

**TATA STEEL**

 **We Also Make Tomorrow**

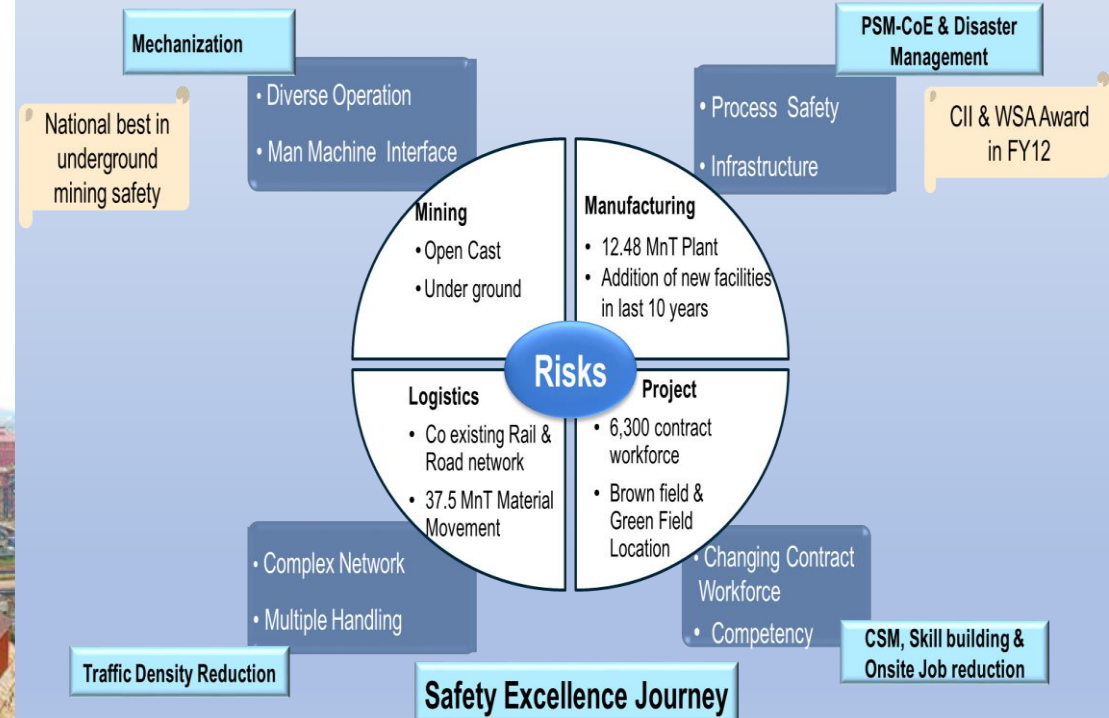
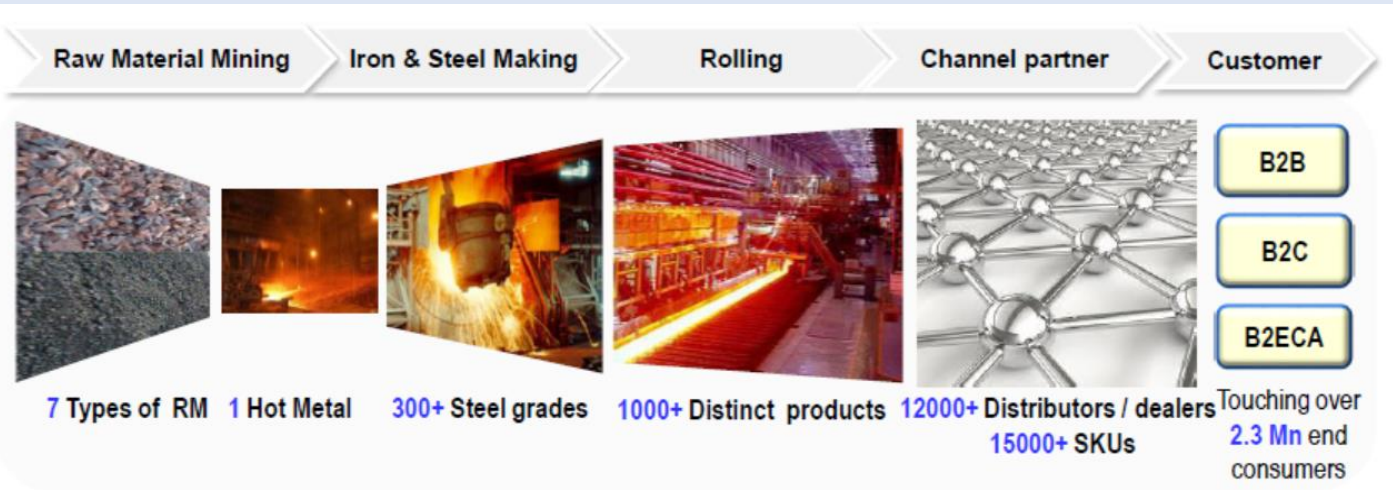
## **Experience to Enthusiasm**

