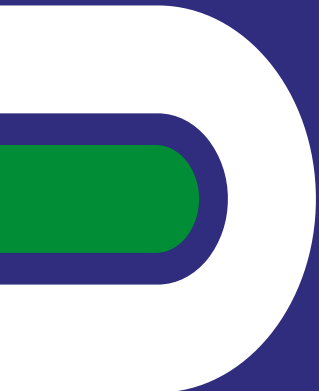


ENVIRONMENT AND HEALTH & SAFETY

Break-out session



drive
sustainability

ANTI-TRUST

Regarding your company's and/or your competitors' product and services, **it is forbidden:**

- To discuss current or future prices or supply conditions.
- To discuss any increase or decrease in price or change of supply conditions.
- To discuss pricing procedures.
- To discuss standardizing or stabilizing prices or commercial supply conditions.
- To discuss current or future demand.
- To ask competitors why a previous bid was so low, or to describe the basis for a previous bid.
- To discuss profit levels.
- To discuss controlling sales or allocating markets for any product.
- To discuss future design or marketing strategies.
- To discuss credit terms.
- To discuss banning or otherwise restricting legitimate advertising by competitors.
- To discuss allocating customers.
- To discuss volumes.
- To discuss any other subject likely to restrict competition.

Regarding your company's and/or your competitors' selection of their supplier companies, **it is in particular forbidden:**

- To disclose or discuss the identity of suppliers if this identity is a competitively sensitive information.
- To discuss any boycotting of a company because of its pricing or distribution practices.
- To discuss strategies or plans to award business or remove business from a specific company.
- To discuss prices, margins, payment terms, volumes, markets, customers or marketing strategies of suppliers with competitors.

Regarding your company's and/or competitors' trade secrets, **it is forbidden:**

- To discuss trade secrets or confidential information of your company or any other member

CHATHAM HOUSE RULES

Please also keep in mind

- Participants attending the training **may discuss the details** of the discussion in the **outside world**, but **may not discuss who attended or identify what a specific individual said**
- Provides anonymity to speakers and encourages sharing of information;
- Used throughout the world;
- Allows people to speak as individuals, and to express views that may not be those of their organizations;
- Encourages free discussion

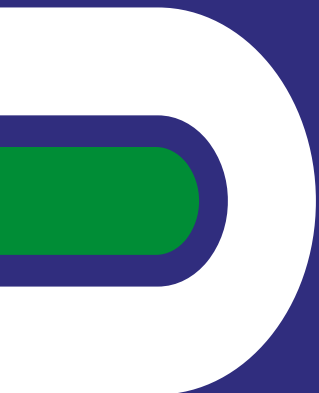
AGENDA: ENVIRONMENT AND HEALTH & SAFETY

Working & leaning together

| | |
|-----------------------------|--|
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| 12:30 – 12:45 | Coffee break |
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| Participants regroup | |
| 13:10 – 13:30 | Closing |

INTRODUCTION

Expectations towards the industry: Guiding Principles



drive
sustainability

THE GUIDING PRINCIPLES

Environment

Companies are expected to support a **proactive approach to environmental responsibility** by protecting the environment, conserving natural resources and reducing the environmental footprint of their production, products and services throughout their life-cycle.

The screenshot displays the 'Global Automotive Sustainability Practical Guidance' document. At the top, it features logos for various automotive groups: BMW GROUP, DAIMLER, FCA, Ford, GM, HONDA, JAGUAR, and LAND ROVER. Below these are logos for NISSAN, SCARFA, TOYOTA, VOLKSWAGEN, VOLVO, and VOLVO. The document is divided into two main sections: 'Environment' and 'Human Rights and Working Conditions'. The 'Environment' section includes a general statement on proactive environmental responsibility, a list of comprehensive approach elements (Energy Consumption & Greenhouse Gas Emissions, Water Quality & Consumption, Air Quality, Natural Resources Management and Waste Reduction, and Responsible Chemical Management), and a reference to the full guidance document. The 'Human Rights and Working Conditions' section includes a general statement on respecting human rights and a list of specific principles: Child Labor/Labour and Young Workers, Wages and Benefits, Working Hours, Forced Labor/Labour, Freedom of Association, Health & Safety, Harassment, and Non-Discrimination.

Environment

Companies are expected to support a proactive approach to environmental responsibility by protecting the environment, conserving natural resources and reducing the environmental footprint of their production, products and services throughout their life-cycle.

A comprehensive approach includes but is not limited to:

- **Energy Consumption & Greenhouse Gas Emissions:** Companies are expected to implement a comprehensive energy reduction strategy and management program while increasing use of renewable energy.
- **Water Quality & Consumption:** Companies are expected to effectively reduce, reuse, and recycle water with responsible treatment of wastewater discharges to protect the environment and improve overall water quality.
- **Air Quality:** Companies are expected to routinely monitor, appropriately control, minimize, and to the extent possible, eliminate emissions contributing to local air pollution.
- **Natural Resources Management and Waste Reduction:** Companies are expected to encourage and support the use of sustainable, renewable natural resources while reducing waste and increasing reuse and recycling.
- **Responsible Chemical Management:** Companies are expected to identify, minimize/eliminate or eliminate the use of restricted substances in manufacturing processes and finished products to ensure regulatory compliance. Companies should also be aware of any use of reportable substances in processes and finished products, and actively investigate suitable substitutes.

For further details please refer to the [Global Automotive Sustainability Practical Guidance](http://www.daimler.com) located at AAAG: <http://aaag.org/corporate-responsibility> and Drive Sustainability: www.drive-sustainability.org

Human Rights and Working Conditions

Companies should respect the human rights of workers, and local all people with dignity as recognized by the international community.

- **Child Labor/Labour and Young Workers:** Companies must ensure that child labor is not tolerated in any form. The age of employment for young workers must meet or exceed company guidelines, legal regulations and local labor laws.
- **Wages and Benefits:** Companies should provide compensation and benefits that comply with applicable local laws, including those relating to minimum wages, overtime compensation, and legally mandated benefits.
- **Working Hours:** Companies should comply with local law regarding working hours, including overtime.
- **Forced Labor/Labour:** Companies must prohibit any form of forced, bonded or compulsory labor/forced, including human trafficking.
- **Freedom of Association:** Companies should allow workers to communicate openly with management regarding working conditions and management practices without fear of reprisal, intimidation or harassment. Companies should respect workers' rights to associate freely, to join or not join labor/union unions, bargain collectively, seek representation, and join workers' interests in accordance with local law.
- **Health & Safety:** Companies should provide workers a safe and healthy working environment that meets or exceeds applicable local laws and industry standards for safety and occupational health.
- **Harassment:** Companies should provide a work place free of harassment against workers in any form.
- **Non-Discrimination:** Companies should not tolerate any form of discrimination in respect of employment and occupation and should provide equal employment opportunities regardless of worker or applicant characteristics such as race, color/ethnicity, age, gender, sexual orientation, gender identity, ethnicity or national origin, disability, pregnancy, religion, political affiliation, union association, covered veteran status, genetic information or marital status.

