

Plastic Reprocessing Pilot Project Bangalore

*Needs Assessment - Environmental,
Safety and Occupational Health
Dimension*

Case-Study Report
Plastic Recycling

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PREFACE

This study has been done in the framework of UWEP, the Urban Waste Expertise Programme, a six-year programme - 1995-2001 - of research and project execution in the field of urban waste management in the south. UWEP aims at:

- generating knowledge on community and small and micro enterprise involvement in waste management
- developing and mobilizing south expertise on urban waste issues

The Urban Waste Expertise Programme covers a range of topics related to waste management in the context of the urban environment in the south - solid waste collection and transfer, waste minimization, recycling of various waste fractions, resource recovery and liquid waste treatment.

Waste management and its various stakeholders now form a rapidly growing area of interest. The role played by small and micro enterprises and communities, however, is still much neglected. UWEP aims to generate, analyse, document and customize the information that is gathered during research and pilot projects, in order to enhance the expertise of the UWEP target groups, ultimately aiming at an improved integrated sustainable waste management system. This will in the long run lead to an improved environment, create more employment and offer improved urban services for everyone.

One of the UWEP research topics was plastic recycling and the possibilities of responsible reuse by involving small enterprises. This report, "*Plastic Reprocessing Pilot Project Bangalore - A Needs Assessment*", reflects the results of a case-study research done by V. Rajaram commissioned by WASTE, the executing agency of the UWEP programme. Similar researches on the topic of plastic waste were undertaken in Chile, Colombia and Peru. By publishing these case-study reports, we explicitly aim at divulging the data gathered during the researches. UWEP sees this report as one of the ways of focusing attention on small and micro enterprises, community involvement and their invaluable role in urban waste management.

Hopefully this publication helps you to form a picture of the role the various stakeholders play in urban waste management. More information and an overview of the other UWEP reports and books can be obtained from WASTE.

The *UWEP Case-study Report* series are published informally by WASTE. In order that the information contained in them can be presented with the least possible delay, the typescript has not been prepared in accordance with the procedures normally adhered to. WASTE accepts no responsibility for errors.

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EXECUTIVE SUMMARY

1.0 BACKGROUND

The environmental performance of plastics has been a subject of investigation worldwide. Entrepreneurs in Bangalore have developed techniques to recover waste plastic by melting them. However, visits to such units had indicated a need to investigate Occupational Safety and the Environmental Performance of this activity. Research based inputs were desired, to design a project that would address ESOH issues.

2.0 RESEARCH OBJECTIVES

The study was designed to:

1. To assess the needs of the PRPs.
2. To assess the ESOH scenario in the PLASTIC RE-PROCESSORS sector.
3. To provide inputs to design a “Pilot Project” to address ESOH issues.

3.0 THE RE-PROCESSING SECTOR IN BANGALORE

- The industry is mature and well established
- There are approximately 75 – 85 units in Bangalore
- There has been no dramatic increase in number of new units. While there are new units coming up, a number of them have closed down.
- Typically, they have an investment of 2 to 3 lakh Rupees.
- There are instances of established plastic re-processors owning more than one unit in the names of other family members, at different locations.
- The process used to reclaim waste plastic is very basic and elementary in nature. Homogenous waste is cleaned and melted to produce either granules or in few instances finished products.
- Products manufactured from re-processed plastic are cheaper than those made from virgin plastic. They also have smaller shelf life and are brittle.
- The properties of plastic deteriorate progressively, every time it is re-processed.
- The machinery used by plastic re-processors is locally manufactured with re-conditioned motors, gears and other spare parts. Hence the cost of these machinery is not comparable to branded / first hand / technically designed machinery.
- Raw material for almost all-plastic re-processors comes from a local market called “Jolly Mohalla / Jolly market”.