**Driving Risk Awareness from the  
Shop Floor**

Abhinav Sharma & Pranay Ranjan

*23 Oct 2019*

# Tata Steel Limited, Kalinganagar Steel Plant



## Our Vision & Belief

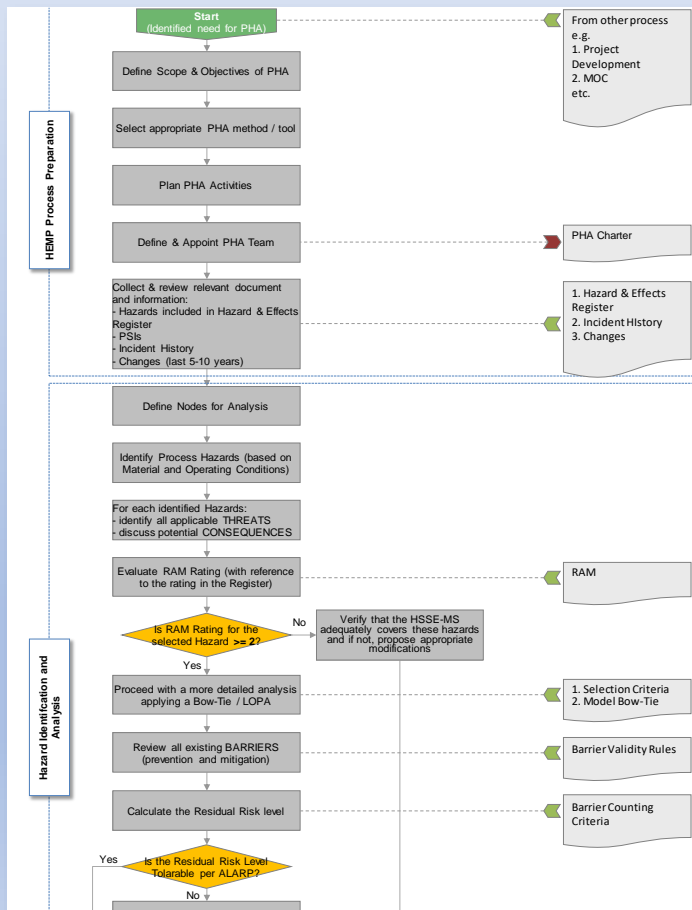
### **Vision**

We aspire to be the global steel industry benchmark for Value Creation and Corporate Citizenship.

### **Belief**

The Safety and health of all the people who work in and work with Tata Steel group is our number one priority

# Embarking on a Holistic Process Safety Risk Management Journey



- 1 Form a HAZOP team
- 2 Identify the elements of the system
- 3 Consider variations in operating parameters
- 4 Identify any hazards or failure points