THE PRACTICAL GUIDANCE

Environment - A comprehensive approach includes - but is not limited to:



Energy Consumption & Greenhouse Gas Emissions (including monitoring, energy management strategy)



Water Quality & Consumption (including assessment of water stress, conservation measures)



Air Quality (including monitoring, air emissions management plan)



Natural Resources Management and Waste Reduction (including waste reduction targets, waste management hierarchy, use of sustainable and renewable resources)

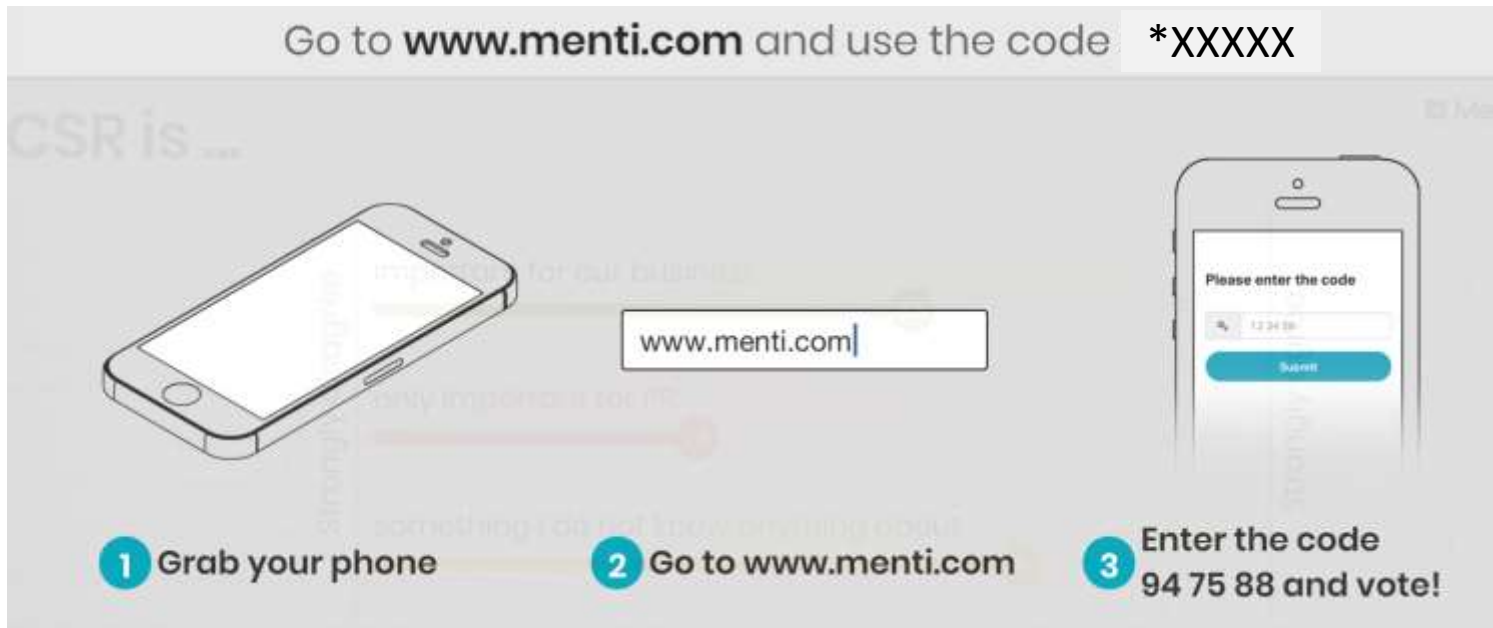


Responsible Chemical Management (including Safety Data Sheets, measuring data completeness against bill of materials)

POLLING EXERCISE

On which topic of the Guiding Principles/Practical Guidance would you like to receive more information?

Go to www.menti.com and use the code *XXXXX



The diagram illustrates the process of accessing a Menti poll. It features three numbered steps: 1. Grab your phone, 2. Go to www.menti.com, and 3. Enter the code 94 75 88 and vote! A smartphone is shown on the left, a browser address bar with www.menti.com in the center, and a smartphone on the right displaying a 'Please enter the code' screen with a text input field containing '94 75 88' and a 'Submit' button. The background of the diagram shows a blurred Menti poll interface with the text 'CSR is ...' and various options.

- 1 Grab your phone
- 2 Go to www.menti.com
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*Code to be shared with the participants during the session

How to Write a Policy?

Preparation

- Consider mission, values, vision of the company
- Define the place and the role of the code
- Prepare benchmarks
- Research of norms and legislation

Approval on establishing the policy/code

Outlining and writing

- Consult internally with the relevant departments, e.g. HR, compliance officer, in certain cases perhaps the CEO
- Feedback
- Contact communication to discuss the layout of the code and the communications strategy
- Escalate the document and the ideas to the necessary decision-making fora

Approval on the policy/code

Policy/Code

- With the approval of the board, create the final policy/code
- Start communication within the company. Trainings, e-learningings are common ways to roll-out such an instruments and don't forget refresher trainings.

BASF Environment, Health and Safety Policy

Issue:

- Continuous improvement of safety, health, environmental protection, energy and resource efficiency.
- Commitment to Responsible Care® Management System.

Solution:

- Principle integrated in all business processes.
- Attendance to all legal, regulatory, and trade related requirements.
- Economic considerations that do not take priority over safety, health and environmental protection.
- Dedication and active participation of all employees.
- External certification of management systems.
- Implementation of Trade Control, an instrument of national and international security policies.

Results:

- Employee's health and safety preservation (HPI = 0.96).
- Continuous improvement of EHS Policy.
- Open disclosure of policies (lifelong learning with platform Go2Learn)
- Incentives for leaders to participate in the trainings.



THE GUIDING PRINCIPLES

Health & Safety

Companies should provide workers a **safe and healthy working environment** that meets or exceeds applicable local laws and industry standards for safety and occupational health.

