

ENGINEERING PRODUCTS
FOR THE FUTURE



TUBE PRODUCTS OF INDIA SHIRWAL

**30x28-Sapthagiri Engineering-Crack sample analysis and action plan.
Complaint received on 28/03/23 through ETL Sanand (Spinning crack)**

Customer :- Saptagiri Engineering.

Complaint :- Weld Crack.

Size :- 30x28.

ETL SANAND – 28/03/2023

Suspected lot details

Dispatches from Shirwal to PWH & from PWH to Saptagiri Engineering

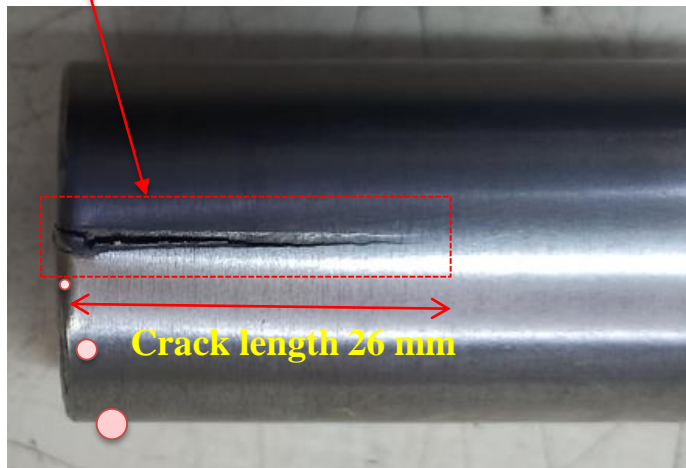
Customer Name	PWH Invoice No	PWH Invoice Date	OD	ID	Length	Qty Mts	Qty Tons	Qty Nos	Plant Invoice	Plant Invoice Date	Invoice Qty	Vehicle No.
SAPTAGIRI	3015010054777	07-Mar-23	30	28	4650	6273.80	4.404	1254.76	PSH-LST-16511	24-Feb-23	6273.80	MH12NX4312

Complete Shirwal invoice dispatched to Saptagiri

Dimensions



OD	29.97/30.04 mm
ID	27.97/28.03 mm



Crack Area

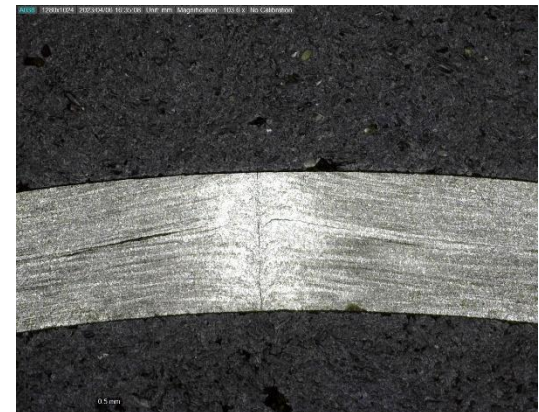
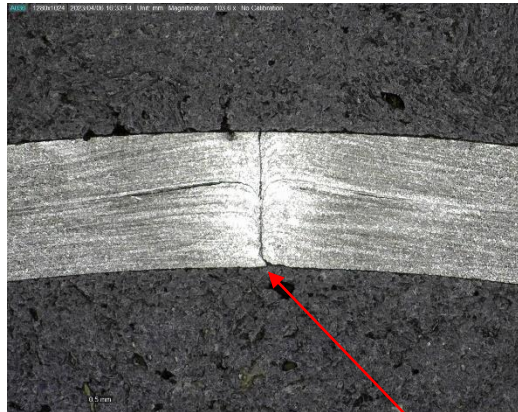


**52400-KOP-DA10-M1
18-03-23T**

Elements	%C	% Mn	%S	%P	%Si	%Al
Spec	0.12 Max	0.60 Max	0.040 Max	0.040 Max	-	-
Actual	0.098	0.38	0.010	0.012	0.024	0.052

