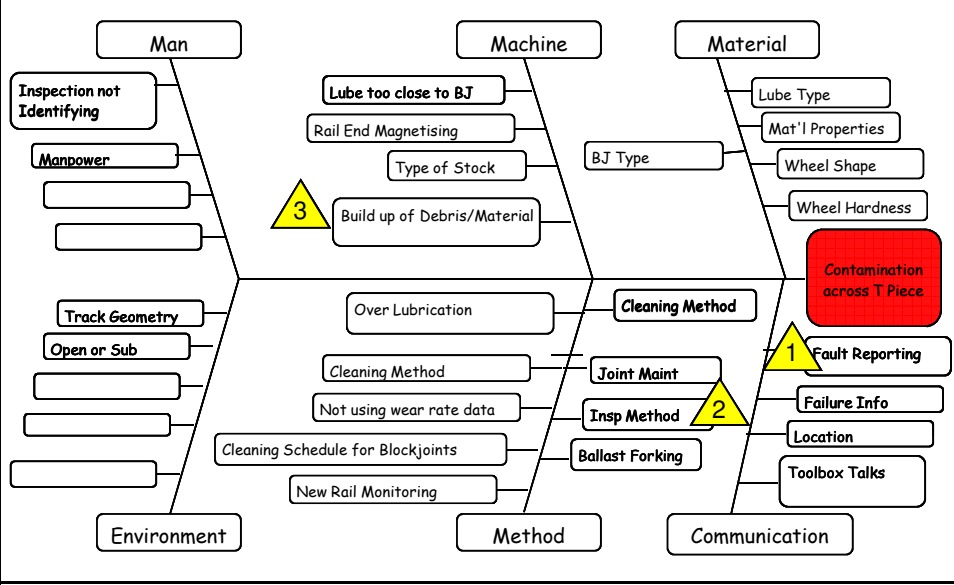
## 4. Point of Cause



## 5. Initial Containment Activity

Item	Action	Resp	When
1	Six Sigma Report from Tubelines required	NR	06-Apr
2	Review Crib Pack for Failure Diagnosis with BB - sent to TIMs, Metal Pickers, Incident Managers (26/05)	RS	01-Apr
3	Additional Metal Pickers (Part of Scaling PPS)	DH	On-going
4	South Circle Block Joint team	TM	TBC
5	Check for Repeat Contamination by Location	KS	09-Mar
6	Lubricator Map & Position Required - List Provided	AW	23-Mar
7	Analysis of Blockjoint Density by Location - No Data	AW	23-Mar

## 6. Cause Analysis



## 7. Cause Investigation

Item	Investigation	Resp	When	Status
1	Details of BJ Failure to be improved, specific locations to be obtained	KS	Daily	●
2	Site Inspection required between Earls Court - West Ken Battered End/Broken T Piece	N Beaton/ B Dunmore	Comp	✗
	Site Inspection of South Circle Line to identify risk of failures - contamination	N Beaton/ B Dunmore	Comp	✗
3	Review specification for Best Practice Cleaning to prevent contamination failures	AB	Comp	●
	Concession for New Tenconi Blockjoint with Painted Rail Ends - SQE Approval Required	AC	Comp	✗
	Analyse data before and after scaling team activity, roll out to other areas if applicable	AW/KS	Comp	●
	Confirm data for Debris by weight from cleaning areas by location	AW	Comp	●
	Trial New Tenconi Blockjoint with Painted Rail Ends on Victoria line	DM	Comp	✗

Direct Cause #1 : Broken T Piece & Battered Ends @ Earls Court  
 Direct Cause #2 : Snowing in T Piece causes Failures