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THE PRACTICAL GUIDANCE

Health & Safety - A comprehensive approach includes but is not limited to:



H&S Management System (including risk assessment, training, policy & procedures, internal evaluation)



Permits, licenses, inspection and testing reports



Workplace safety (including machine safety, electrical safety, personal protective equipment, responsible chemical management)



Emergency preparedness (including fire safety, evacuation drills)

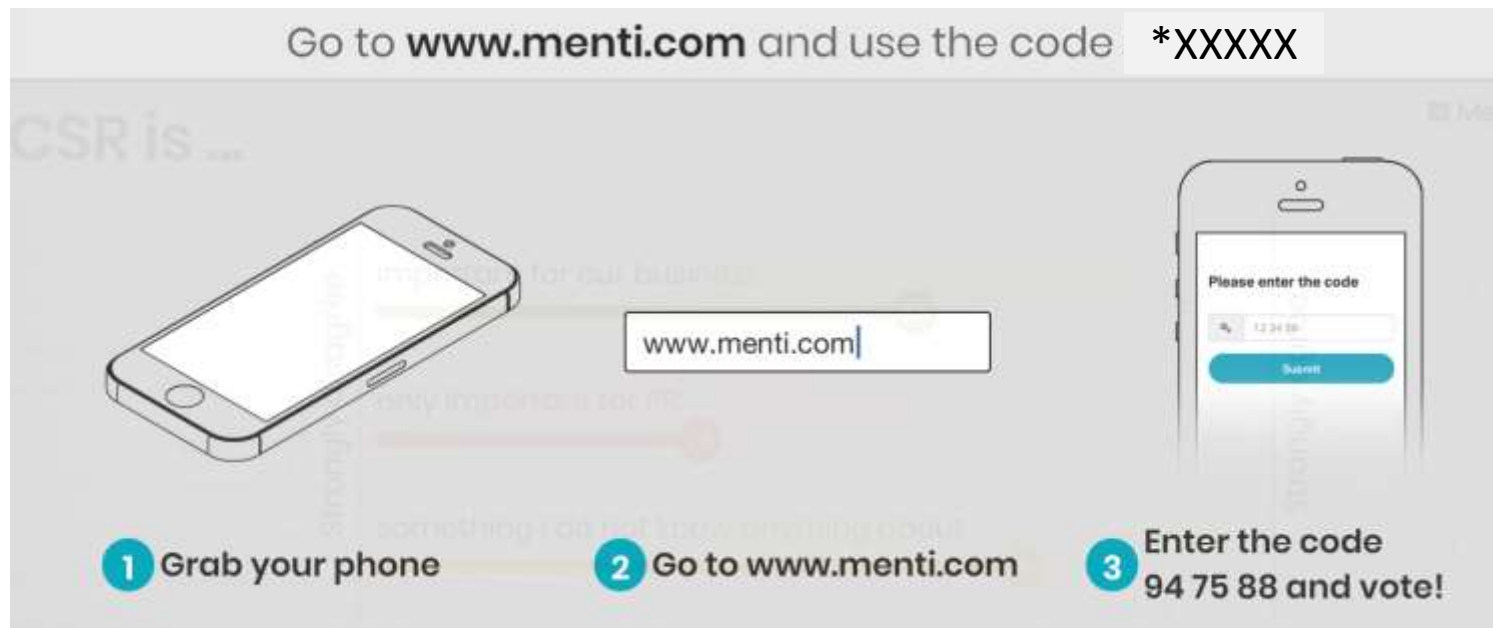


Employee health (e.g. health & hygiene procedures, insurance, health compliant work place)

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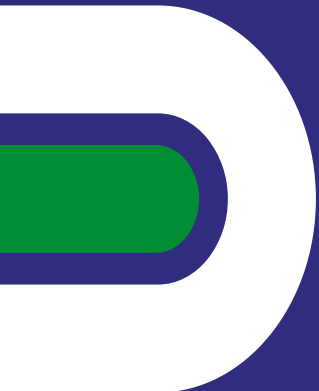
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IMPROVEMENT PLAN EXERCISE

Identifying key local challenges



THE IMPROVEMENT PLAN

How to make an improvement plan

- Establish goals, company regulations and policies

Plan

- Identify challenges
- Root causes analysis
- Identify and agree workable corrective and preventive actions
- Designate responsibilities

Identify

- Establish strategy to monitor improvements
- Communicate status to key stakeholders

Monitor

- Implement actions
- Allocate realistic budget
- Set ambitious & reasonable timeline

Act

GROUP EXERCISE – 1 H 30

Your group task for the day

| <u>KEY CHALLENGES</u> <u>(SELECT 3)</u> | <u>ROOT CAUSES (SELECT</u> <u>3 PER CHALLENGE)</u> | <u>PLANNED</u> <u>CORRECTIVE AND</u> <u>PREVENTIVE ACTIONS</u> <u>(SELECT 2 PER ROOT</u> <u>CAUSE)</u> | <u>BUDGET</u> | <u>PERSON IN</u> <u>CHARGE</u> | <u>TIMELINE</u> |
|--|---|--|---------------|-----------------------------------|-----------------|
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Coffee Break

15 min



GROUP EXERCISE – 1 H 30

Format

40 min Brainstorming session

- Each table brainstorms:
 - What are the biggest challenges & issues you face/d in regards to Environment and Health & Safety?
 - Where do you need support?
- Each table creates top 3 list of challenges they want to address in improvement plan

50 min Group discussion & analysis

- Each table presents 3 top challenges
- Trainer presents data analysis on biggest challenges
- Comparison / discussion

WHAT DOES THE DATA SAY

The biggest local sustainability issues with direct, short-term effect are:

Water-use efficiency

In India, water demand is expected to be twice the available supply by 2030.

- In 2018, 64 global companies reported 84 water related risks in India
- Global companies operating in the country also reported some 182 facilities at risk
- An oil refining company had shut down its crude unit in southern India. The company reported that it was able to operate only about half of its capacity due to water shortage.
- India's largest power producer closed down a power plant in eastern India

Governments are taking strict measures to address water scarcity.

- For e.g: the state of Maharashtra has cut water supply to the industry by as much as 50% in Sinnar Industrial Estate.

Performance of Automobile Companies Participating in National Water Award

- 6 –15% average annual reduction in specific water consumption

References:

http://mohua.gov.in/upload/uploadfiles/files/WaterInd-Ramanilyer1252011_0.pdf

<https://www.cdp.net/en/articles/companies/indias-looming-water-crisis-a-call-to-action-for-companies>

<https://economictimes.indiatimes.com/news/economy/agriculture/by-2030-indias-water-demand-to-be-twice-the-available-supply-indicating-severe-water-scarcity-report/articleshow/64679218.cms?from=mdr>

WHAT DOES THE DATA SAY

The biggest local sustainability issues with direct, short-term effect are:

Energy efficiency

DOMESTIC POLICY

Energy intensive sectors are a prime candidates - automobile could be covered by **mandatory** Energy Efficiency trading schemes.

