



**IndianOil**  
*The Energy Of India*



# Initiatives in Indian Oil Refineries

# Safety Management System at IndianOil

## HSE Leadership and Commitment

- H,S&E Policy
- Safety Committee meetings
- Employee participation
- Review & Monitoring
- Apprising the Board

## Facilities Design and Construction

- Statutory Licenses
- OISD Standards
- PNGRB Regulations
- International Standards like NFPA, API, DIN etc.
- Dedicated fire fighting system

## Process Safety, Risk Analysis, Reliability

- PHA/ HAZOP/ QRA
- Process Safety interlocks
- Emergency Shutdown System
- Condition Monitoring
- Predictive/ Preventive Maint.

## Training & Personnel Safety

- Use of PPEs
- IFR Coveralls
- Training as per OISD-STD-154
- Live Fire Fighting Training
- Training on specialized topics

## Procedural System

- Work Permit System
- Standard Operating Procedures
- Job Safety Analysis
- Toolbox Talks
- Management of Change
- Identified Fire Permit Signatories

## Disaster Management

- ERDMP for all locations
- Mock Drills
- Onsite/ Off-site Disaster Drills
- Mutual Aid Agreement
- Pre fire fighting plans

## Audits

- Internal Safety Audits by Multi-Disciplinary Teams
- System Audit
- External Safety Audit
- Surprise Safety Audit
- Pre-Commissioning Audit
- Electrical Audit
- Hygiene index Audit

## Incident Investigation

- Investigation Committee
- Implementation of recommendations
- Sharing of lessons learnt
- Animated films
- Near Miss Reporting
- Penal Action

## New Initiatives being taken to curb incidents – by all Divisions

Implementation of issuing of Work Permit in SAP

E-learning modules on various safety related topics - Swadhyaya - 190 courses

Corporate guidelines have been developed on use of PPEs, covering 57 critical activities across Divisions and PPEs to be used during these activities.

Periodical review of SOPs of various activities at locations and approval by Competent Authority.

Policy on FPR-Building Safety formulated and FPRs identified for all Admin buildings, Training Centers and Residential Colonies

Implementation of Electrical Safety Audit Scheme for buildings,



# New Initiatives being taken to curb incidents – by all Divisions

## Safety Awareness Program



# New Initiatives being taken to curb incidents – by all Divisions

## Safety Park

Safety parks are designed as an area designated for reinforcement of safety knowledge of our work force through visual display of safety related aspects.

In some of the refineries the safety park has various sections. Each section is dedicated to a specific hazard present in the Refinery. These sections have both reading material and still models of various activities/ process & related hazards in the Refinery.





# New Initiatives being taken to curb incidents – by all Divisions

## Sharing of lessons learnt

### Learning from incident/ accident is shared among the employees/ contract workers through measures like:

- One pagers circulated to all employees indicating major lapses/ improvement actions required.
- Questions on lessons learnt included in online safety quiz conducted on All India basis.
- Sharing of accident details in safety committee meeting/ monthly safety day program etc.
- E-learning modules based on incident, for use by all.
- Safety films on few major accidents being prepared by Refinery Division.

#### **MAJOR FIRE ACCIDENT** AT RETAIL OUTLET M/s GOPINATH & BROTHERS, CHAKARPUR, KANPUR ON 23.05.2020

##### **Brief of the Incident:**

- On 23.05.2020 at 11:30 hrs, truck number UP78CN4103, parked in vacant land of RO M/s Gopinath & Brothers, Chakarapur, Kanpur caught fire when driver tried to start it.
- The fire also spread to another truck number NL01AB8967 parked nearby at the RO.
- RO manager and customer attendants tried to extinguish the fire using fire extinguishers however the fire could only be extinguished by 12:30 hrs after arrival of fire tender.
- During the fire, cabin of truck number UP78CN4103 was badly damaged and there was also damage to rear end of truck number NL01AB8967.
- Both these trucks belonged to regular customers of the Retail Outlet and were not petroleum transport vehicles.



Fire incident



UP78CN4103 –After Incident



NL01AB8967 –After Incident

##### **Cause (s):**

Exact cause of fire could not be confirmed during accident investigation, however, as per eyewitness, the probable cause of fire was bursting of battery while starting the truck.