- A whole network of rag pickers / hawkers (kabadi wallas) and traders supply plastic waste to wholesalers in Jolly Mohalla.
- Plastic is segregated into homogenous lots by these wholesalers. The process of segregation is done by unskilled labour, based on their experience. The workers rely on the feel, shine and cleanliness of plastic waste.
- Almost all units are promoted from private funding or personal resources of entrepreneurs.
- The owners keep the size of a unit (volume of plastic reprocessed), small for a number of reasons.
- Labour in a number of units are from outside the state, it is largely felt that local labour is not consistent in working, not reliable and have lower contribution to production in the unit.
- Labour usually comes from the states of Bihar, Rajasthan, Orissa, and Uttar Pradesh.

4.0 NEEDS OF THE PLASTIC REPROCESSORS AT BANGALORE

4.1. PRIME NEEDS

- Constant and regular power supply
- Low cost / subsidised power
- Rationalized / subsidised tax structure
- Financial support

4.2 OTHER NEEDS

- Training about nature of plastics
- Low cost system for collection of waste

5.0 ESOH DIMENSION OF THE PLASTIC REPROCESSING SECTOR

5.1 ENVIRONMENTAL PERFORMANCE

- The owners of plastic reprocessing industry insist that, in and around the work place there is no negative fallout because of the process involved in reclaiming waste plastic.
- The PRPs contribute to the up keep of the environment, by virtue of reclaiming waste plastic, that otherwise would have caused greater environmental damage.

- Reprocessing of certain kinds of plastic, particularly PVC is known to be unfriendly / damaging to the environment.

5.2 OCCUPATIONAL HAZARDS

- In and by itself, it is difficult to pinpoint specific occupational hazards of the PRP sector.
- Occupational hazards common to most manufacturing sector can be noticed among the plastics re-processors, viz., high sound levels, workers not using certain protective equipment like gloves, air filters etc.

6.0 FACTORS THAT AFFECT THE PLASTIC REPROCESSORS

6.1. COST OF VIRGIN PLASTIC

- Most plastic re-processors manufacture granules that are used by virgin plastic processors. Hence, if the price difference between virgin granules and reprocessed granules is not significant, they prefer to use virgin granules.
- The international and domestic prices of virgin plastic have been on significant downward trend. With the setting up of domestic production facilities and with liberalised import policies virgin plastic is available in large quantities.
- Products manufactured from virgin plastic have greater demand than those made from reprocessed plastic.

6.2. COST OF RAW MATERIAL

- There is an elaborate self-generated mechanism by which all kinds of rejects are collected and suitably sold for reuse. Plastic in particular attracts a regular market value. The hawkers expect to earn a certain minimum amount every day, thus they do not collect waste that are not remunerative. This ensures that the cost of raw material will not go down drastically.

6.3. COST OF POWER

- The only input in plastic reprocessing unit, other than plastic waste is power. The lesser they pay for it, the higher their profits. It must be mentioned, that it is

generally considered that a number of units pilfer power by tampering with the electric meter.

6.4. TAXES ON RAW MATERIAL AND FINISHED PRODUCTS

- Plastic re-processors pay a 4 % tax on purchase of raw material, they also pay 4.2 % tax on sale of finished product. Turnover tax is paid depending on the turnover declared. It is estimated that they pay 8–12 % tax on an overall basis. Most units do not declare their purchase or sale and hence save on taxes.

7.0 THE PROBLEMS OF PLASTIC REPROCESSORS

7.1. IRREGULAR POWER SUPPLY

- Karnataka is a power deficient state. All industries face power shortage (Load shedding). In addition to announced power cuts, the SEB resorts to unscheduled load shedding.
- Power cuts not only mean loss of productive working hours, but also, it takes about two hours to heat plastic, so after every power cut, the machine needs to be re-heated. During such instances, there is degradation of plastic being melted.

7.2. LEVIES ON THE PRECISION ELECTRONIC METERS

- The State Electricity Board has installed precision electronic meters to check theft of power. However, they collect a fee for the meter and a deposit equal to three times the average monthly bill. This is considered unfair and this is being contested in the courts.
- The SEB has installed such meters only in a few industrial areas. Thus units not having such meter, are able to maintain lower production costs.

7.3. HARRASSMENT BY THE STAFF OF STATE ELECTRICITY BOARD

- Considering that some units indulge in malpractice, the employees of the SEB are known to seek their share of the loot, and resort to harassment of the innocent manufacturers.

