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Emergence of Make in India and Environmental Impact in Industry

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ABSTRACT *In this research paper, researcher has covered a wide spectrum of the environmental factors which are having direct or indirect impact on the make in India concept. Development of nation is in direct proportion to the industrialisation but compromising with environmental issues may bring huge losses for the future. Industrial revolution initiated the use of machinery and clubbed with technological improvements factories led to mass production and led to economic development and prosperity of the world and provided Employment and Business opportunities, but on the other hand also contributed to environmental degradation. The impact on environment was not immediately seen and evaluated but seen many years later. National Green Tribunal (NGT) keeps issuing various guidelines timely and focuses its attention for the betterment of the environment. While industrial revolution caused positive benefits for the industrial world it also initiated the beginning of damage to environment and resources. Depletion of natural resources, carbon emissions, effect on human health due to exposure, Water depletion, climate change are all attributed to industrial activities.*

Introduction:
The industrial units make use of Raw materials, Energy, Fuel, Water, Land etc and apart from the desired manufacturing output, interaction with environment also happens in the form of impacts in terms of changing the natural habitat of that area, Global Climate change, Loss of bio diversity, Ozone depletion, Emission of toxins to air causing damage of living organisms and humans, Water depletion and resource depletion. Deforestation is one of the major concerns. When forests are cleared, wild life also vanishes. As the concern is known and we all have to put in our contributions to do our part the very first step towards prevention will be to identify the contribution our industry is causing to the environment. This paper attempts to quantify the environmental impacts and whether significant or not and then how to address these through Elimination, Substitution, Engineering and Administrative controls.

Assessing the impact on environment
Identifying the impact on environment which your industry causing to environment is a very essential and important step to scientifically evaluate and quantify how much as an organization we are contributing to degradation of environment. This helps to identify on scale whether all concerns are equally serious or there are concerns which are causing more damage to environment and needs to be controlled immediately and effectively. Though, organizations have developed methodologies to identify the impacts, but a simple and easy methodology is cited below:

Definition as stated in ISO ISO 14001 : 2004 : Environment Management System.

Environment
Surroundings in which an organization operates including Air, Water, Land, Natural Resources, Flora, Fauna, Humans, and their interrelation.

Environment Aspect
Element of an organization activities or products or services that can interact with the environment. A significant environmental aspect has or can have a significant environmental impact. Any change to the environment whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.

For carrying the Environment Impact study we have to

- Review all the activities being done in plant including that done by contractors. Explore all departments and
- While evaluating consider all normal, abnormal & emergency conditions

To manufacture a product organization does several activities in sequence and steps. The activity produces the environment aspect which can significantly impact the environment. Consider painting as an activity. The environmental aspect is generation of paint fumes and the impact to environment is air pollution.

As per the definition of environment following impacts to environment are to be considered.

- Emission to Air
- Release to Water
- Waste Management
- Land Contamination
- Use of Raw material and Natural resources – Depletion of Resources
- Noise pollution

For identifying the impact evaluate the rating of aspects having significant environmental impact based on the:

- Quantity – A in the scale of 1 to 5
- Occurrence (B) in the scale of 1 to 5
- Impact (C) in the scale of 1 to 5
- Detection (D) in the scale of 1 to 5
- Control (E) in the scale of 1 to 5

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To determine the significant aspect having impact on environment Multiply A, B, C, D, E to get a product F

Literature Review:

The research paper on "Potential benefits of developing and implementing environmental and sustainability rating systems: Making the case for the need of diversification" by Cesar A. Poveda, Ryan Young, Department of Mechanical Engineering, University of Alberta, 4-9 Mechanical Engineering Building, Edmonton, Alberta explores the potential benefits of implementing environmental and sustainability rating systems (ESRS) in industrial sectors other than the building industry. The increasing demand of natural resource exploration and exploitation has generated greater impact of such activity on both the organization and its stakeholders. One solution to mitigate the negative impacts is to regulate through government agencies and legal requirements. These though provide general guidelines but often provide little practical help to organizations to address triple bottom line goals in sustainability i.e social, economic & environment. ESRS possess the characteristic of facilitating the engagement and management of stakeholders in the decision making process for green and sustainability performance assessment from the development of assessment tools. Therefore the stakeholders are the fundamental not only in the selection of assessment tool but also in defining the different criteria and their metrics and overall sustainability objectives. The paper summarizes that as the building sector is benefiting from the rating system other industries can also support their own green revolution and transformation by development and implementation of assessment methodologies through a rating system. CII, Green Business Centre, Hyderabad has developed Green Company rating for Industries in India.

