Kaizen Details

Theme : **Enhancement in Reliability of HP Ammonia Feed Pump by Improving Stuffing box Sealing / Cooling.**

Start Date : **16/8/08** **Finish Date** : **25/5/09**

Impact on Category :

1.Process 2.Customer 3.Environment

4.Tangible 5.Intangible

Team Introduction

- Mr Sudhakar Dubey
- Mr Shishu Pal Singh
- Mr NJ Verghese
- Mr PC Paul
- Mr Kamlesh Pal

Theme identification-1

- HP Ammonia feed pump operates at very high Pr 240 Kg/Cm2 and is directly related with Urea Production.
- 21P1A Crank Case damaged in April'2008 with Pre-failure observation "Increase of supply oil pressure while increasing pump rpm" and OEM concluded "Obstruction in supply oil line" as root cause.
- Team was of opinion that "Overloading at Stuffing box" must have contributed for such "Severe damage of Crank Case" and can not be ignored.

Theme identification-2

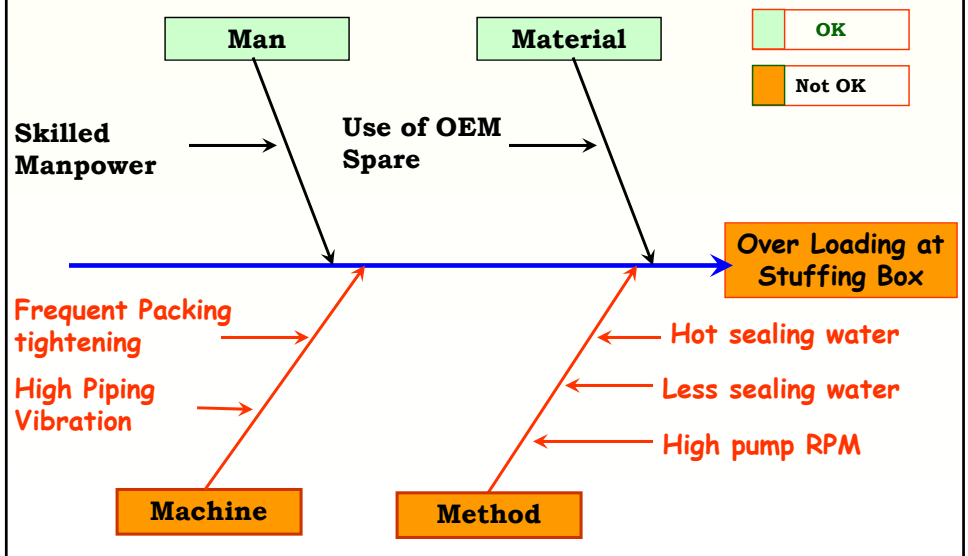
- Pre-failure observation was found repeated when 21P1A was being started after repair in June'08.
- Based on thought of "Overloading at stuffing box" , we increased "Supply of sealing water" and immediately we found "Supply oil Pr" stopped increasing.
- Further pump continued to run normal.
- Team Identified "Overloading at Stuffing Box" as theme for improvement further.

Focus Area

To identify causes of

"Overloading at Stuffing box"

Cause & Effect Diagram



Why-Why Analysis

Why	Answer	Action Taken
Frequent Packing Tightening	High Ammonia in seal water	Packing tightening
Why High Ammonia in seal water	Due to fast wear of packing	Stuffing box replacement
Why fast wear of packing	Due to high friction between Packing & Plunger	
Why high friction between Packing & Plunger. (Overloading at SB)	1) Less supply of seal water	1) Increased seal water supply
	2) Hot seal water supply	2) Changed to Cold seal water supply
	3) High Pump RPM At 112	3) Operating both pump at shared RPM instead of single pump at high RPM in both unit

Schedule-PDCA

	SN	ACTIVITY	RESPONSIBILTY		PROJECT SCHEDULE			
					Aug' 08	Sept' 08	Oct-Dec'08	Jan-May' 09
P	1	Develop Scheme	SD/SPS	P				
				A				
	2	Get the details & data collection	PCP/KP/NJV	P				
				A				
D	3	Evaluate possible alternative & solution by FMEA	SD/SPS/NJV	P				
				A				
	4	Procurement of materials	SD/SPS	P				
				A				
	5	Implementation of piping scheme	SPS/PCP/KP	P				
				A				
	6	Arrange for suitable seal water source /supply	SD/SPS	P				
				A				
	7	Implementation of new seal water supply	SD/SPS	A				
	8	Running both pump in place of single	PRODUCTION	P				
				A				
C	9	Monitor pump performance parameter	NJV/KPI	P				
				A				
A	10	Evaluation of performance data	SD/SPS	P				
				A				

Problem Faced

- Difference of Opinion with OEM for root cause finding of 21P1A CC damage.
- On further discussion with OEM (URACA now they got convinced & revised operating limits for “Supply Sealing water”.
- We are intending to supply sealing water at 40^0 cent (max) but limiting to supply up to 48^0 cent average (not on continuous basis) with existing situation.
- **Work is under progress for supplying seal water at temp 40^0 cent (max) on continuous basis.**