7.4. LACK OF FINANCIAL SUPPORT TO THE INDUSTRY

- Plastic re-processors buy raw material by paying cash, they process the same in a day or two and sell the finished goods immediately (most often on credit). For the

size of operations they are, they do not get any institutional support for their working capital or other financial needs.

8.0 OTHER STAKE HOLDERS IN THE INDUSTRY

8.1. THE PLASTIC WASTE SUPPLIERS

- Plastic waste is collected, segregated and sold by dealers at jolly market. They do not sell their material below a certain base price, beyond which it is not worth collecting waste and also they cannot over-price their goods, in a manner that it will make it not viable. Prices are solely dictated by supply-demand situation.
- Most plastic re-processors work with only one kind of plastic. Hence, the dealers are known to acquire material from out side the state and also send material as far as Delhi, depending on the prevalent market prices in the respective cities.

8.2. THE STATE ELECTRICITY BOARD

- The single most important input is electrical power. The state electricity board controls it. The role of KEB is more of a service provider, it has no powers to formulate policies about power generation, distribution or sale.
- The SEB has always been in the deficit with regard to its resources, hence will never be in a position to show selective treatment to any small sector.

8.3. THE FINANCIAL INSTITUTION

- The financial institutions do not consider funding such units, because the net investment in them is of small value, they are unorganised, the machinery is not worth being considered an asset. They also know very little about this sector.

8.4. THE POLLUTION CONTROL BOARD

- The pollution control board has no policies or directives regarding this industry. It treats the re-processing industry with the same yardstick as it would treat any other industry.

8.5. OTHER GOVERNMENT DEPARTMENTS

- The labour department is one of the few Government departments that have visited the plastic reprocessing industry on more than one occasion. However, they have not shown any special interest in this sector. Their visits are considered more of an inconvenience than for the benefit of labourers. It must be emphasised that the owners have more to hide from this department.
- There is an officer designate called Factories Inspector from the Industries and Commerce ministry whose responsibility is to ensure that the working conditions in the premises are safe. They have adequate and wide-ranging powers to enforce proper functioning of the units under the Factories act of 1948 (see annexure iv for an abstract). However, being severely understaffed, they do not show great interest in this unorganised sector. They prefer to visit larger factories.

8.6. THE PUBLIC IN GENERAL

- The knowledge levels are restricted to the idea that plastic waste of certain kinds has resale value. Their interest and knowledge levels about the needs for safe disposal and judicious use of plastics are woefully low.

9.0 THEIR WILLINGNESS TO WORK TOGETHER

- Today the units are sensing the need to work together. So far, having been very profitable and not governed by any policies, they are weary about attracting attention.

- They are aware of the need to address issues such as meter deposits jointly. However, they are unwilling to take any initiative. They would rather some external agency does this for them.

10.0 THE PILOT PROJECT

- This study was designed to define the Need, Scope, Content and Guidelines for a Pilot Project that could showcase an overall improvement in ESOH aspects of this industry.
- Firstly, the owners of these units do not consider that ESOH in their units needs any attention. Any attempts to counter them on technical grounds such as noise levels, particulate matter in air or use of safety equipment while working, are countered with an argument that on a relative scale they are much safer than certain other industries or busy traffic junctions for that matter.
- Secondly, Occupational Safety is a matter of human sensitivity. Culturally, for a stratum of society that works with waste, their work and working conditions are not considered as needing investments.
- Finally, these units being private enterprises are more profit centred. It is desired that any investments directly lead to increased profits. In this context, when they do not perceive ESOH problems, they are reluctant to even consider talking the subject. They relegate such talks to “impractical-ivory-thoughts”.
- There are enough regulations within the Govt. policies to ensure international ESOH standards. The need is, to implement them. The Govt. is lacking in its interest, will to enforce and infrastructure to implement such guidelines.
- One of the prime features of any Pilot Project would be to showcase its overall developmental nature for the industry to emulate. Without a dramatic improvement in productivity / profitability, the industries are unwilling to make investments based on / for a pilot project.
- To gain acceptance of any pilot project, we should be able to establish a correlation between profitability and ESOH improvements. Considering that, they do not see such a correlation, a high degree of motivation will be required to start and sustain a Pilot Project.
- We can have a pilot project in the instance where we can bring them together in the form of a union or association and leverage to Govt. to offer recognition,

support and concessions to this sector. This would leave us in a position to bargain certain basic standards and performance levels in the units.