##### **Major Lapses:**

- RO Dealer allowed parking of trucks in RO area though as per PESO approved layout there is no designated parking area in licensed premises of this RO.
- Both the trucks were parked very close to each other and facing in opposite direction. Truck no. NL01AB8967 was not parked in drive out position.
- CCTV coverage was not provided at RO.

##### **Lessons Learnt:**

- Parking of Trucks in licensed premises of retail outlet should not be done.
- If parking of vehicle is necessary for some time, it should be placed in drive out position.
- CCTV coverage should be provided to cover all activities of Retail Outlet.

Detail Incident Investigation Report can be accessed thru CO-HSE website under Accidents/incidents tab.



# New Initiatives being taken to curb incidents – Refineries Division

## PPE Monitoring system

Artificial Intelligence (AI) based PPE monitoring system implemented in some of the refineries and under implementation at remaining locations.

The screenshot displays the AI-based PPE monitoring system interface. On the left, a vertical list of timestamps from 13:58:35 IST 2022 to 13:56:07 IST 2022 is shown, with 'Critical' status indicators. The main video feed shows a worker in a blue uniform walking through a doorway, with a red bounding box around their head. A second worker in an orange uniform is visible in the foreground. A play button and a progress bar are located below the video. On the right, a separate video feed shows a worker in a red uniform at a refinery site, with a red bounding box around their head and a yellow label 'PPE\_Harness @Ref\_IFR\_Coverall'. Below the video feeds is a 'Compliance Table' with columns for Location, Total, and Passed. The table shows 100% compliance for all locations. To the right of the table are two green boxes showing '100% Total Compliance for Workshop (Today)' and '99% Overall Compliance for Workshop (13.12.2021 to 13.01.2022)'. At the bottom, an 'Insights' section features a bar chart showing the number of violations over time, with a red triangle icon and the text 'Last violation recorded on 2022-01-07 at 09:27:28'. The interface also includes a 'Camera' section with '5\_Camera\_GATE\_2B' and a 'Capture Time' of 'Mon Nov 07 13:57:32 IST 2022'.

Location	Total	Passed
All Sites	100%	99%
SRU	100%	99%
Workshop	100%	99%
Bhawan	100%	98%
SA Gate	100%	99%
UPS	100%	100%



## New Initiatives being taken to curb incidents – Refineries Division

“Automatic Vehicle Over speed Detection System” is made functional for speed safety monitoring inside refineries.