Remark:- Chemical Analysis by spectro Method does Confirms to IS 3074/2005 CEW 1

Weld flow analysis



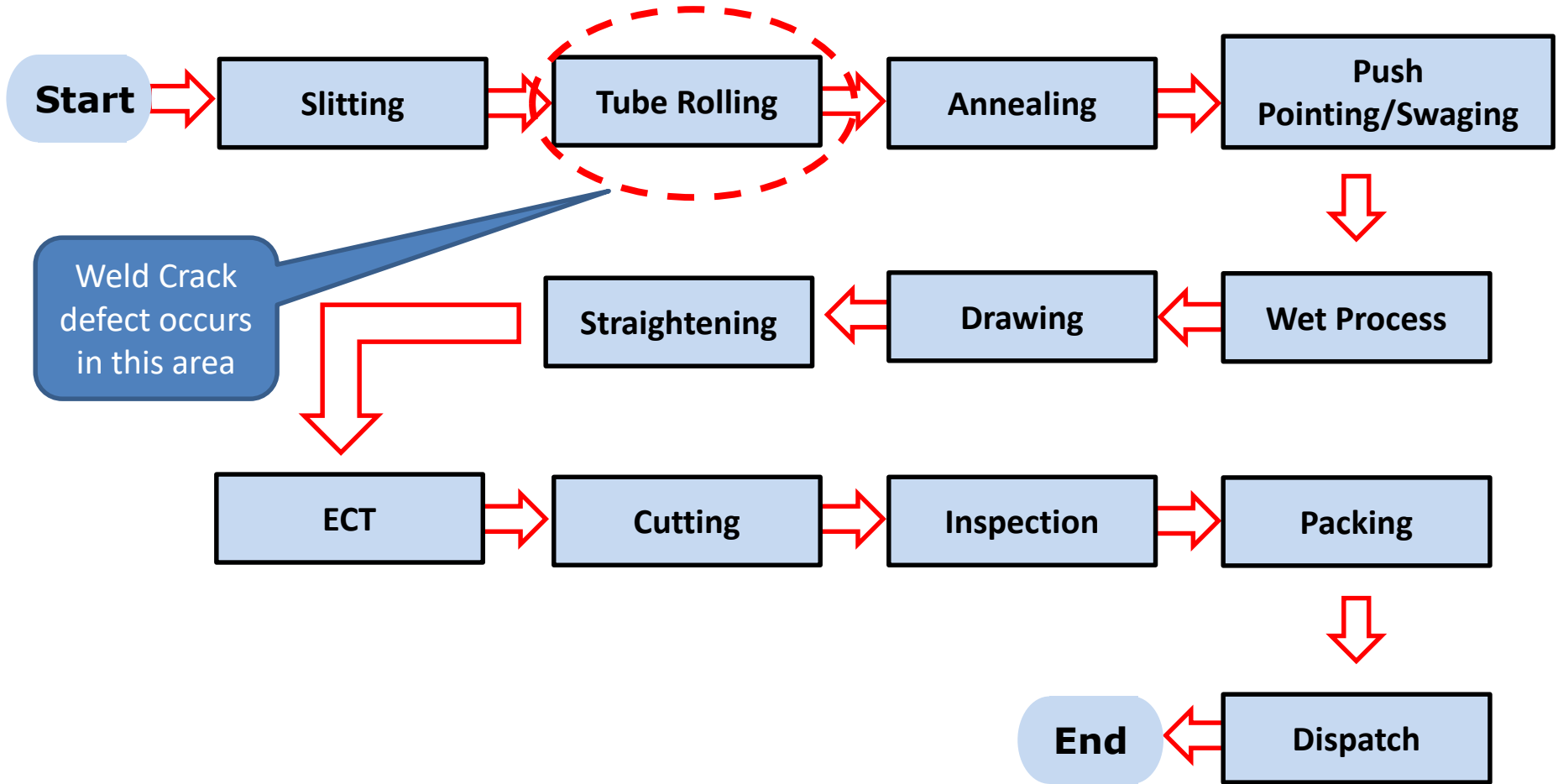
Observations:-

1. Crack observed on the weld line
2. Crack started from ID side
3. Weak weld line and parallel weld flow A and B location