Government notified automobile sector as one of the designated consumer under Energy Conservation Act 2001

Perform Achieve Trade (PAT) scheme is being implemented in India since 2012 – covers 11 sectors

MARKET DEMAND

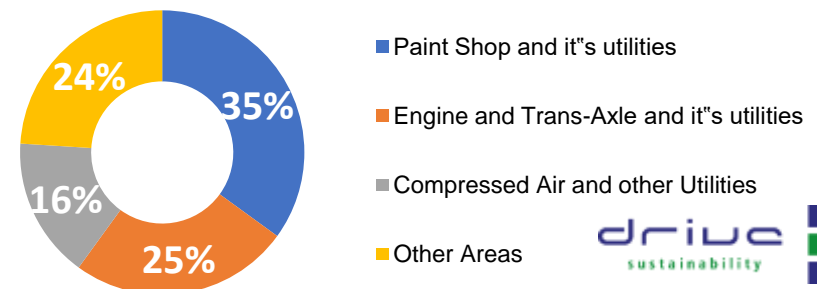
Maruti Suzuki is committed to reduce energy consumption/ vehicle and conducts energy audits on suppliers

INTERNATIONAL COMMITMENTS

India's Nationally Determined Contribution (NDC) - reduce the emissions intensity of the GDP by 33-35% by 2030 from 2005 level.

The overall energy consumption of automobile sector is estimated to be 0.41 million MTOE.

Typical Energy Consumption trend of an Automobile Industry



WHAT DOES THE DATA SAY

The biggest local sustainability issues with direct, short-term effect are:

Resource efficiency

Increasing the use of secondary metals will reduce the currently high input of primary materials, thus easing the stress on the environment while saving cost and reducing supply dependencies.

- 22 million ELV (end-of-life vehicles) in India by 2025 which would require recycling
- Steel and aluminium are 100% recyclable. Can replace steel from virgin materials
- 25% of ELV waste poses threat due to the presence of heavy metals, waste oils, coolants, ozone-depleting substances, etc.
- Steel recycling of an Indian compact car can decrease raw material consumption by 23%
- 600 million tonnes of primary raw material could be saved upto 2030. Since recycling is already taking place in India, the unexploited potential is less than this
- Technology up-gradation can help achieve yield improvement in the forging industry to up-to 70%
- India's metal recycling rate (25%) is at the bottom of the global list of recycling nations.
- 98% of the aluminium waste scrap generated from the auto component manufacturing gets recycled and only about 2% gets wasted in the Indian automobile sector

There are no regulations in India to deal with the disposal of ELVs. Scrapped vehicles are cut & sold for scrap by low-tech units in the unorganized sector that use crude techniques polluting the environment, & operate with low recoveries.

RISKS!!

- Ferrous and non-ferrous scrap metal will not be used if it is not recycled which leads to higher usage of energy, water and also, results in water and air pollution significantly.
- High potential of discharge of harmful fluids, hazardous gases.
- Dumped Tyres release methane gases
- Workers of the dismantling units are exposed to toxic gases

Peculiar challenges

2.5% levies of import duty on metal scrap which makes the recycled material expensive compared to other countries.

Generally, vehicle OEMs dictates the specifics of the raw material and source as well. In some cases, the raw material is itself procured and provided by the OEM to the component manufacturer for controlling the cost part. To introduce any such changes in the process or material sourcing, an approval from OEM is required.

WHAT DOES THE DATA SAY

The biggest local sustainability issues with direct, short-term effect are:

Resource efficiency

Organized companies have begun taking interest in the domain on account work two regulatory decisions

Closing of unregulated scrapping units

Reducing the vehicles' maximum service life.

Established automakers, such as Toyota Motor Corp., Mahindra and Mahindra Ltd., and Suzuki Motor Corp., have already started investing heavy amounts in setting up modern vehicle recycling and salvaging units.

In November 2019, a scrapping unit, by the name of Cero Recycling, was set up in Greater Noida, as a joint venture between Metal Scrap Trade Corporation Limited (MSTC), and Mahindra Accelo.

Mahindra and Mahindra (M&M) has plans to set up 25 more such facilities in the country.

In November 2019, JV b/w Suzuki Motor Corp. and Toyota Motor Corp., for setting up an automobile dismantling facility in Noida with a capacity to process 2,000 vehicles per month.

Two Japanese automakers hope to establish more such recycling plants in the country

Outlook for India

Indian end-of-life vehicle and dismantling market

- Revenue (2019) USD 3,474.0 million
- CAGR Forecast (2020-2030) – 17.2%
- CAGR (organized bifurcation 2020-2030) - 48.6%
- Maharashtra was the most productive state in the Indian ELV and dismantling market in the past. In the coming years, the NCT of Delhi would grow the fastest in the industry.
- Till 2030, the ferrous metal category would continue dominating the market
 - ferrous-metal components make up for around 70% of an average vehicle
 - can be easily extracted by using a strong magnet
 - have a easy reusability factor.

WHAT DOES THE DATA SAY

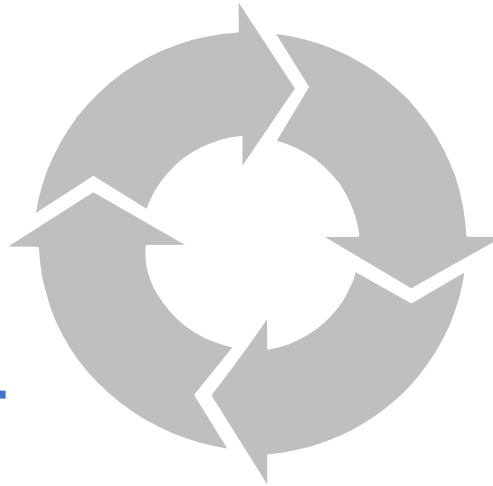
The biggest local sustainability issues with long-term effect are:

Environmental regulations

- Preparations for emission norms for subsequent Bharat Stage (Indian equivalent to European emission standards for automobiles)
- Recycle batteries, tires, other non bio-degradable components

Respond to technology disruptors

- Components for hybrid/alternative fuel/ electric vehicles



Reverse logistics

- Expected to become a key focus area for cost optimization
- Integration with forward logistics operations

Health and Safety

Implement:

- Contiguous OHS framework (supplier to product roll-out)
- Networked intelligent safety system

GROUP DISCUSSION

Theory VS Reality

- What is your opinion when you compare the results of your previous discussion and the data we collected before this training?
- What is/should be your final top 3 list of issues & biggest non-compliances?