F-1	3	2	2	1	1
F-2	3	3	2	1	1
F-3	4	3	3	2	1
F-4	4	3	3	3	2
F-5	4	4	4	3	3
	C-1	C-2	C-3	C-4	C-5



Involvement of Contractors and treating them as own employees



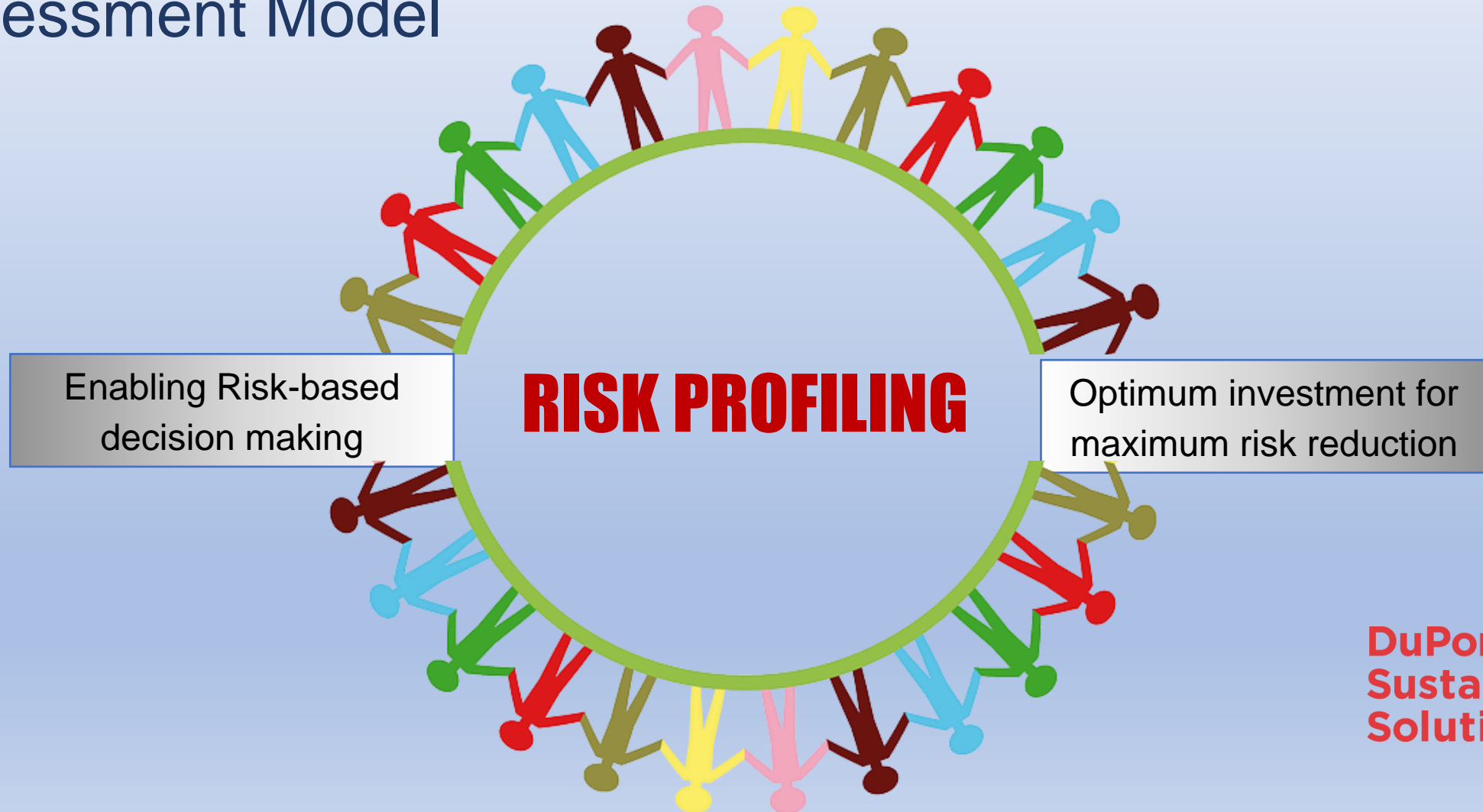
# Active Worker Participation Leading to a Vibrant Organization

- Worker empowerment
- Management responsiveness
- Improved process safety performance



Compliment our ongoing risk assessments by a more continuous view of risks by tapping into the perspectives and experiences of our frontline employees