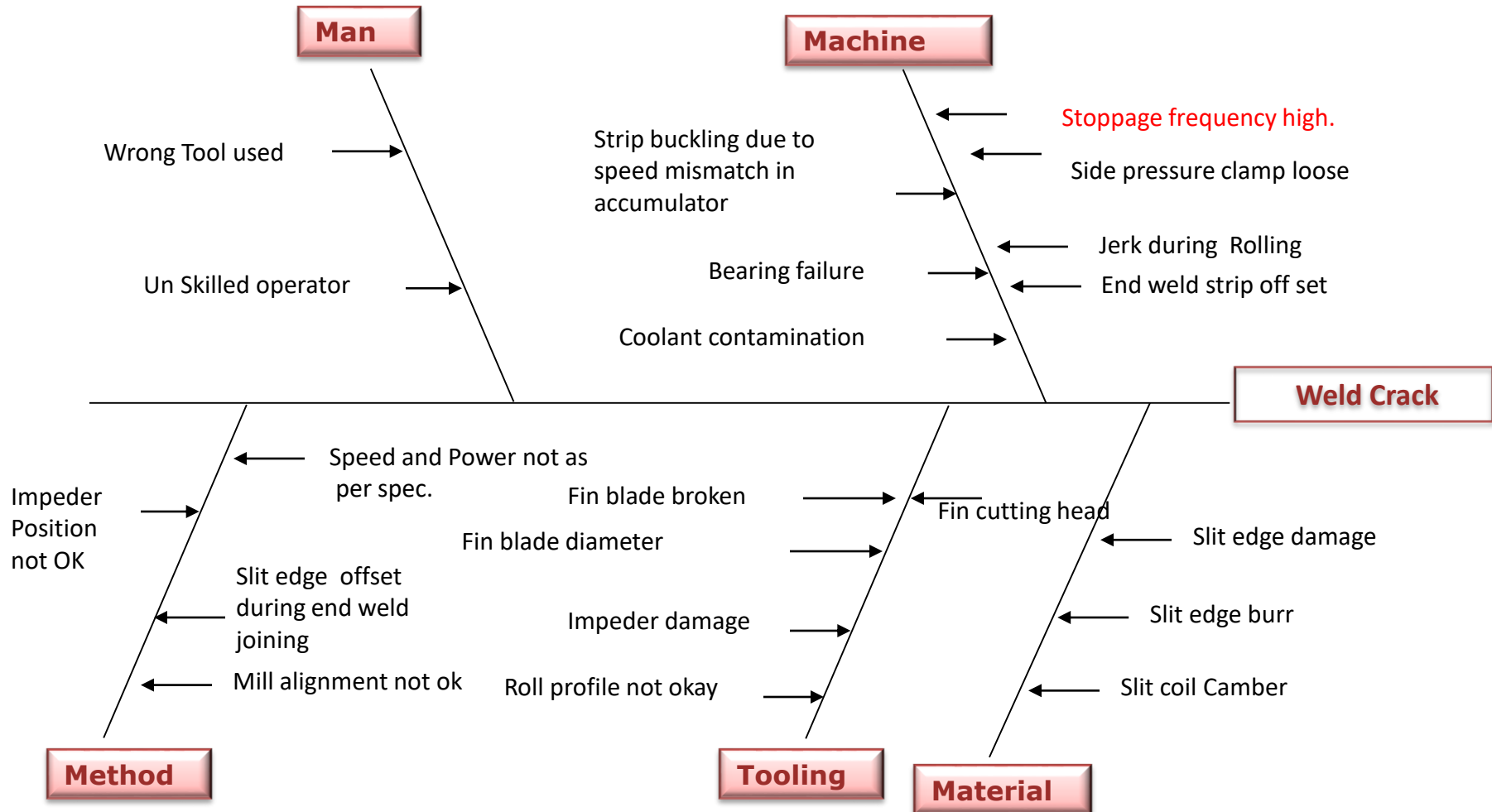
Crack
started
from ID
side

Process Flow

CDW Tube Process Flow



Root Cause Analysis:-



#	4M	PROBABLE CAUSES	FACTS VERIFICATION	Remark
1	MAN	Wrong Tool used	Verified the tool issue process no abnormality observed	OK
		Un Skilled operator	Operators are skilled no new operators on Machine	OK
2	TOOLING	Roll profile not okay	Checked roll profile found ok	OK
		Fin cutting head.	Fin Cutting head checked and observed top roll mounting pin worn out and damage .(Tube mill stoppage was there)	OK
		Impeder damage	Impeder condition was ok	OK
		Fin blade broken	No abnormality observed in Fin blade	OK
		Fin blade diameter	Fin blade diameter is inadequate when end weld is offset	ok
3	MATERIAL	Slit edge damage	Wooden plank on slit storage rack found	OK
		Slit edge burr	No burr observed on slit	OK
		Slit coil thickness variation in initial lap	No Thickness variation in initial lap of slit coil	OK

Verification of Causes

#	4M	PROBABLE CAUSES	FACTS VERIFICATION	Remark
4	METHOD	Mill alignment not ok	Mill alignment checked during setting found in place.	OK
		Speed and power as per specification	Speed and power checked as per speck and found ok.	OK
		Slit edge offset during end weld joining	Parallel Slit edges are verified by visually	OK
		Impeder Position not OK	Fin cutting bar length is standardized and it is OK	OK
5	MACHINE	Strip buckling due to speed mismatch in accumulator	Tube mill accumulator potentiometer found OK	OK
		Bearing failure	No bearing failure found	OK
		Coolant contamination	Filter checked found OK	OK
		End weld strip off set	The operation of Strip joining was carried out by hydraulic system	OK
		Stoppages	Stoppages frequency high	Not ok.
		Side pressure clamp got loose.	No strip shifting observed.	OK
		Jerk during Rolling	Verified the Tube mill report no Mill jerk observed	10 OK