Closing – Day 1

- Summarize the topics discussed on Day 1
- Upcoming tasks to be discussed on Day 2

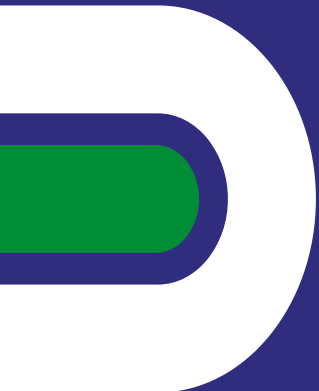
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IMPROVEMENT PLAN EXERCISE

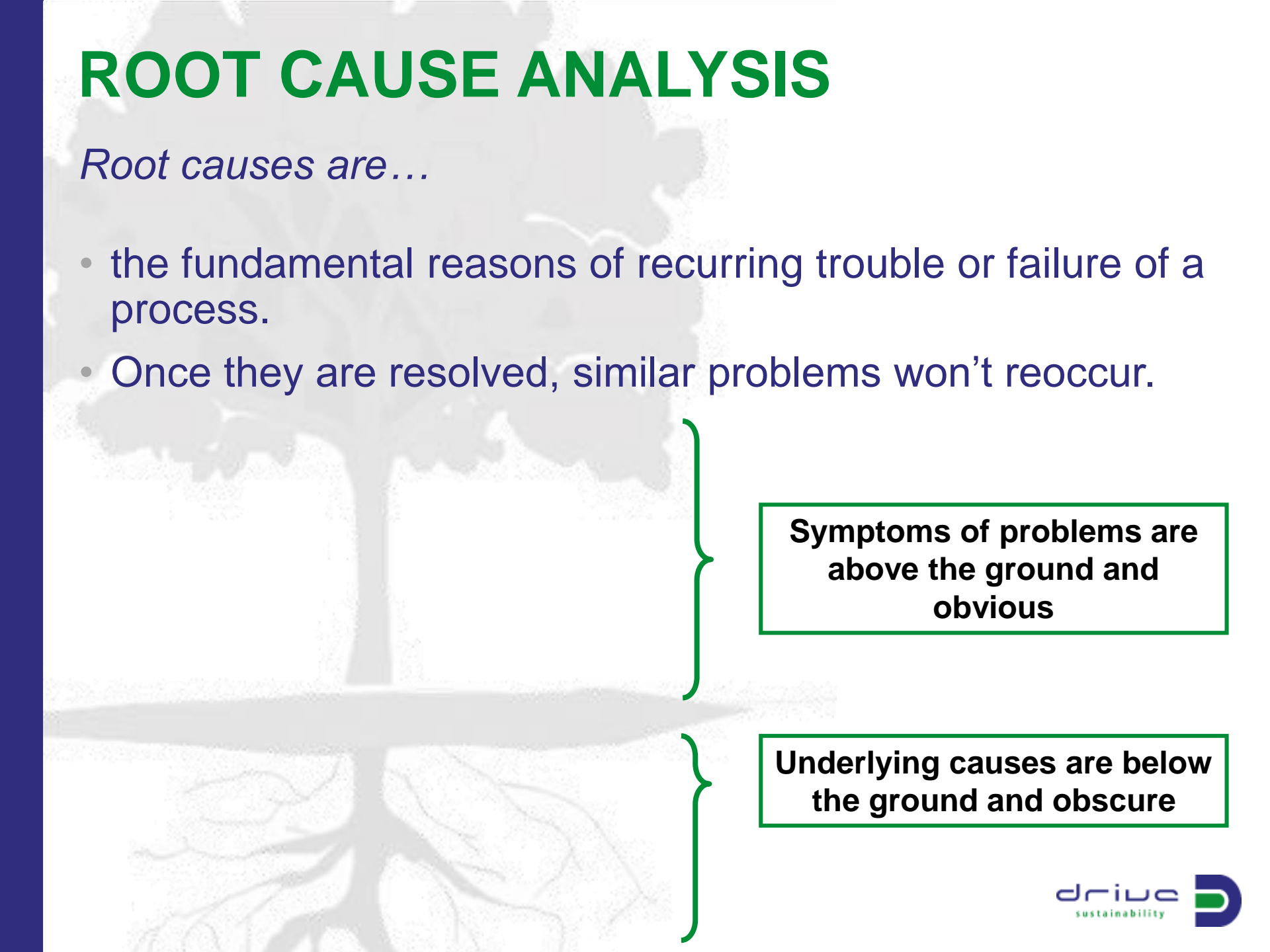
Root causes and actions



ROOT CAUSE ANALYSIS

Root causes are...

- the fundamental reasons of recurring trouble or failure of a process.
- Once they are resolved, similar problems won't reoccur.