- We have a national level policy initiative “The National Plastics Waste Management Task Force” (Ministry of Environment and Forest, Govt. of India.) working to bring about a set of guidelines to recognise, regulate safe disposal of waste plastic. ESOH concerns are a part of the mandate given to this committee.

11.0 IN SUM

- Intervention from the dimension of ESOH improvements will not be acceptable to the industry.
- There are enough rules and regulations to enforce international standards and industry specific guidelines are being developed. There is no need to replicate efforts, or to set-up enforcement bodies.
- Market forces have brought out a degree of maturity to the industry. Noticeably, there has been a shakeout, enabling the better-managed and capable units to survive.
- Two factors that affect the recycling business are “falling prices of virgin plastics” and “electrical power, its availability and price” will continue to influence this sector. At a extreme instance and late future, these factors may cause the industry to be economically unviable as a private business proposition.
- There is very little intentional interaction between plastic re-processors and other stakeholders. There is a need to bring about awareness and responsible participation from all stake holder, particularly
 - . The Govt. / Policy makers
 - . Virgin plastic manufacturers
 - . The virgin plastic processors
 - . The enforcement agencies and
 - . The public
- In the absence of explicit policies from the Govt. and lack of infrastructure to enforce minimum requirements, a project that showcases ESOH improvements will need very high level of motivation and sensitisation of the owners.

- . In larger interest of safeguarding the environment from plastic waste, it is necessary to sustain plastic recycling activity.

THE DETAILED REPORT

1.0 BACKGROUND

All over the world there has been an increased concern about the deteriorating environmental situation, and lack of attention to occupational hazards. The use and misuse of plastic has been an area of prime interest.

It is a known fact that, plastics are non-degradable in nature, and hence has been attracting attention to its safe use. A number of entrepreneurs and technologists have developed methods by which discarded plastic can be reclaimed. Bangalore has a number of such units, who melt and produce reusable products / granules from waste plastic.

Earlier visits to the plastics recycling industry had indicated an 'in-principle' need to initiate projects that would address the Environmental Safety and Occupational Hazards on the reprocessing industry. It may be observed that, industries by themselves do not pay attention to such issues and are more profit oriented.

One approach to address these issues would be to enact rules that will govern the setting up and functioning of such units. However, we know that, industries often bypass them and it would mean additional infrastructure to enforce rules.

Another likely avenue is to address the needs of the industry and in doing so, have them be sensitive to Environmental Safety and Occupational Hazards. To have a successful project, it is necessary to have constructive participation from all sectors / factors that affect or stand to benefit from the performance of this sector. This research was commissioned to achieve this end.

2.0 RESEARCH OBJECTIVES

The study was designed to:

1. TO ASSESS THE NEEDS OF THE PRPS.
2. TO ASSESS THE ESOH SCENARIO IN THE PRP SECTOR.
3. TO PROVIDE INPUTS TO DESIGN A “PILOT PROJECT” IN AID OF PRPS.

At the end of the study we would:

- . Assess interest levels among the respondents on improving the ESOH performance.
- . Likelihood of implementing a pilot project.
- . Intentions to develop collaborations during the pilot project
- . Identify the collaborators who could influence the success of the pilot project.
- . Identify actions to implement a pilot project.
- . Articulate the Financial, Management and information needs of the plastic-reprocessing sector.
- . Identify the problems and assistance needs of the sector.
- . Understand the relation of re-processors with other stakeholders.
- . Develop the role of stakeholders in the pilot project.

The study would be limited to the city of Bangalore, India. The study would cover units that convert waste plastic into useable forms, i.e., granules, lumps and finished products. By definition they would have one or more extruders.