Recently, a variety of environmental and sustainability rating tools have been developed to assist organisations and firms in making decisions to to fit Environment and Sustainability goals. Environment & Sustainability ratings are readiliy used by and championed by Building industry and these ratings tools are yet to be adopted by other industries like Mining, Energy, Oil & Gas, Heavy Industries. The paper outlines the potential benefits that these industries could get in choosing to use such tools for the assessment of sustainability performance.

The Building Research established BREEAM – Building Research Establishment Environmental Assessment Method) and since then more than 600 sustainability ratings have been developed worldwide by 2008. However, the two most popular rating systems are LEED – Leadership in Energy and Environmental Design) and BREEAM. The LEED system, developed by the U S Green Building Council, USGBC was first introduced in North India Market but has now expanded around the world. Currently more than 10.5 billion square feet of building space in nearly 150 countries have adopted the LEED system. (USGBC, 2014a)

Scoring Legend

Quantity (A)		Occurrence (B)		Impact (C)		Detection (D)		Control (E)	
Excessive	5	Continuous	5	Fatal to Human Life	5	> 24 Hrs	5	Absent or control not effective	5
High	4	Several Times a day	4	Affects Human Health	4	< 24 Hrs	4	Mechanism not reliable	4
Moderate	3	Once a day	3	Affects flora / fauna	3	Within 8 Hrs	3	Control needs human intervention	3
Low	2	Once a week	2	Resource Depletion	2	Within 1 Hr	2	Inbuilt secondary controls present	2
Negligible	1	Very rare	1	Causes discomfort / Negligible impact	1	Immediately	1	Effective control at source present	1

Consider an example of painting activity

Activity	Environmental Aspect	Cond N/A/E	Env Impact	A	B	C	D	E	F
Liquid Painting on component	Generation of paint fumes	N	Air Pollution	2	5	5	1	2	100
	Generation of paint emulsified water from painting booth exhaust circulation system	N	Water Pollution	3	4	4	1	1	48
	Generation of paint sludge from painting booth exhaust circulation system and painting booth	N	Water Pollution	2	3	2	2	2	54
	Consumption of paint during painting	N	DR	3	5	3	1	2	90
	Consumption of water in painting booth exhaust system	N	DR	3	3	3	1	2	54
	Generation and disposal of empty paint & thinner containers	N	Land / Water Pollution	3	4	2	1	3	72
	Generation and disposal of Paint touch up cans used for doing touch up	N	Land / Water Pollution	2	3	2	1	3	36
	Fire in Painting booth	A	Air Pollution / DR	2	1	3	1	3	18

Activity	Environmental Aspect	Cond N/A/E	Env Impact	A	B	C	D	E	F
Machining – Drilling, Boring in CNC machines	Leakage of Coolant	A	Land/ Water Pollution	2	4	3	1	3	72
	Leakage of coolant from chip collecting trolley	A	Land / Water Pollution	2	4	3	1	3	72
	Generation of waste and used coolant	N	Land/ Water Pollution	3	2	1	1	3	18
	Disposal of waste coolant	N	Water Pollution	2	2	2	1	3	24
	Generation of coolant soaked chips	N	Land Pollution	3	5	1	1	3	45
	Disposal of coolant soaked chips	N	Land / Water Pollution	3	5	1	1	3	45
	Generation of coolant Mist	N	Air Pollution	1	5	2	1	2	20

N / A / E – Normal / Abnormal / Emergency

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Environment Impact – Air Pollution, Water Pollution, Noise Pollution, Land Pollution, Depletion of Resources (DR)

This evaluation with scoring is to be done for all activities in the plant. This will score in form of numbers indicating impact to Environment. As we cannot correct all at a time we are required to priorities the concerns to be taken first and then later.

In order to prioritise see the number of concerns which are identified above a particular cut off rating. E.g in above case if we take the cut off at 36 then the concerns below 36 are not significant and all the concerns above 36 are significant and are considered to be causing impact on environment. For identifying the cut off decide mutually in the team carrying out study.

This study in the plant should be done by cross functional team comprising Manufacturing, Projects, Utilities, EHS, and Maintenance. Also as impact to health is significant concern hence anywhere if the rating of C is above 4 then that aspect and activity will already be considered significant. This above was a sample exercise. In this way the entire activities of the plant will have to be mapped from the Raw material entering the product to the finished good leaving the plant. Aspects can all the time be negative only. E.g if some trees are planted and they are releasing Oxygen to the Air and absorbing Carbon di oxide then the activity of planting and growing the trees is considered to be an activity with positive environmental impact.

The above exercise will summarize the impacts from the plant to environment and helps the plant to identify measures required for controlling the environment impacts.

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