# First-of-its-kind Shopfloor Driven Risk Assessment Model



**DuPont  
Sustainable  
Solutions**

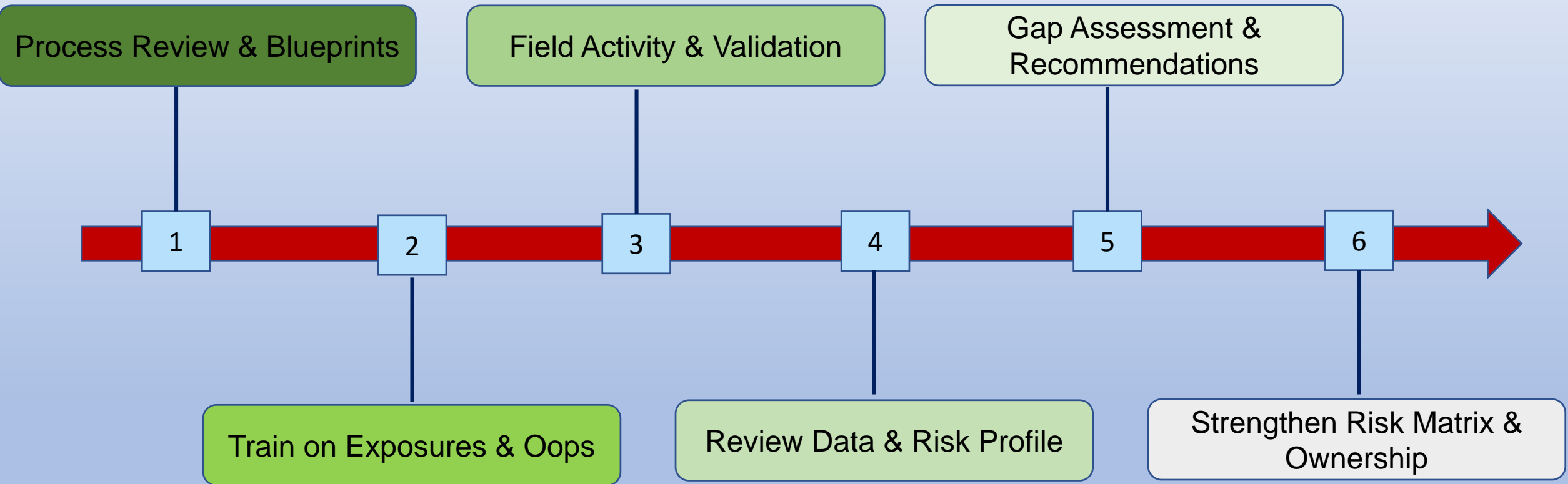
# Bringing a Large, Diverse, Young Workforce into Alignment

**Safe Work  
Practices**

**Operational  
Discipline**

**Perceptions of  
Risk**

# High Level Approach





# Risk Profiling is a Ground-up Approach



**UNUSUAL**

**UNEXPECTED**

**UNDESIRABLE**

**Risk Profiling estimates the potential for risk**

# From Experience to Enthusiasm



A unique “A day in your life” approach helps bring out potential incidents and scenarios waiting to happen through structured interactions & engagements



# Proactively Highlighting Risks and Taking Ownership



# Risk Sensitization through Structured Interactions

1- Approach the waverter to check Dryness

2- Tilt the converter to charging angle

3- Lift the ladle from DS

4- Move the crane with HM back to 11m

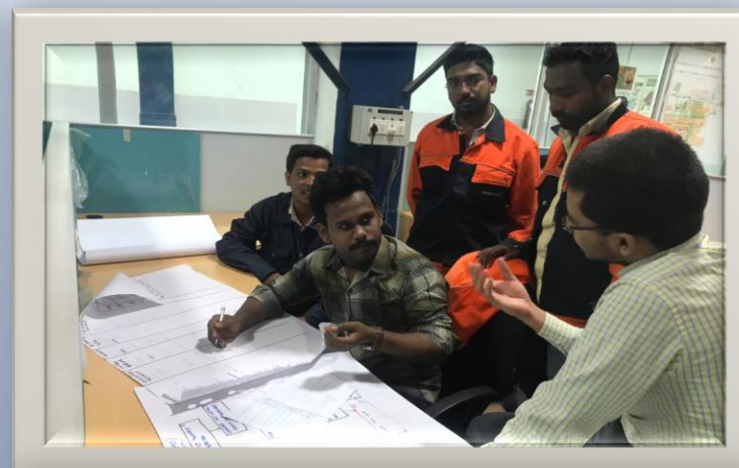
5- position the crane in front of Converter