**SPEED LIMIT 25**

**AUTOMATIC VEHICLE OVERSPEED DETECTION SYSTEM**

**GO FOR ~~SPEED~~ SAFETY**

**GUJARAT REFINERY FOR SAFER ROADS**

Vehicle No.	Speed (km/h)	Time	Location
GUJ-12-AB-1234	35	10:15:00	Refinery Road
GUJ-12-CD-5678	28	10:16:00	Refinery Road
GUJ-12-EF-9012	42	10:17:00	Refinery Road
GUJ-12-GH-3456	25	10:18:00	Refinery Road
GUJ-12-IJ-7890	30	10:19:00	Refinery Road
GUJ-12-KL-1122	22	10:20:00	Refinery Road
GUJ-12-MN-3344	38	10:21:00	Refinery Road
GUJ-12-OP-5566	27	10:22:00	Refinery Road
GUJ-12-QR-7788	33	10:23:00	Refinery Road
GUJ-12-ST-9900	29	10:24:00	Refinery Road
GUJ-12-UV-1122	31	10:25:00	Refinery Road
GUJ-12-WX-3344	26	10:26:00	Refinery Road
GUJ-12-YZ-5566	36	10:27:00	Refinery Road
GUJ-12-AA-7788	24	10:28:00	Refinery Road
GUJ-12-BB-9900	32	10:29:00	Refinery Road
GUJ-12-CC-1122	28	10:30:00	Refinery Road
GUJ-12-DD-3344	34	10:31:00	Refinery Road
GUJ-12-EE-5566	23	10:32:00	Refinery Road
GUJ-12-FF-7788	37	10:33:00	Refinery Road
GUJ-12-GG-9900	25	10:34:00	Refinery Road
GUJ-12-HH-1122	30	10:35:00	Refinery Road
GUJ-12-II-3344	27	10:36:00	Refinery Road
GUJ-12-JJ-5566	35	10:37:00	Refinery Road
GUJ-12-KK-7788	22	10:38:00	Refinery Road
GUJ-12-LL-9900	31	10:39:00	Refinery Road
GUJ-12-MM-1122	29	10:40:00	Refinery Road
GUJ-12-NN-3344	33	10:41:00	Refinery Road
GUJ-12-OO-5566	26	10:42:00	Refinery Road
GUJ-12-PP-7788	38	10:43:00	Refinery Road
GUJ-12-QQ-9900	24	10:44:00	Refinery Road
GUJ-12-RR-1122	32	10:45:00	Refinery Road
GUJ-12-SR-3344	28	10:46:00	Refinery Road
GUJ-12-TT-5566	34	10:47:00	Refinery Road
GUJ-12-UU-7788	23	10:48:00	Refinery Road
GUJ-12-VV-9900	37	10:49:00	Refinery Road
GUJ-12-WW-1122	25	10:50:00	Refinery Road
GUJ-12-XX-3344	30	10:51:00	Refinery Road
GUJ-12-YY-5566	27	10:52:00	Refinery Road
GUJ-12-ZZ-7788	35	10:53:00	Refinery Road
GUJ-12-AA-9900	22	10:54:00	Refinery Road
GUJ-12-BB-1122	31	10:55:00	Refinery Road
GUJ-12-CC-3344	29	10:56:00	Refinery Road
GUJ-12-DD-5566	33	10:57:00	Refinery Road
GUJ-12-EE-7788	26	10:58:00	Refinery Road
GUJ-12-FF-9900	38	10:59:00	Refinery Road
GUJ-12-GG-1122	24	11:00:00	Refinery Road
GUJ-12-HH-3344	32	11:01:00	Refinery Road
GUJ-12-II-5566	28	11:02:00	Refinery Road
GUJ-12-JJ-7788	34	11:03:00	Refinery Road
GUJ-12-KK-9900	23	11:04:00	Refinery Road
GUJ-12-LL-1122	37	11:05:00	Refinery Road
GUJ-12-MM-3344	25	11:06:00	Refinery Road
GUJ-12-NN-5566	30	11:07:00	Refinery Road
GUJ-12-OO-7788	27	11:08:00	Refinery Road
GUJ-12-PP-9900	35	11:09:00	Refinery Road
GUJ-12-QQ-1122	22	11:10:00	Refinery Road
GUJ-12-RR-3344	31	11:11:00	Refinery Road
GUJ-12-SR-5566	29	11:12:00	Refinery Road
GUJ-12-TT-7788	33	11:13:00	Refinery Road
GUJ-12-UU-9900	26	11:14:00	Refinery Road
GUJ-12-VV-1122	38	11:15:00	Refinery Road
GUJ-12-WW-3344	24	11:16:00	Refinery Road
GUJ-12-XX-5566	32	11:17:00	Refinery Road
GUJ-12-YY-7788	28	11:18:00	Refinery Road
GUJ-12-ZZ-9900	34	11:19:00	Refinery Road