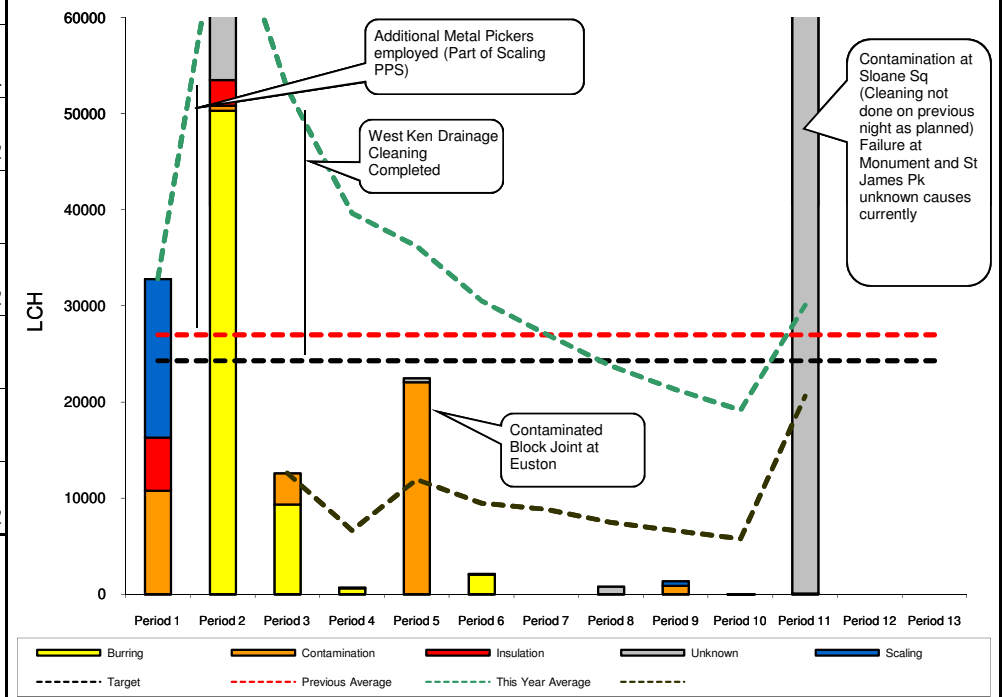
## 8. Root Cause Investigation

Why	Because	Why	Because
Why : Broken T Piece and Battered Ends @ EC	Because : Hard Impact between sleeper & concrete support	Why : Snowing in T Piece causing failures	Because : Metal filings within grease cause failure of isolation system (Gap Bridge)
Why : Hard Impact	Because : Voids between Sleepers and Concrete	Why : Failure of Insulation System	Because : Wheel/Rail interface causes small shards of metal to detach from rails
Why : Voids between Sleeper and Concrete	Because : Shrinkage of Timber over time	Why : Shards detaching from rail	Because : The wheel/rail interface is incompatible
Why : Shrinkage of Timber over time	Because : Design of Concrete/Timber system does not compensate for shrinkage	Why : Wheel/Rail interface not compatible	Because : Wheel/Rail System Design is not optimised to prevent excessive friction
Root Cause : Design of Concrete/Timber System does not compensate for Timber Shrinkage		Root Cause : Wheel/Rail System Design not optimised	

## 9. Countermeasure Implementation

Item	Root Cause	Countermeasure	Resp	Date
1	Drainage condition poor accelerating deterioration of Timber	Drainage clearing to be completed by 16/6.	T Cella	Comp
2	Deflection of timbers on concrete support	MRIS Grouting Programme required to improve voiding. Final site review required with Contractor. Budget review required.	ML	01-Feb
3	Patrolman briefing to include magic wands	Final version of brief to be issued to TIMS for review. Steve G to confirm Central Line	RS	Comp
4	Removal of debris around block joints (Can BCV Metal Picking be done at same time as Litter?)	Order 1 magic wand per Patrolmen (Confirm with TIMS).	NB	Comp
		Brief Signals to use Magic Wands on installations	RS	Comp
		Regular Metal Picking schedule to clean Blockjoints to be included in new Cleshars contract, feed into P30 review of contract. Review mtg Thu 18th Jan	Dave Heron	1st June
5	Insufficient isolation for block joints (Paint Rail Ends) INFO: There is ONE concession only - it is for a modified T Piece with Tenconi Block Joint with	Vic Line - Oxford Circus-Green Park, new BI's to be installed	AC	Comp
		Circle Line - Victoria area, new BJ's to be installed	AC	Comp
		Obtain feedback from Tubelines (New 'T' Piece)	AC	Comp
		Final report of new block joint trials to decide best way forward for asset performance	AC	Comp

## 10. Results



## 11. Follow Up Activity

Item	Activity	Resp	Date
1	Voltage Analysis Meter to help Failure Prevention (Not deemed priority in current climate, no further action currently)	AB	N/A
2	Alliance Drainage improvement work for West Ken curve - plan req	NB	End Mar
3	Ballast Replacement work at West Ken curve - undercutter, review mtg	NB	End Mar
4	40x augered soakaways required at Diamond - estimate required	NB	End Mar
5	West Ken (Diamond) Drainage Renewal Plan Required (May 2008)	NB	TBC
6	Business case for factory glued joints/site made joints (are they in stores)	AC	N/A
7	Additional BJ (Bullhead) Trials, 3 extra sites between Embankment and Westminster, identify sites based on high levels of scaling	AC	N/A
9	Add Housekeeping check to Independent Weld Inspection Checksheet	RS	Comp

## 12. Learning Points

It is not always necessary to look for a replacement fix, regular basic maintenance can be very cost effective and very effective.