6- Engage the auxiliary Hoist

*(Note: The board is covered with numerous sticky notes detailing risks such as 'Hot metal spill', 'Wrong positioning', 'Miscommunication', etc.)*

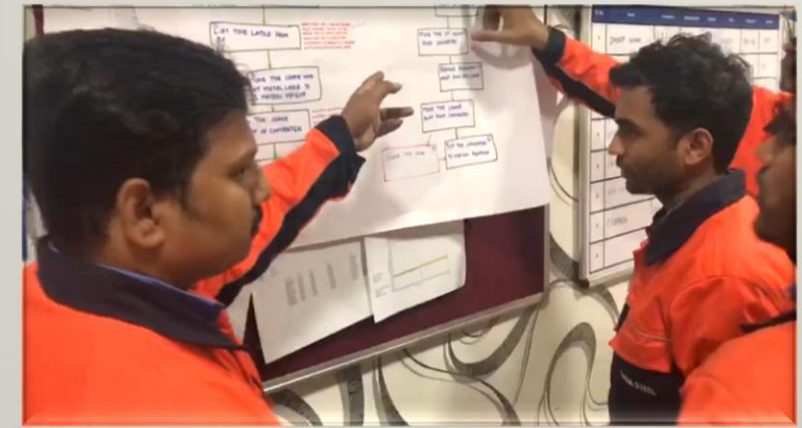
Filling position  
 operation freely  
 check  
 YES → NO → Read indicator → Call (over call)  
 NO → Leave  
 YES → Tilt runner  
 YES → NO → Read indicator → Call (over call)  
 YES → YES → Tilt to respective side → Hold the lever by hand  
 YES → YES → check pr. gauge (ready) → OK → NO if An pr low → close An val  
 YES → YES → Tilt to respective side → Hold the lever by hand  
 YES → YES → check pr. gauge (ready) → OK → NO if An pr low → close An val  
 YES → YES → Tilt to respective side → Hold the lever by hand  
 YES → YES → check pr. gauge (ready) → OK → NO if An pr low → close An val

*(Note: The board contains a flowchart and diagrams with sticky notes like 'Heat A/Dark', 'Spillage of molten metal', etc.)*