GUJ-12-AA-1122	23	11:20:00	Refinery Road
GUJ-12-BB-3344	37	11:21:00	Refinery Road
GUJ-12-CC-5566	25	11:22:00	Refinery Road
GUJ-12-DD-7788	30	11:23:00	Refinery Road
GUJ-12-EE-9900	27	11:24:00	Refinery Road
GUJ-12-FF-1122	35	11:25:00	Refinery Road
GUJ-12-GG-3344	22	11:26:00	Refinery Road
GUJ-12-HH-5566	31	11:27:00	Refinery Road
GUJ-12-II-7788	29	11:28:00	Refinery Road
GUJ-12-JJ-9900	33	11:29:00	Refinery Road
GUJ-12-KK-1122	26	11:30:00	Refinery Road
GUJ-12-LL-3344	38	11:31:00	Refinery Road
GUJ-12-MM-5566	24	11:32:00	Refinery Road
GUJ-12-NN-7788	32	11:33:00	Refinery Road
GUJ-12-OO-9900	28	11:34:00	Refinery Road
GUJ-12-PP-1122	34	11:35:00	Refinery Road
GUJ-12-QQ-3344	23	11:36:00	Refinery Road
GUJ-12-RR-5566	37	11:37:00	Refinery Road
GUJ-12-SR-7788	25	11:38:00	Refinery Road
GUJ-12-TT-9900	30	11:39:00	Refinery Road
GUJ-12-UU-1122	27	11:40:00	Refinery Road
GUJ-12-VV-3344	35	11:41:00	Refinery Road
GUJ-12-WW-5566	22	11:42:00	Refinery Road
GUJ-12-XX-7788	31	11:43:00	Refinery Road
GUJ-12-YY-9900	29	11:44:00	Refinery Road
GUJ-12-ZZ-1122	33	11:45:00	Refinery Road
GUJ-12-AA-3344	26	11:46:00	Refinery Road
GUJ-12-BB-5566	38	11:47:00	Refinery Road
GUJ-12-CC-7788	24	11:48:00	Refinery Road
GUJ-12-DD-9900	32	11:49:00	Refinery Road
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GUJ-12-GG-5566	23	11:52:00	Refinery Road
GUJ-12-HH-7788	37	11:53:00	Refinery Road
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GUJ-12-JJ-1122	30	11:55:00	Refinery Road
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GUJ-12-PP-3344	33	12:01:00	Refinery Road
GUJ-12-QQ-5566	26	12:02:00	Refinery Road
GUJ-12-RR-7788	38	12:03:00	Refinery Road
GUJ-12-SR-9900	24	12:04:00	Refinery Road
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GUJ-12-UU-3344	28	12:06:00	Refinery Road
GUJ-12-VV-5566	34	12:07:00	Refinery Road
GUJ-12-WW-7788	23	12:08:00	Refinery Road
GUJ-12-XX-9900	37	12:09:00	Refinery Road
GUJ-12-YY-1122	25	12:10:00	Refinery Road
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GUJ-12-AA-9900	29	13:04:00	Refinery Road
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GUJ-12-VV-3344	31	13:51:00	Refinery Road
GUJ-12-WW-5566	29	13:52:00	Refinery Road
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GUJ-12-AA-3344	24	13:56:00	Refinery Road
GUJ-12-BB-5566	32	13:57:00	Refinery Road
GUJ-12-CC-7788	28	13:58:00	Refinery Road
GUJ-12-DD-9900	34	13:59:00	Refinery Road
GUJ-12-EE-1122	23	14:00:00	Refinery Road
GUJ-12-FF-3344	37	14:01:00	Refinery Road
GUJ-12-GG-5566	25	14:02:00	Refinery Road
GUJ-12-HH-7788	30	14:03:00	Refinery Road
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GUJ-12-UU-3344	23	14:16:00	Refinery Road
GUJ-12-VV-5566	37	14:17:00	Refinery Road
GUJ-12-WW-7788	25	14:18:00	Refinery Road
GUJ-12-XX-9900	30	14:19:00	Refinery Road
GUJ-12-YY-1122	27	14:20:00	Refinery Road
GUJ-12-ZZ-3344	35	14:21:00	Refinery Road
GUJ-12-AA-5566	22	14:22:00	