(WHY-WHY ANALYSIS)

• Root cause establishment (Why-Why Analysis) - Occurrence

WHY – 1	WHY- 2	WHY -3	WHY-4	Why-5
Weld Crack.	Cold weld (Weak weld bond line)	Improper squeezing during welding at localized area	Less heat (Could be set up or stoppage tube)	Stoppages are more due to surface defect correction.

• Root cause establishment (Why-Why Analysis) - Detection

WHY – 1	WHY- 2	WHY -3	WHY-4	Why-5
Weld crack	Tube got opened in subsequent operation	Less bonding strength	Not detected in ECT	Weld intact.

Action Plan

Occurrence Side Action

Sr. No	Cause	Countermeasure	Target. Date	Status
1	Improper squeezing during welding at localized area (Stoppages are more due to surface defect correction.)	<p>Long term action -We are procuring the New Imported roll set(Japan- Sanyo Seiki, Korean), Proposal already raised. It will take 3 months' time.</p> <p>Short term actions - In the meantime we are making arrangement to make New roll set for forming and fin pass section with similar design with domestic supplier.</p> <p>To eliminate the stoppages due to od deburring related issues , we have installed single point tool with double post. (Kaizen sheet attached)</p>	<p>1) July-23 2) May 23 first week. 3) Completed on 04 th April -23</p>	Short term actions completed.

Detection side Action

Action Plan

Occurrence Side Action

Sr. No	Cause	Countermeasure	Target. Date	Status
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Detection side Action

1	Detection	As per Stoppage Matrix one extra tube will be removed.	Implemented by Jan-23	Started.
2		On line ECT at TM 2 Planned.	15 th July-23	Capex approved.
3		To Increase the ECT Sensitivity ECT Actual coil ID will be reduced from 38 to 35 MM.	June -23	PR and PO raised.
		Installation of thermal mapping system will be explored.		It is under discussion.
4				
5				

Thank You !