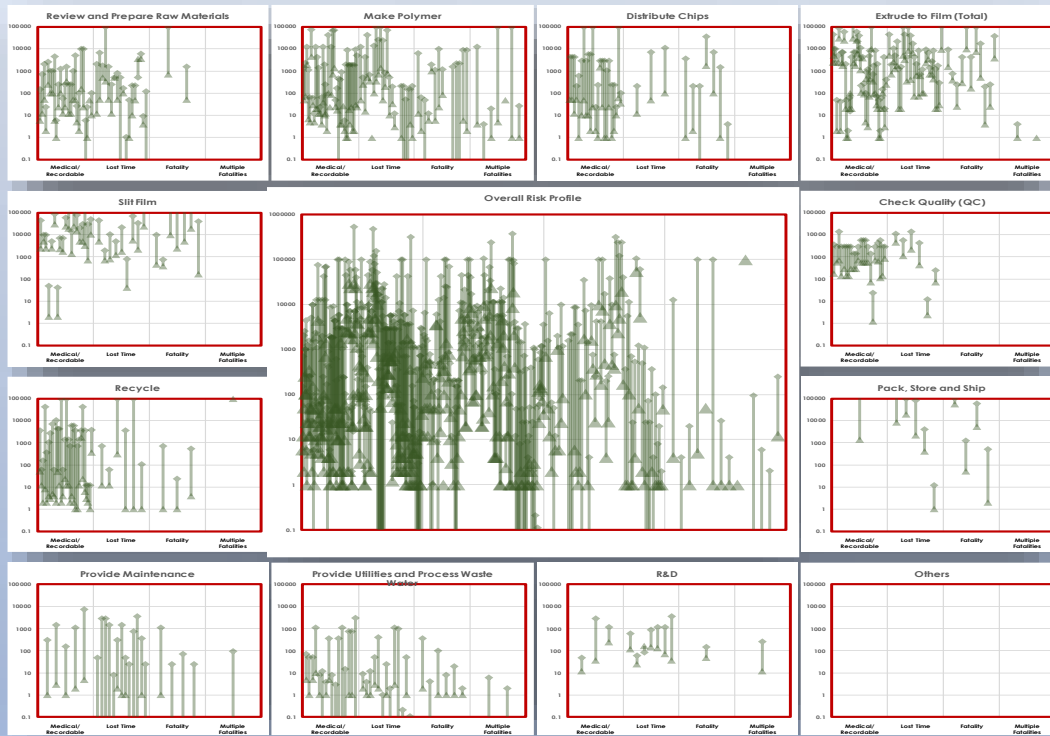


# Creating a Platform for Meaningful Discussions





# Risks and Threats Analyzed Beyond Safety



<b>Likelihood</b>	<b>F1 (Almost Certain)</b>					<b>I</b>
	<b>F2 (Likely)</b>			<b>II</b>		
	<b>F3 (Possible)</b>		<b>III</b>			
	<b>F4 (Un Likely)</b>					
	<b>F5 (Rare)</b>	<b>IV</b>				
		<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>
<b>Consequence</b>						
<b>People</b>	No injury /Local Offsite Treatment	Minor Injury / Health Effect	Major injury or Reversible health effect	Single Fatal / Irreversible health effect	Multiple Fatality / Irreversible health effect	
<b>Asset</b>	Slight damage	Minor damage	Moderate damage	Major damage	Massive damage	
<b>Community</b>	Slight impact	Limited impact	Considerable impact	National impact	International impact	
<b>Environment</b>	No Effect / Slight Effect	Minor Effect	Moderate Effect	Major Effect	Massive Effect	

- The **Horizontal axis** represents increasing **Consequences** and each of the identified consequences assess the **severity (C1 to C5)** in the four **consequence categories - People, Asset, Community and Environment (P, A, C, E)** going beyond just safety
- The **vertical axis** represents increasing **Likelihood (levels F1 to F5)** **of the Consequence**

# Playing a Critical Role in Gap Assessment & Recommendations

PARAMETER	GUIDEWORD	Deviation	Cause	Consequence	Impact* P-Possible & Severity C-Commonity E-Environment	Safeguards	Protected Risk	Recommendation	RESIDUAL RISK	Opportunity for Improvement
							SEVERITY	FREQUENCY	RISK	
Excess vessel is completely dry (STEP-01)	Operator action	wrongly judged	Human Factor-- Operator Error	If converter is not dry enough, it will be heavy explosion which will lead to major damage to scrap and vessel.	P, A	Neutral guard switch	O4			
	Sequence/Order	what if missed	Human Factor-- Operator Error				O4			
Transfer of hot metal from De-Slag station/Transfer platform (STEP-02)	Rate	Too fast	Human Factor Hydro-Operator error	Chance of collision of the hot metal ladle with another ladle or equipment in the area. The platform which will be the damage to equipment and loss of equipment of overhead hot metal ladle.	P, A	Detect--operator (EOT Over load system) Decide--PLC Defect--Crane movement stopped	O3	F3	R3	
				Chance of collision of crane with another crane in the area. It will lead to the collapse of hot metal carrying major damage to people and moderate damage to equipment. Loss of hot metal.	P, A	Detect--Electrical stopper will not operate Decide--Operator to stop crane Defect--Charging crane with another crane fall Defect--Hot metal ladle is connected	O4	F3	R3	

STANDARD OPERATING PROCEDURE					
Form No. : EHSMSM/446/4013	Form Rev. No. : 01	Effective Date	08/08/2017	Effective date: 01.01.2016	REVISION No
SOP No.	TSK/QMS/SMS/OPRN/SOP/19/REV:01	Section	PSM		01
SOP DESC	HOT METAL CHARGING IN RUNNING VESSEL	Page	2 of 9		
DEPARTMENT	SMS TSK				