The study would also seek inputs from other people / factors who influence the industry. Such people, identified as stakeholders, would be drawn from:

- . The State Electricity Board
- . The Pollution Control Board
- . The Labour Department
- . Financial Institutions (Banks and the State Financial Corporation)
- . Technology Research Centres
- . Commercial Tax Department
- . Machinery manufacturers
- . Raw material suppliers (Plastic Waste)
- . Plastic Manufacturers Association
- . Karnataka Small Scale Industries Association

3.0 METHODOLOGY

We used a combination of Structured Interviews and Focus Group Discussion to fulfil the study objectives. The instruments used are enclosed in Annexure I and II respectively. All interviews were conducted in person by a team of trained investigators.

In the absence of any reliable sampling frame, respondents were identified after field visits. The respondents were contacted a second time after a clearer concept of the project was formulated.

The sample sizes desired and achieved are mentioned below.

Type	Number of respondents	
	Target	Achieved
Plastic re-processors	50	50
Government Agencies	10	10
Institutions	05	05
Private Sector	05	05
Total	70	70

The Focus Group Discussion:

A group of 13 entrepreneurs were invited to participate in focused discussion about plastics recycling activity in Bangalore. However, only 2 people turned up at the venue as promised. The balance had a number of excuses for being absent. It is our belief that we lacked credibility, as a number of others has spoken about improvements to happen in this sector, and nothing has happened. However, we followed up and met them again on a one-to-one basis.

4.0 PROFILE OF REPROCESSORS IN BANGALORE

The plastics reprocessing industry is not new to India. A number of units have been operational for a long time. Bangalore has units, which are close to 20 years old. Over 35 percent of the units contacted were above 8 years old. The age distribution of the units sampled in this study is mentioned in Table below.

All figures in percentages

Year of establishment	%
1991 and earlier	39
1992, 1993	23
1994,1995	25
1996 and later	13

By standards of industries in Bangalore, most units are small and tiny in size. The floor area of the units sampled are mentioned below

Below 500 sq. ft.	11 %
501 – 1000 sq. ft.	52 %
1001 + sq. ft.	36 %

The units typically process 200 KGs to 600 KGs of waste plastic every day. One or two units are able to achieve production of over 1 tonne a day by running more than one shift of operations. Raw material availability and market for the finished goods govern their production. They claim that there is no predictable consistency in their production.

The following kinds of plastics are primarily recovered by re-processors in Bangalore.

HD	59 %
PP	39 %
LD	45 %
PVC	11 %

Typically they process only one kind of plastic at a time. With experience they have learnt that different kinds plastics should not be mixed for melting, this could result in damage to the machinery, or poor quality granules / products. However, there is one segment of re-processors (approx. 20% of the re-processors) in Bangalore, who work with road waste, which by nature is very heterogeneous. The waste used have different colours diverse history and soiled to different extents. These units produce lumps as their final product.

Close to 60 % of the units in Bangalore produce granules as their end products. Another 5 to 10 percent manufacture lumps. Certain units convert waste plastic directly to finished products such as :

- Kodams (Water pots)
- Buckets
- Other household articles
- Agricultural pipes (and pipes for other applications)
- Carry bags

Most units have a maximum investment of Rs. 2,00,000/-.

5.0 PROBLEMS

The logic of looking at the problems faced by the industry was to identify a possible opportunity to leverage an ESOH pilot project.

Responses to an open-ended question regarding the problems in the industry are mentioned in Table below.

The State Electricity Board	100 %
Availability of finance/ Lack of liquidity/ cash flow	25 %
Labour related	33 %
Falling cost of virgin plastic	18 %
Availability of raw material	18 %

Other problems mentioned include issues relating to taxes, harassment by other departments. Some of them also mentioned they did not face any problem worth mentioning.

In recording these responses one must observe that the first three problems are common to all industries across the state. Particularly, the power situation in the state needs drastic improvements for all sectors.