# New Initiatives being taken to curb incidents – Refineries Division

## New Innovations – Helmet testing

Available System	Innovation
For a crucial life saving PPE (helmet) , there is no testing mechanism or facilities available at industry level to test robustness of safety helmet.	Helmet Penetration Resistance Testing Bench was designed first at GR F&S) (As per IS 2925) at very low cost utilizing available resources and is being used for testing safety helmets of working agencies.

### Benefits:

- Identification and replacement of low-quality helmet
- Cost saved in terms of saving human life by using good quality safety helmets

### Value Addition:

- Enhancement of safety culture among the contract workers.
- Sense of satisfaction and positivity among workers.



# New Initiatives being taken to curb incidents – Refineries Division

## New Innovations - Vertigo testing facility

Available System	Innovation
<ul style="list-style-type: none"><li>Workers have general medical fitness issued by OHC Doctors</li><li>Mandatory safety training for working at height and issue of Specialized Training Card.</li><li>Model based training at safety park.</li></ul>	Endurance test of worker's fitness for VERTIGO thru 'Vertigo Test Model'

### Major features:

- ✓ Examination and recording of blood pressure & pulse of the person by medical team (First Aid Doctor).
- ✓ Person wears full body safety harness before climbing on vertigo structure.
- ✓ Person has to walk on the walkway to other end of the platform & return back to the starting point.
- ✓ BP & pulse of the person is again examined & recorded by medical team.
- ✓ After the test, fitness of the person is decided by First Aid Doctor.



# New Initiatives being taken to curb incidents – Refineries Division



1. Continuous Monitoring.
2. Ease of Monitoring at top of the Technical Structures/Columns.
3. Workers are more alert to follow safety norms.
4. Large area can be monitored.
5. TV displaying drone monitoring videos at site



## New Initiatives being taken to curb incidents – Refineries Division



Imparting induction training by IOCL front line officers to the workers before the commencement of the job.

Benefits:

1. First hand experience on safety training to newly joined IOCL officers.
2. Improvement in training quality
3. 18 safety topics identified by RHQ-HSE covering critical aspects.



# New Initiatives being taken to curb incidents – Refineries Division

## National Seminar on 'Process Safety Management - Way to Minimise Hazards' at Gujarat Refinery



ED & RH, Gujarat Refinery, along with other dignitaries, during the seminar

Gujarat Refinery and Indian Institute of Chemical Engineers (IICChE), Baroda Regional Centre (BRC) recently organised a National Seminar on 'Process Safety Management - Way to Minimise Hazards' at Gujarat Refinery in technical collaboration with Petroleum Explosives and Safety Organisation (PESO). The Chief Guest, Mr Sanjaya Bhatnagar, ED & RH, Gujarat Refinery, in his inaugural address, emphasised on sound and effective process safety culture by creating awareness among all employees and shop floor workers, correct procedures and operations, crisis response management and such other aspects of safety culture. Ensuring training for the workforce on Process Safety Management (PSM) is the need of the hour which will not only help in saving valuable lives but also save the crucial infrastructure which maintains steady output to keep the wheels of prosperity moving. Dr R Venugopal, IPESS, Joint Chief Controller of Explosives, PESO, Vadodara, was the Guest of Honour. In his keynote address, he mentioned several types of processes in the oil & gas industry having the potential for chemical releases that create dangerous fires, safety and health hazard. He defined PSM in four key steps viz. Commitment towards process safety, Understanding Process Hazards & Risks, Managing Process Risk to ALARP & Learning from Experience. "It should not be necessary for each generation to rediscover principles of process safety which the generation before had discovered. We must learn from the experience of others rather than learn the hard way", said Dr Venugopal. The valedictory function was chaired by Mr S C Bamaniya, Joint Director, DISH, Vadodara, who stressed upon the importance of adhering to PSM principles and Gujarat Factories Rule to avoid fatalities, injuries and financial penalties. The presentation topics covered the PSM in Cryogenics Industries, Chlor-Alkali Industries, Chemical Industries, Upstream E&P & Process Equipment Design & Fabrication, besides case studies of Refinery, upstream Chemical Industries, and Fertilizer Industries showing the root cause analysis (RCA) of incidents, key learnings and one point lesson from Incident Investigation. More than 400 delegates from 55 industries from across India participated in National Seminar, which was designed into three technical sessions chaired by eminent industry leaders & presentations on various facets, including Behavioural Safety, Management of Change, Process Safety Incident Investigations besides Case Studies on the Process Safety Management by distinguished faculties from Inox, Gujarat Fluorochemicals Limited, Reliance Industries Limited, Deepak Nitrite, GSFC, Sun Petrochemicals Private Ltd, ISGEC Hitachi Zosen Ltd, IndianOil Gujarat Refinery and PESO, Vadodara. (A R Srinivasan, Sr Officer (Corp Comm), Gujarat Refinery)



# New Initiatives being taken to curb incidents – Refineries Division

## New Innovations/ Policies/ Guidelines

Revised guidelines on **interlock bypassing and testing** issued

**Control procedure for impairment of fire protection system** issued.

**IFR coverall made mandatory PPE** for all personnel entering battery area of Refineries irrespective of job they are involved in. **Inherent Flame Retardant (IFR)** coverall provided in Refinery (32,463 nos).



