

Title of the Project: **Assessment of Waste & Pattern of Occupational Hazards in Plastic Industry all over India.**

Principal Investigator: **Dr. P.K. Gupta**

Implementing Agency: **National Foundation of Indian Engineers (NAFEN)**

Date of completion: **June, 2007**

### **Executive Summary**

- 432 manufacturing organisations were visited for collecting data against an identified sample size of 415 units (2473 units as Universe). The maximum response of 69% units was from SSI sector followed by 14% in SME. Similarly, against 50 Hospitals identified for data collection, data was collected from 52 Hospitals (32 ESI Hospitals & 20 General Hospitals).
- Maximum 177 (41%) organizations responded from Maharashtra followed by 79 (18%) from Delhi.
- Maximum 114 (26%) organizations which were established between the period 1980-1989 responded followed by 102 (24%) between 1990-1999. 355 (82%) units surveyed were established more than seven years ago.
- Only 17 (4%) organizations are having any collaboration/ franchisee arrangements.
- Out of 432 organisations, only 35 (8%) organizations are engaged in plastic raw material manufacturing. Out of 35 organisations, 26 (74%) are using Suspension Polymerization Process followed by 6 (17%) using Emulsion Polymerization and remaining using Bulk and Solution Polymerization Processes.
- Maximum 293 (68%) organizations use Extrusion Processes followed by 201 (47%) use Injection Moulding Process.
- Only 124 (29%) organizations are having ISI/ BIS marked products. Only 74 (17%) organizations are ISO certified.
- Total present annual installed capacity of 432 organizations surveyed is around 0.6 Million MT.
- Maximum organisations use exclusively indigenous Raw Materials (81%), Machinery (78%) & Auxiliary Machinery (93%).
- Only 43 (10%) organizations incur any R&D expenditure. Average R&D expenditure as a %age of annual sales, maximum 7.0% is in Large sector during the year 2005-2006.
- Maximum 3.2% average R&D budget spending for improving the processes to reduce wastage is in Large Sector.
- Maximum solid waste generated in various stages is 6.70% in Tiny sector followed by 5.93% in SSI sector. Maximum average solid waste (6%) is in Injection Moulding and Blow Moulding process.
- Maximum average annual solid waste in terms of MT is 7.78 MT over 50.43 MT (15.43% of average annual production in MT) is in tiny sector for organizations using only scrap material. 417 (97%) respondents mentioned that, after recycling process, whatever is left, is generally sold to Scrap Dealers.
- More than 325 (75%) industry respondents gave the following suggestions:-
  - Recyclable materials must be collected and transferred before the collection containers get full.

- Provide collection containers with in the factory areas where waste materials are generated.
  - Schedule regular and periodic collections through established local reprocessing companies.
- More then 390 (90%) industry respondents gave following major measures for reducing waste/ rejections:-
- Regrinding of the scrap materials should be done to the maximum extent possible with good quality grinder after crushing the bigger pieces to the smaller ones.
  - Total Quality Management (TQM) principles should be applied for close monitoring of the production processes at all manufacturing stages. The Quality Control (QC) inspector should give the report at each stage. The corrective actions on these reports should be taken immediately to avoid mistakes and reduce wastage.
  - Employ qualified workers and supervisors to have improved man machine management
  - Conduct regular training programmes for workers, supervisors and managers including TQM, six sigma and soft skills
  - Government should improve the infrastructure facilities like regular uninterrupted supply of Power, Good Quality Roads and Water Supply since it is not with in the internal control of the organizations.
- Only 56 (13%) respondents from industry have admitted that there are Health & Safety Hazards for the workers in the works. Out of which, more than 45 (80%) respondents indicated the following two reasons. The reasons given below lead to Accidents and Low Productivity:-
- Inadequate machine maintenance
  - Use of impure water in production system and for drinking
- Following are the major measures suggested by more than 300 (70%) industry respondents for health and safety of workers:-
- Use latest safety equipment like hydraulic safety systems on the machines. Hold frequent seminars / workshops & training programs on safety of workers and supervisors.
  - The factory layout should be adequate and proper ventilation and lighting of the premises should be there with heavy duty exhaust fans. Every workman to be allowed sufficient rest during night.
  - Electrical wiring should be as per norms and all electrical equipments should have proper earthing.
  - Smoking and use of mobile phones by workers on the shop floor should be ban.
  - Adequate medical facilities to be provided for the workers either in the factory premises itself or at the nearest hospital. In any case, the factory should have functional first aid box.
  - Government should improve the medical facilities at the Community Health Care Centres.