Developing Capacity of Stakeholders towards Green Factories: An Action Research
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Introduction

- The Industrial sector is one of the most prominent sectors which drives the Indian economy. Its overall growth in 2008-09 has been reported to be 9.5%.

- The industries have pursued their manufacturing operations without giving much attention to environmental issue.

- This has resulted in impact on resources, besides creating impacts on human health and wellbeing.

- This indicates towards a rampant need for the development and adoption of green building rating systems in manufacturing sector.
IGBC Green Factory Building Rating System is the first kind of rating system addressing industrial buildings.
Significance

Stakeholder participation and awareness is required for initiation of this movement.

Training programme was thus sought to be a tool for awareness and information sharing to empowering stakeholders.

The research focused on:

- To understand IEQ credits
- Benefits

Training intervention:
- Knowledge Change
- Perception Change

Guiding framework for developing
Objectives

• To do case profiling of operational green factories.
• To study the knowledge and perception of stakeholders vis a vis green factories.
• Developing a need based training program regarding Indoor environmental quality in factories.
• To conduct the training program to generate awareness regarding Indoor environmental quality and occupational health in factories.
• To study post training change in knowledge and perception regarding green factories.
• To appraise the training program from the perspective of stakeholders.
METHODOLOGY

LOCALE
Intervention – NCR

Case profile
• Grundfos Pvt Ltd, Chennai
• SFK India, Haridwar

SAMPLE
Stakeholders from manufacturing corporations in NCR
Top managers

+ Middle managers
Selection

Phase-1- Selection of the Organization

A listing of all the manufacturing corporations located in Capital and National Capital Region

The corporations were contacted through mails and explained the purpose of the study.

Two were selected randomly

Organizational structure of these organizations was studied

Specific level of managers were targeted and included in the training program
The sample comprised of all the top and middle level manager who were deputed by the organization for training.
Study tools

Case Study
- Checklist for green features
- A general framework for eliciting information of the project

Interview Schedule
- To assess the perception

Knowledge testing questionnaire
- To assess knowledge

Tool for Training Evaluation
- To assess affective and attitudinal responses to the training program
Training Program - Content

Training module 1: Awareness generation and motivation
- Session A: Understanding Sustainability
- Session B: Climate Change and Global Warming: Adaptation and mitigation
- Session C: Recapitulation

Training module 2: Green built environment
- Session A: Sustainable Built environment: Green buildings and Green Factories
- Session B: Green Rating Systems: IGBC and LEED (USGBC)
- Session C: Recapitulation

Training module 3: IGBC Green Factory Rating system
- Session A: Green factory rating system
- Session B: Indoor Air Quality and occupation health: Benefits and Credits
- Session C: Recapitulation
Intervention Schedule

Prior Appointments

Pre-testing was done 2 days prior to Intervention

Intervention

Factory 1
10 days (1 session each day)

Factory 2
10 days (1 session each day)

Post-testing
Training Programme tools

- Manual
- Summary handouts, Pamphlets
- Presentations and Videos
The industrial sector is one of the most prominent sectors which drives the Indian economy. The industries have pursued their manufacturing operations without giving much attention to environmental issues. This has resulted in impact on resources, besides creating impacts on human health and wellbeing. This indicates towards a rampant need for the development and adoption of green building rating systems in the manufacturing sector which will help in steering growth towards sustainable industrialization. This in turn can be accelerated by generating awareness amongst stakeholders of the manufacturing sector to voluntarily adopt green practices for their factory buildings.