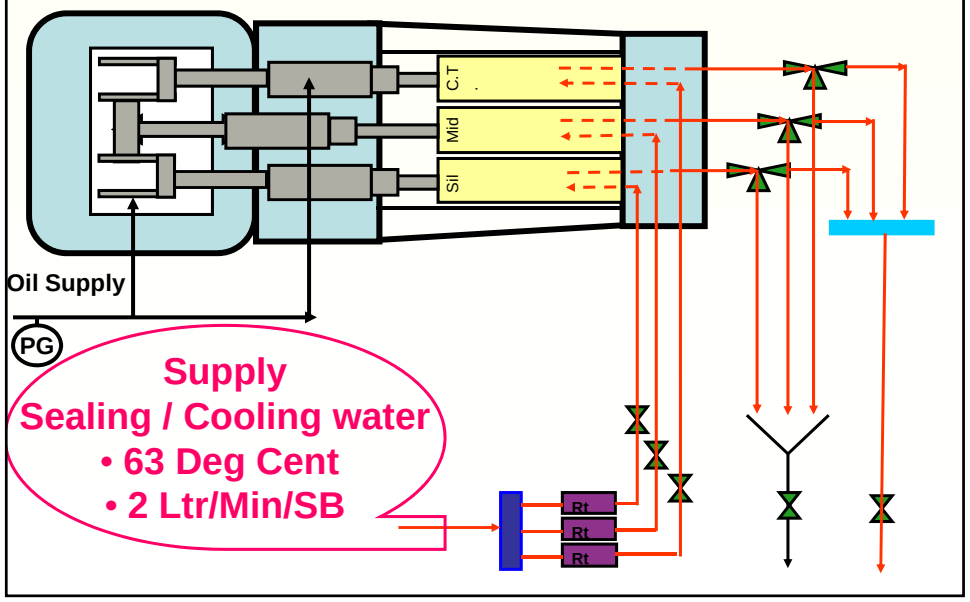
Team Working

- Brain storming amongst team members.
- Specific task like performed by team -

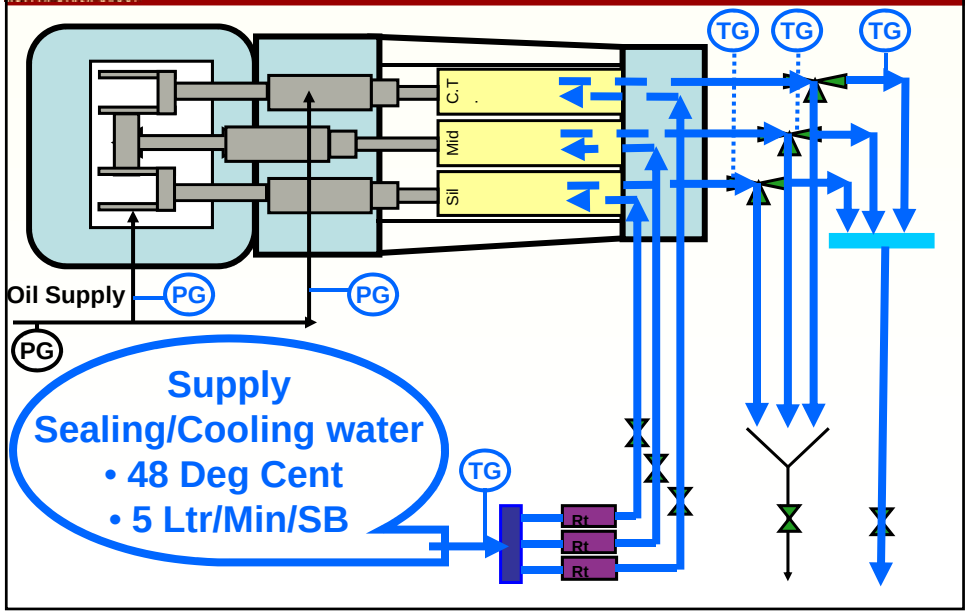
1. Closely observing pump parameters during pump start-up & stoppage and
2. Daily Look , Listen & Feel check-up.
3. Interaction with other fertilizers.
4. Interaction with OEM for validation before horizontal replication.