**Symptoms of problems are
above the ground and
obvious**

**Underlying causes are below
the ground and obscure**

METHODOLOGY: ROOT CAUSE ANALYSIS

5 Whys



Fishbone methodology



Affinity diagrams



ROOT CAUSE ANALYSIS

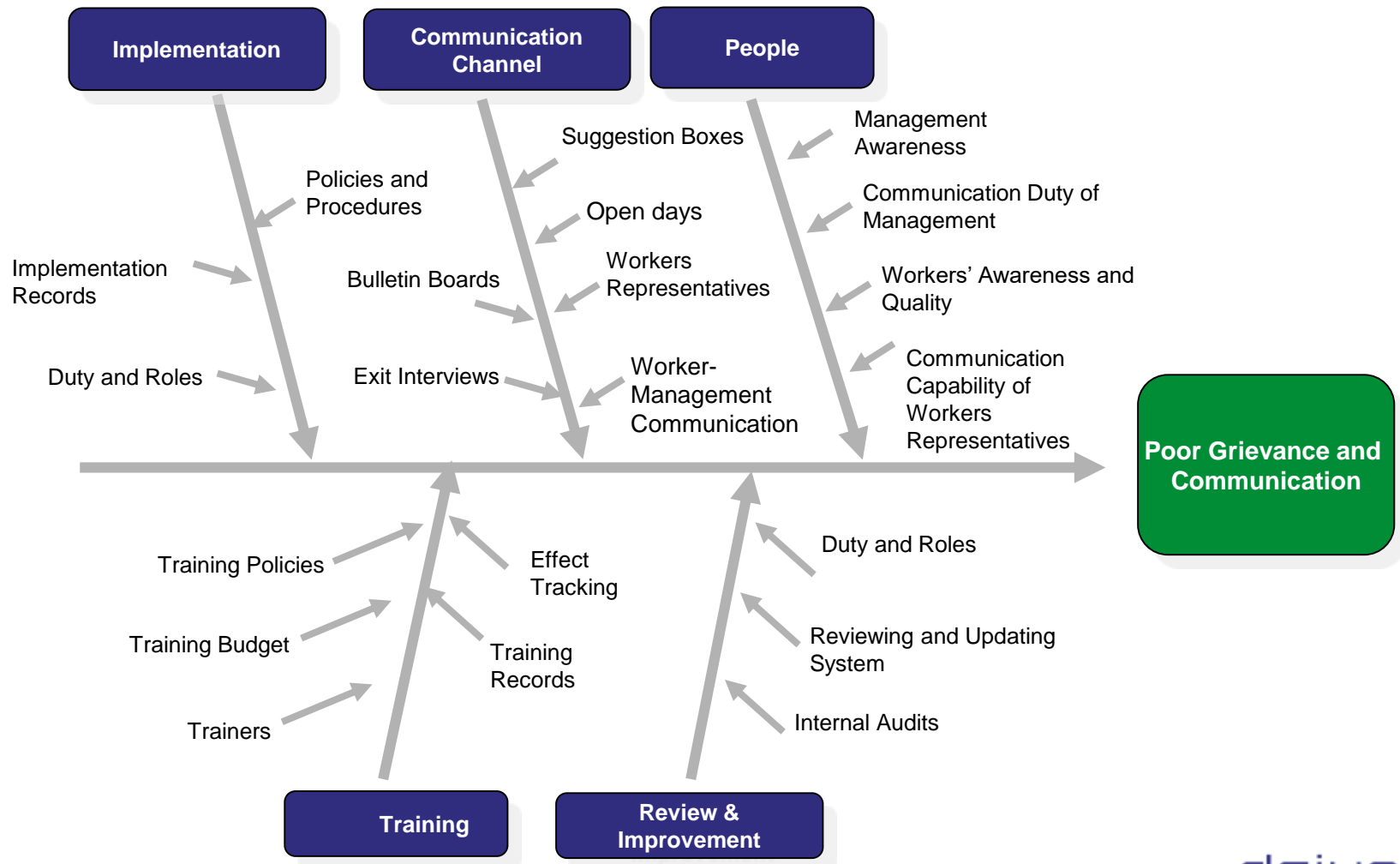
5 Whys

Case Study: The workers are not happy with the ' satisfaction is low

- **Q1: Why are workers dissatisfied?**
→ Because their concerns are not heard and addressed by the management e.g. unofficial pressure to do unpaid overtime.
- **Q2: Why are concerns not heard and addressed by the management?**
→ Because communication between workers and management is generally less direct and raising such concerns to the management is not part of the culture.
- **Q3: Why isn't the local corporate culture changing its ways?**
→ Because there is no program and target to drive such cultural change.
- **Q4: Why hasn't a program and target been set?**
→ Because worker satisfaction and communication are not set as key performance indicators and therefore are not prioritized by management
- **Q5: Why isn't upper management setting such KPIs?**
→ Because they lacked awareness of the issue before the employee satisfaction survey revealed that this communication channel is being missed.

ROOT CAUSE ANALYSIS

Fishbone methodology



ROOT CAUSE ANALYSIS

Affinity diagrams: Root cause classification

...generate, organize, and consolidate information



Lack of awareness



**Lack of management
commitment**




**Lack of procedure of
policy**



External cause



Cost



**Lack of internal
communication and
worker integration**

PLANNED ACTIONS

Corrective and preventive actions

Corrective action



Short-term

- Immediate remediation to remove / address the non-compliances

Preventive action



Long-term

- Address root cause issue
- Ensure issue does not reoccur
- Long-term implementation
- Focused on management systems

Coffee Break

15 min



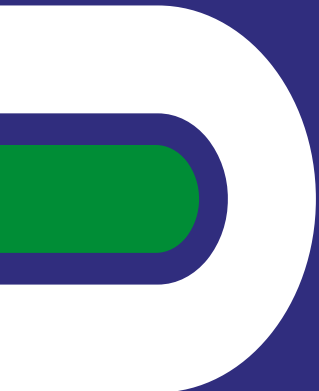
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| 09:30 – 10:00 | Day 2 Opening – Registration and Connection to Day 1 |
| 10:10 – 12:00 | Improvement plan exercise: Identifying root causes and actions (Cont.) |
| 12:00 – 12:10 | Coffee break |
| 12:10 – 13:10 | Improvement plan exercise: Budget, responsibilities and timeline |
| Participants regroup | |
| 13:10 – 13:30 | Closing |

IMPROVEMENT PLAN EXERCISE

Root causes and actions (cont.)



REMINDER

Morning session conclusion

- Top 3 challenges, issues, non-compliances
- Where do you need support
- Root cause analysis methodology

GROUP EXERCISE – 1 H 45

Improvement plan column 2 + 3

| <u>KEY CHALLENGES</u> <u>(SELECT 3)</u> | <u>ROOT CAUSES (SELECT</u> <u>3 PER CHALLENGE)</u> | <u>PLANNED</u> <u>CORRECTIVE AND</u> <u>PREVENTIVE ACTIONS</u> <u>(SELECT 2 PER ROOT</u> <u>CAUSE)</u> | <u>BUDGET</u> | <u>PERSON IN</u> <u>CHARGE</u> | <u>TIMELINE</u> |
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GROUP EXERCISE – 1 H 45

Format

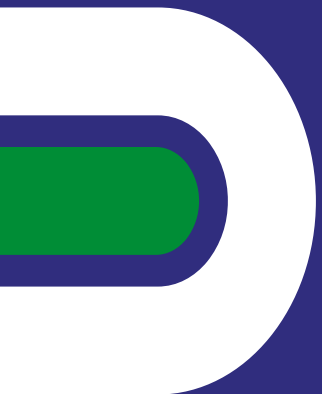
45 min Brainstorming session

- Each table brainstorms:
 - root causes and actions/countermeasures for each challenge
 - Participants share practical experience on how to deal with issues, what works, what does not work etc
- Each table creates top 3 list of root causes for each challenge
- Each table identifies two actions per root cause

60 min Group discussion

- Each table presents root causes and challenges
- Trainer presents best practices, case studies and solutions check-list to address challenges
- Comparison / discussion

Case Studies



drive
sustainability

Case Study 1: Abilities India Pistons And Rings Ltd.

Focus topic: Resource Efficiency

Issue:

- Reducing rejected products leading to material savings and waste minimization

Root Cause Analysis:

- Process-related inefficiencies
- Design of quality parameters not conducive to resource efficiency
- Analysed all critical processes and identified design modifications

Case Study 1: Abilities India Pistons And Rings Ltd.