Green Factory

Adopting green practices for factory buildings will help in using resources efficiently, betterment of working conditions and enhanced productivity, thereby leading to substantial national benefits.
FINDINGS AND DISCUSSIONS
Case Profile - I

**Grundfos Pumps Green Factory (Chennai)**

- Registered for IGBC Green factory “Gold” certification in 2010
- It has applied for 80 points in total out of which 19 pertain to Indoor environment quality and Occupational Health

**SKF India Factory, Haridwar**

- Registered for IGBC Green factory “Gold” certification in 2010
- It has applied for 70 points in total out of which 9 pertain to Indoor environment quality and Occupational Health
• A designated smoking room in the facility

• Use high efficiency filters at main HVAC intakes

• CO₂ sensors have been installed

• 95% daylight penetrates through windows for at least 95% regularly occupied areas

• Low emitting materials such as VOC sealant/ carpets/ composite woods/ paints used

• Facilities provided in the breakout spaces include- Canteen, sitting space, toilets, restrooms, locker facilities
## Benefits

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
<th>Grundfos</th>
<th>SFK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in Energy Consumption</td>
<td>20-30%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Reduction in Incidence of sickness</td>
<td>10-20%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Increase in Employee productivity</td>
<td>10-20%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Reduced Incidence of employee absenteeism</td>
<td>5-10%</td>
<td>15%</td>
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The workers perceived that working green factories had a positive impact on them.
Intervention
• Knowledge of the participants was tested on following:

- Sustainable development and global warming
- Green built environment
- Green rating systems
- IEQ credits of green factory rating system
Intervention contd.

- In pretest majority of respondents misconceived green buildings to be associated with high cost construction and green in color. In post-test respondents were able to comprehend the health and productivity benefits of green buildings.

- Percentage of respondents that could identify green rating systems increased from 10% in pre-test to 100% in post-test.

- The knowledge towards IEQ was seen to be quite low amongst respondents in pre-test.

- They were acquainted with these concepts and their importance by drawing examples from existing green factories.
The perception of the respondents were sought on following heads:

- Sustainable development and climate change
- Towards self as a factor towards ecosystem
- Green built environment
- Indoor environment quality and occupational health

- Perceived benefits of green factory
- Perceived motivation towards green factories
- Motivation towards adoption of various aspects of Green Factory Rating System
Intervention contd.

- Pre-training respondents were seen to oblivious to the seriousness of climate change as they perceived it to be exaggerated.

- They also showed a positive perception post-training towards sustainable development as they were interested in knowing how they can access workshops, seminar relating to these issues.

- Post training more than three fourth (85%) respondents were motivated to adopt green factory certification to a large extent’ as compared to only 10% prior to training.
Intervention contd.

- Pre-training respondents were seen to oblivious to the seriousness of climate
- They also showed a positive perception post-training towards sustainable development
- Post training more than three fourth (85%) respondents were motivated to adopt green factory certification
- Respondents realized their duty towards the protection of environment which can be seen as the first step towards the initiation of green movement.
Pre and post training motivation- A comparison

• Post-training 90% of respondents expressed their willingness to adopt green factory rating system.

Perceived barriers for adoption

• Majority responses (90%) indicated towards the lack of knowledge and awareness as being the major barrier towards adoption of green factories.

• 70% responses were received for the lack of institutional framework for effective implementation of green factories
The training was found to have statically significant impact on knowledge level and perception of managers.
Training programme appraisal

Distribution of the sample as per the usefulness of the program:
- Not Useful: 5%
- Useful: 35%
- Very Useful: 60%

Distribution of the sample ranking the overall content and delivery of the program:
- Excellent: 40%
- Good: 15%
- Fair: 10%
- Very good: 35%

Pie chart showing:
- Satisfactory: 70%
- Unsatisfactory: 20%
- Exceeded expectations: 10%
Summary and Conclusions

- IGBC green factory helped both the factories to venture into green manufacturing.
- Hence such rating systems should also be formulated by other leading rating programmes i.e. LEED, CASBEE, BREEHAM etc.
- Such interventions can be taken up at a wider scale to motivate stakeholders.
- Incorporating the knowledge regarding the same school curriculum
- Green factory rating system can be incorporated in policy framework to promote greater willingness on part of industries.
THANKYOU