- **Success speaks “Together we can Win”**

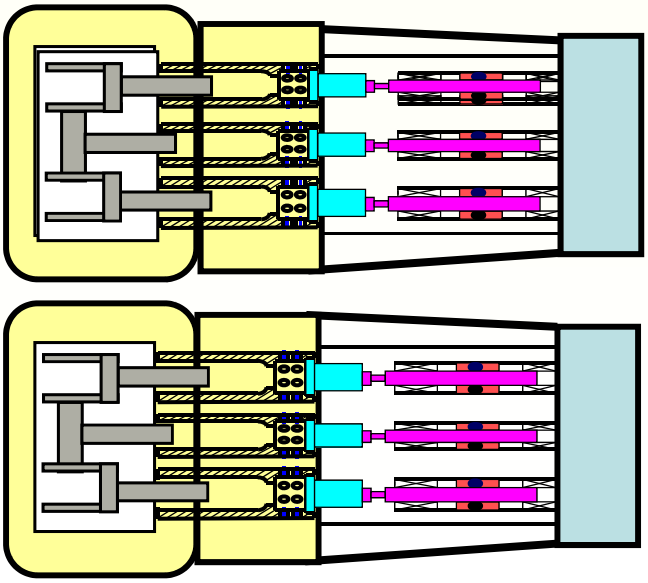
Before-1



After-1



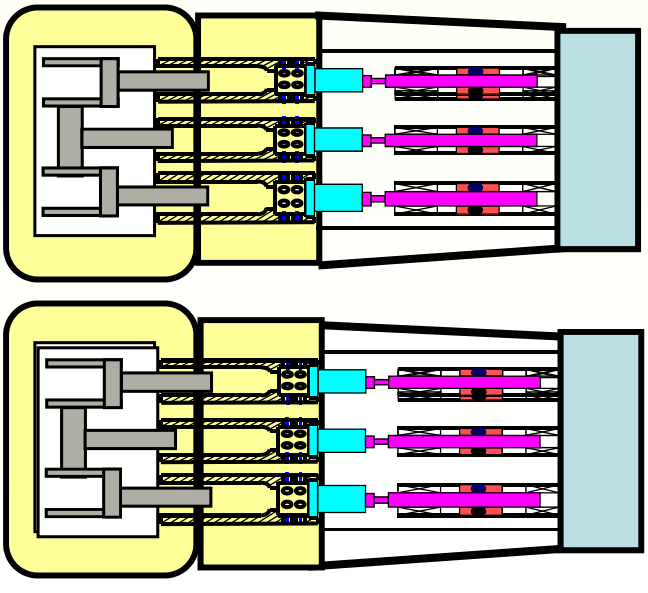
Before-2



Running
RPM 112

Stand by
Pump

After-2



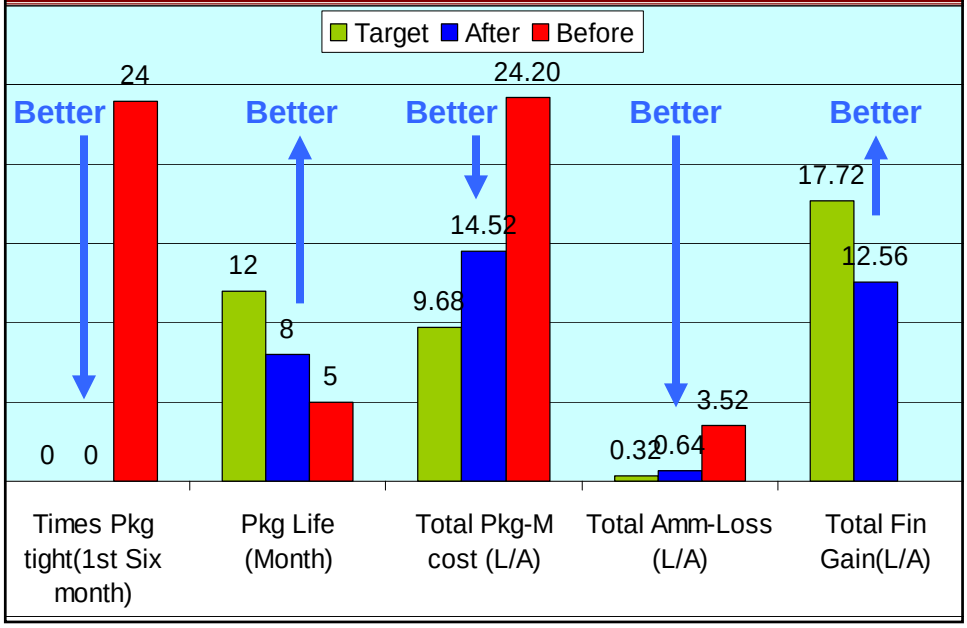
Running RPM
60 approx

Running RPM
55 approx

Action Taken , Benefits & Impact

Action Taken	Benefits	Impact
1) Improved	1)Reduced maint.	Tangible
supply sealing	2)Reduced amm loss	Envirment
water	3)Reduced load fluct.	Process
2) Provided view	1)Better operability	Customer
for seal water		
temp & lube oil Pr		
3) Operated both	1)Uniform plant load	Process
pumps on shared	2)Prod. Enhanced	Tangible
RPM	3)Reduced vibration	Tangible
	1)Better operability	Customer

Result : Target Vs After & Before



Key Learning

1. Sealing water supply qty 5 Ltr/Min/SB (Minimum)
2. Sealing water supply temp 40^0 cent (Max)
3. Even having OEM analysis & recommendations , we should not stop our self & Effort should be made till getting convincing root cause in terms of PDCA.

Thank You