Focus topic: Resource Efficiency

Corrective Actions:

- Redesigning of runners and gates, for instance, helped AIP to reduce in-house rejections in the casting section.
- Selection of machines for a particular product, defining speed and feed of the machines, establishing parameters and monitoring the process capability

Preventive Actions:

- Optimal re-sharpening frequency of the tools was clearly defined and marked.
- Quality alert boards were posted in all stations where critical quality parameters needed to be adhered to (fifteen in total) to prevent mistakes

Case Study 1: Abilities India Pistons And Rings Ltd

Focus topic: Resource Efficiency

Results:

- 15% increase in productivity
- Overall equipment effectiveness (OEE) increased from 67% to 84.6%
- Operating procedures (master document) were standardized and displayed in a proper format in 20 crucial workstations.

Lessons Learned:

- Effective communication strategies can go a long-way in influencing behavior:
 - Quality alert boards (refer previous slide) included pictures showing the difference between good and bad parts to make it easier for workers to comprehend.
 - Learning and experiences gained while carrying out improvements on machines/equipment, were captured in the form of so-called “one-point lessons” (OPL) – short visual presentations that communicate standards, problems and improvements about work processes and equipment. OPLs were displayed at different places on the shop floor, so that previously committed mistakes would not be repeated.

Case Study 2: M&M, Nasik

Focus topic: Water-use efficiency

Issue: High raw water consumption

Root Cause Analysis:

- Raw water was being used for cooling (69% water used in the plant is raw water)
- Water wastage during routine processes

Reference: http://mohua.gov.in/upload/uploadfiles/files/WaterInd-Ramanilyer1252011_0.pdf

Case Study 2: M&M, Nasik

Focus topic: Water-use efficiency

Corrective Actions:

- Water saving during daily fire hydrant post trial, through reducing the size of opening of the hydrant post
- Replacement of forced cooling draft tower with natural cooling towers

Preventive Actions:

- Set a target to become water positive in a defined time

Case Study 2: M&M, Nasik

Focus topic:

Results:

- Zero discharge
- 2820 cum savings per year
- Specific water consumption - 1.96 cum/vehicle against benchmarks of 2.74 cum/vehicle by Maharashtra Pollution Control Board

Lessons learned:

- Optimise water use by understanding water balance diagram
- Water audit can help identify low-hanging fruits for achieving efficiency gains
- Establish benchmarks and ambitious targets
- Follow target-setting with planning and formulating implementation strategy for achieving defined targets.

Case Study 3: Kohler Power, Aurangabad

Focus topic: Energy

Issue: Higher production cost due to high power consumption

Root Cause Analysis:

- Inefficient equipment – Conventional blowers, Conventional bulbs
- Sub-optimal utilisation of maximum demand and load factor

Case Study 3: Kohler Power, Aurangabad

Focus topic: Energy

Corrective Actions:

- Implementing variable frequency drives (VFD)
- Replacement of conventional blowers with breeze air blowers
- Replacement of conventional lights with LED lights

Preventive Actions:

- Conducted energy audit: A preliminary energy audit of the plant was conducted and energy saving ideas were documented for subsequent implementation
- Controlling load factor: Electricity supply companies often provide incentives for maintaining the load factor above/ within a certain threshold – which can help accumulate finances that can be re-directed towards new investments in energy efficiency.
- Redefining, monitoring and controlling maximum demand: Penalties/ extra charges are levied when the maximum demand crosses connected demand. Avoided penalties can reduce utility budget expenditure and provides opportunity for investment in energy saving technologies.

Case Study 3: Kohler Power, Aurangabad

Focus topic: Energy

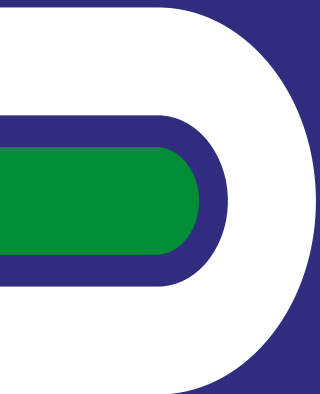
Results:

- Savings 19.6 MWh per annum; or 20% of the total annual consumption
- Cost savings of INR 1,24,691 (or about USD 1,600) per month

Lessons learned:

- Energy Audit is a crucial tool for identifying opportunities of Energy conservation in industries, commercial places, etc.
- Energy Audit can be used as a continuous improvement tool with periodic reassessments to track the trend of progress and its effectiveness.
- Savings from replacing conventional bulbs was
 - (i) 78.9% of the total savings from the interventions made; and,
 - (ii) 15% of the total monthly consumption in the plant.
- Payback period for LED lamp – 1.4 years
- Payback period for one VFD – 16 months

Solutions check-list



Health & Safety: Solutions to meet expectations

Health & Safety Management

- ✓ Compliance as per **Factories Act, 1948**
- ✓ Develop health and safety **procedures and policies (including ergonomics)**
- ✓ **EHS risk assessments**
- ✓ **Assign responsibilities** for health and safety management
- ✓ **Inform workers** of emergency procedures, potential safety hazards, health and safety procedures and policies through **regular training**
- ✓ **Voluntary certifications – ISO 45000**

Emergency Preparedness

- ✓ Ensure **fire safety**: emergency exits, fire detection, evacuation drills
- ✓ Medical emergency care, first aid equipment



Health & Safety: Solutions to meet expectations

Workplace Safety & Employee Health

- ✓ Develop **documentation and reporting** procedures – including, but not limited to near-miss reporting and follow-up actions
- ✓ Provide required **personal protective equipment**
- ✓ **Regular medical check-ups** for occupational health diseases especially for workers posted/ deployed in dangerous work areas
- ✓ Implement **machine-safeguarding program and electrical safety** incl. training for workers
- ✓ Ensure **health at the workplace**: health & hygiene procedures, employee insurance
- ✓ Responsible storage/usage/disposal of **hazardous material**
- ✓ **Operational controls**: Temperature and radiations, machinery protections, gas canisters, electrical installations report



Environment: Solutions to meet expectations

Companies shall operate the necessary Systems of Control and Continuous Improvement using **permanent and reliable measures**.