Sl. No.	Activity (What)	Associated Requirements/Hazards/Impact	Responsibility (Who)	Process/Tools/ PPE's	Remarks
1	Placing hot metal ladle in front of the vessel.	SAFETY: 1. Overhead EOT crane movement 2. Spilling of hot metal. 3. Falling of HM Ladle jam.  ENVIRONMENT: Nil  QUALITY: Nil	Converter Charging Operator	Ask the charging crane operator to bring the hot metal ladle in front of the vessel by giving hand signals/by walky talky and place it centrally to the mouth of the vessel.  PPE's: Helmet, safety shoes, Fire-retardant jackets, Safety goggles.	1. Before hot metal charging, it must be ensured physically that the vessel is completely dry. (No moisture in scrap/ no liquid slag should be present) Scrap Charging SOP: TSK/QMS/SMS/OPRN/SOP/17/REV:01  2. <b>The dryness must be checked by the charging operator physically from outside standing at a safe distance via near cutout hatch.</b>  3. The charging door must be full open.

Not many organizations engage their shopfloor employees in a structured manner, empower them to speak up and hear them out. We made the difference.

# What makes this approach so Unique?

We developed a sense of risk thinking now

We feel empowered to talk about the not so obvious risks too now

OOPS gives us a good explanation of how risk taking has become a habit for us

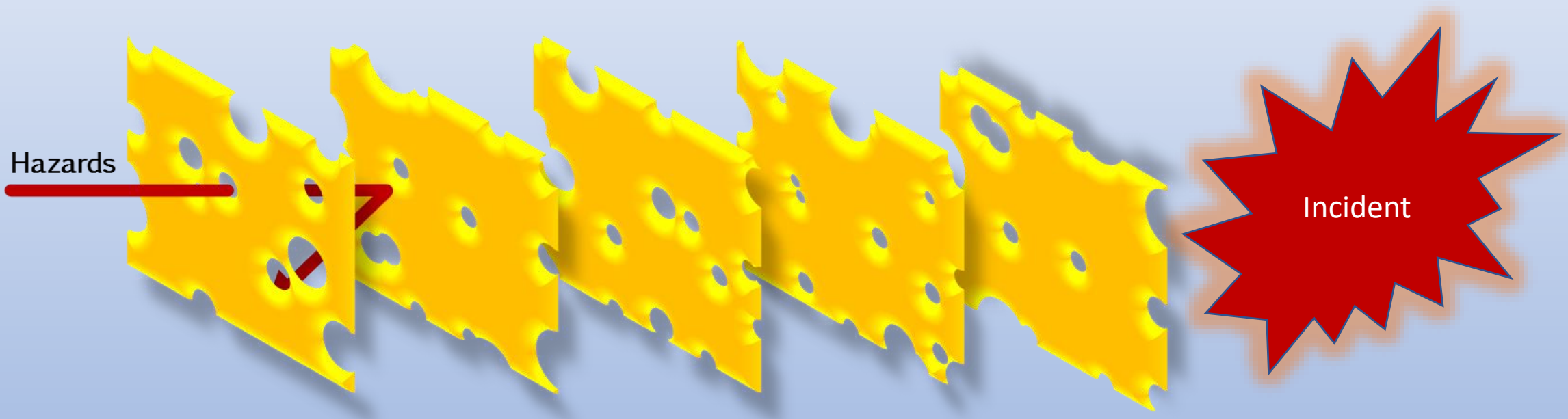
We never realized before this program that we are exposed to such high hazard levels! The calculations blew our mind & our perception of risk

This would avoid forced agreements of compulsion and move to conviction



We are getting more recommendations from Risk Profiling from a large number of people on ground

# Critical layers of protection



**Make the frontline personnel envision themselves as a critical layer of protection**

## Outcomes & Benefits

- Effectively refreshed a large workforce in a wide range of activities, building capability and competency while decreasing anxiety
  - Comprehensive Risk register covering most of routine & non routine activities
  - Common understanding of risks and stronger culture of hazard awareness and Risk appreciation
- Identified gaps in operational discipline and activities missing from existing SOPs
  - Creating an active and continuously evolving dialogue among and between operators and line managers to identify and appreciate high risks
  - Enable meaningful cultural transformation at the organization level, top-down & bottom-up

**‘Vocal’, ‘confident’, ‘enthusiastic’ and ‘risk aware’ workforce making for a dynamic organization with vibrant management systems**



# TATA STEEL

 We Also Make Tomorrow

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