Guidelines on **Working on Fragile roof** issued for ensuring safety .



# New Initiatives being taken to curb incidents – Refineries Division

ONE SMALL SAFETY THOUGHT CAN MAKE YOUR DAY 'SAFE'

# 100 Safety Thoughts

## Fire & Safety Gujarat Refinery

Safety thoughts broadcasted among employees on regular basis on different topic

### Safety Thought

ST#2020/00052

#### Making a Face Cover at Home Without Sewing Machine

Step 1: Prepare the material.  
Step 2: Cut the material.  
Step 3: Sew the material.  
Step 4: Attach the elastic band.  
Step 5: Finish the product.  
Step 6: Use the face cover.  
Step 7: Wash the face cover.

#### MEASURES TO PROMOTE IMMUNITY

1. Wash hands regularly with soap and water for at least 20 seconds.
2. Avoid touching your face, especially your eyes, nose, and mouth.
3. Maintain a healthy diet and exercise regularly.
4. Get enough sleep.
5. Avoid close contact with people who are sick.

#### TAPPING INTO AGE-OLD WISDOM OF AYURVEDA DURING COVID-19

Natural Ways to Boost the Immune System

1. Turmeric: Contains curcumin, which has anti-inflammatory and antioxidant properties.
2. Ginger: Helps in boosting the immune system and has anti-inflammatory properties.
3. Garlic: Contains allicin, which has antibacterial and antiviral properties.

### Safety Thought

12.11.2019

#### Safety of Mobile Crane

- ✓ Vehicle must be sited on firm and stable ground
- ✓ Sufficient clearance from obstructions and overheads when operating
- ✓ Barrier around crane to prevent it being struck by vehicles and keeping out people from underneath the cradle.
- ✓ Guard rails incorporated into the cradle, safety harness must be worn as an additional backup
- ✓ Control should be inside the cradle, so that the person actually working at height has some control
- ✓ Must not be driven with the cradle raised unless specifically designed to do so.
- ✓ Must not be overloaded
- ✓ Must be inspected by a competent person
- ✓ Use should be restricted to trained, authorized staff only
- ✓ Flagman should always be present
- ✓ Slings must be checked for any wear and tear.

Monthly Safety Theme: Safety in Lifting Tools & Safe Lifting Methods

### Safety Thought

ST#2020/0028

#### Prevent unauthorised entry

Prevent unauthorised access from entering confined spaces by placing barriers and warning signs and give necessary entry permits at the entrance of confined spaces.

#### Test for hazards

Test for atmospheric hazards in the following order: oxygen, flammable gases and toxic. An authorised person and permit employee to observe testing.

#### Communication

Communication between workers and confined space attendants must be maintained at all times.

#### Ensure adequate ventilation

Ensure that there is adequate atmospheric testing work in confined spaces.



## New Initiatives being taken to curb incidents – Refineries Division

### Actions being taken by locations to ensure strict adherence of SOP

Existing Standard Operating Procedure (SOP)/ Standard Maintenance Procedure (SMP) are supplemented with **checklist specifying hazards, risks, and mitigation strategies** for each step with provision of signature on the checklist

- **Identification of violations of SOP** during regular monitoring/ supervision of actual job
- **Counselling of violators** and disciplinary action if required
- Conducting Process Mock Drills & Skill Development Programs in all units with an external observer
- Identification of deviations of the steps
- Counselling of the concerned person followed by repetition of the mock drill to ensure compliance

Ensuring preparation/ modification of SOP with adequate training to all concerned employees before commissioning of the approved MOC scheme

**Interaction of senior and middle management with frontline officers and staff** so that they can have a better understanding of their duties and responsibilities including SOP compliances



# Safety

is as simple as . . .

**A** lways

**B** e

**C** areful

# THANKS