Energy, Water and Air Consumption and Quality

- ✓ **Compliance:** The Water (Prevention and Control of Pollution) Act, 1974 with amendments of 2012; The Air (Prevention and Control of Pollution) Act, 1981 with amendments of 2018; Air Act (including amendments), 1981, Environment Protection Act (including amendments), 1986; The Energy Conservation Act, 2001; Energy Conservation (Amendment) Act, 2010
- ✓ Track and document consumption/ emissions; develop **management program** gaining management commitment, identifying constraints, setting baseline, goals, objectives and targets
- ✓ Encourage use of sustainable, renewable natural resources

Natural Resources Management & Waste Reduction

- ✓ **Compliance:** Municipal Solid Waste (M & H) Rules, 2016/ Solid Waste Management Rules, 2016; Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016 with amendments of 2019; E-Waste (Management) Rules, 2016 with amendments of 2018 Plastic Waste (Management and Handling) Rules, 2016 with amendments of 2018; Battery (Management and Handling) Rules, 2001 with amendments of 2010; The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 with amendments of 2000
- ✓ Set targets for waste reduction and **establish a waste management hierarchy** that considers in priority order: prevention, reduction, reuse, recovery, recycling, removal, disposal of wastes.
- ✓ Training to waste handlers
- ✓ Encourage use of sustainable, renewable natural resources

Environment: Solutions to meet expectations



Responsible Chemical Management

- ✓ Compliance: **The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 with amendments of 2000**
- ✓ Proper **storage of chemicals / oils** (especially catch basins, storage capacity and labeling) including training of chemical handlers
- ✓ Provide Safety Data Sheets/Material Safety Data Sheets for chemicals that comply with all applicable laws
- ✓ Establish programs (IMDS or equivalent) to collect data from material manufacturers for all components, identifying all process chemicals and intermediates that are identified as classified hazardous substances
- ✓ Measure data completeness against bill of materials (BOMs), identify data shortages, and take corrective measures to assure data is traceable to the material manufacturers.

Implement Environmental Management Systems (EMS)

- ✓ ISO 14001, Eco-Management & Audit Scheme (EMAS) or Internal, Company-Owned Systems

More information can be found in the **Practical Guidance**.

GROUP DISCUSSION

Complete your list of actions: Which new actions can you add to your list?

Corrective action



Short-term

- Immediate remediation to remove / address the non-compliances

Preventive action



Long-term

- Address root cause issue
- Ensure issue does not reoccur
- Long-term implementation
- Focused on management systems

Coffee Break

10 min



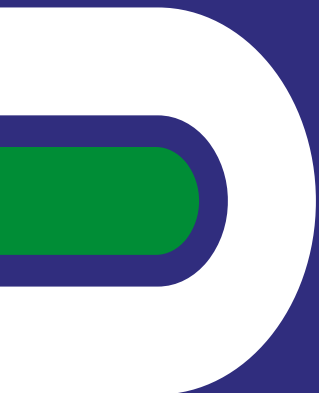
AGENDA: ENVIRONMENT AND HEALTH & SAFETY

Working & leaning together

| | |
|----------------------|---|
| 10:50 – 11:15 | Introduction Break-out session – Day 1 |
| 11:15 – 12:30 | Improvement plan exercise: Identifying key local challenges |
| 12:30 – 12:45 | Coffee break |
| 12:45 – 13:20 | Improvement plan exercise: Identifying key local challenges |
| 13:20 – 13:30 | Day 1 Closing - Summarize the topics discussed on Day 1 and upcoming tasks to be discussed on Day 2 |
| Day 2 | |
| 09:30 – 10:00 | Day 2 Opening – Registration and Connection to Day 1 |
| 10:10 – 12:00 | Improvement plan exercise: Identifying root causes and actions |
| 12:00 – 12:10 | Coffee break |
| 12:10 – 13:10 | Improvement plan exercise: Budget, responsibilities and timeline |
| Participants regroup | |
| 13:10 – 13:30 | Closing |

IMPROVEMENT PLAN EXERCISE

Budget, responsibilities and timeline



GROUP EXERCISE – 1 H

Improvement plan column 4 - 6

| <u>KEY CHALLENGES (SELECT 3)</u> | <u>ROOT CAUSES (SELECT 3 PER CHALLENGE)</u> | <u>PLANNED CORRECTIVE AND PREVENTIVE ACTIONS (SELECT 2 PER ROOT CAUSE)</u> | <u>BUDGET</u> | <u>PERSON IN CHARGE</u> | <u>TIMELINE</u> |
|--------------------------------------|---|--|---------------|-----------------------------|-----------------|
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GROUP EXERCISE – 1 H

Format

20 min Improvement plan best practice

- Trainer presents best practice improvement plan

20 min Brainstorming session

- Each table brainstorms:
 - Budget, person in charge, timeline for each action

20 min Group discussion

- Each table selects one challenge and presents full improvement plan for it
- Trainer gives feedback
- Closing and conclusion

Improvement Plan Best Practice

Case: Energy Conservation

Issue:

- High energy consumption leading to high costs and GHG emissions

Root Cause:

- Outdated and inefficient equipment
- Low-temperature reject heat was being wasted
- Manual operations (As in Compressor OFF/dryer ON, leading to excess running)
- Few processes have not been optimised.

Improvement Plan Best Practice

Case: Energy Conservation

Solution analysis:

- 66 energy saving projects implemented over three years (FY 16, 17, 18). The initiatives involved the following corrective and preventive actions

Corrective actions:

- Use of energy efficient equipment eg. IE 3 energy efficient motors
- Motor and pump optimization – eg. Optimisation of processes eg reduction of torque
- Process optimization
- Power controls

Preventive actions:

- Automatic Switching OFF stack lifter hydraulic motor
- Power Quality Enhancement by Use of Real Time Power Factor Correction (RTPFC) Panels
- Solar light pipe and solar power generation
- Energy management - Daily power balance monitored and Immediate actions identified

Improvement Plan Best Practice

Case: Energy Conservation

Implementation plan:

- **Person in charge:** Vice President – Manufacturing (Nasik and Igatpuri)
- **Timeline:** 3 years
- **Budget:** INR 468 Lakhs (USD 0.62 million) over 3 years
- **Success measurement / KPIs:** Specific energy consumption (SEC)
Total carbon emissions

Improvement Plan Best Practice

Case: Energy Conservation

Results:

- 38% reduction in SEC in FY 2018 as compared to FY 2008
- Best performing in SEC in the group
- Total savings of INR 259 lakh per year (USD 0.34 million)
- CO₂ emission reduced by 24%

Lessons learned:

- There are few zero cost opportunities as well that can yield good energy savings (eg. reduction of torque or automatic switching OFF stack lifter hydraulic motor)
- Average payback period of 1.8 years
- Implementing energy management systems can help identify and manage energy issues in a systematic manner
- Daily power balance monitored and Immediate actions identified
- Collaboration with ESCOs can help with a variety of customized, performance-based energy solutions package

GROUP DISCUSSION

- What is your feedback after doing the exercise?
- Did you encounter any difficulties?
- What are 3 words that summarize the discussion at your table?

CLOSING

Please regroup with other session