THE STATE ELECTRICITY BOARD

At a spoken level every single re-processor articulated the State Electricity Board as the single most common problem in the industry. The range of grouses include,

- Irregular and unstable power supply
- Harassment by unscrupulous staff
- Selective installation of precision electronic meters (at some industrial locations)
- An additional fee of Rs. 12,000 for the precision electronic meter (which they argue is the property of the state electricity board hence they should not be made to pay for it)
- A deposit equal to three times the average fee in the last six months.
- Classification of units consuming power in excess of 67 HP as High Tension (HT) power consumer, and hence have to pay a higher per unit cost and have to bear increased load shedding.
- Earlier the SEB allowed a grace period of over a month on non-payment of bills, however, now the SEB disconnects power after three days past the due date.
- Loss of production due to power shortages, i.e.,
 - Loss of working hours
 - The machines take over two hours to heat up every time it cools down.

AVAILABILITY OF FINANCE / LIQUIDITY CRISIS / CASH FLOW

In the last two years, all industries in India, have faced tight money markets due to a number of reasons, most important being the political uncertainty. Traditionally, the small and micro enterprises receive finances under special schemes only. The reprocessing units are so small by way of net investments and assets, that the financial institutions do not consider funding such projects.

Matters are complicated by the situation that, plastic industries in general have a bad repayment track record.

LABOR RELATED ISSUES

Units having labour in excess of eight numbers must comply with a number of statutory requirements of the state employee/labour laws. In almost all units, cleaning / segregation activity by itself requires as many or more hands at work, and this requirement is never met with.

The more amount of waste segregated and cleaned the more processing that can take place. However, this means a need for,

- . Large working space, which the units have already utilised to the full extent. Additional inputs mean additional investments.
- . A recurring working cash expense and administrative workload for complying with the state laws.

Close to 70 % of the reprocessing industry uses labour brought in from outside the state. Labour usually comes from the poor states of India, i.e., Uttar Pradesh, Bihar, Orissa and Rajasthan. These workers usually stay in the factory premises (sometimes with the family). Coming from a very poor background and having to work in an alien state, they work for long hours and are less demanding in matter of work benefits.

Those units that have local labour, also face the additional problem that when more lucrative avenues come by, the workers do not report to jobs, causing bottlenecks in production.

AVAILABILITY OF RAW MATERIAL

It takes a certain time, before large volumes of homogenous plastic waste are accumulated. Not everybody processes mixed type of waste. Sometimes, there is surplus of one kind of waste too. Nobody wishes to buy and stock waste primarily because it is too bulky and prices keep fluctuating. Inventory management is an art few units have learnt, for others it is still a problem.

FALLING PRICES OF VIRGIN PLASTIC GRANULES

This is a problem solely influenced by market forces and Govt. policies. There is no likelihood of a reversal of situation. In fact, the situation is likely to worsen.

The single largest consumer of reprocessed plastic is the virgin plastic product manufacturer itself. The price difference between virgin plastic granules and reprocessed granules contributes to his profit margins.

Typically, the virgin plastic has been an over taxed item, and there was a perpetual shortage in the market. The prices of virgin plastic granules have fallen drastically with the onset of liberalisation, setting up of indigenous manufacturing facilities, devaluation of East Asian currencies.

The reprocessed granules used to cost about 40 to 50 percent less than that of virgin plastic. Now it costs about 25 to 30 percent less. At a lower price difference, the virgin plastic product manufacturers shall not have as much a distinct advantage of using RP granules. At best he will resort to using lesser quantities of RP granules.

The following table gives the landed prices of various kinds of plastic in India, over the past one year.

Polymers		April 1997	Oct 1997	Dec 1997	Mar 1998*
LDPE/ LLDPE	(Dom)	60,000	54,250	54,750	54,000
	(Imp)	60,166	55,780	55,695	45,00
	(Int)	780 – 990	705-862	710-805	720-770
HDPE	(Dom)	53,500	45,813	43,500	45,000
	(Imp)	51,050	46,442	47,791	43,000
	(Int)	810-840	718-734	680-700	600-610
PP	(Dom)	55,625	43,125	41,400	39,500
	(Imp)	53,481	44,650	43,774	38,000
	(Int)	860-880	686-710	622-642	500-530
PS	(Dom)	52,500	47,500	48,950	32,000
	(Imp)	38,409	42,969	43,462	42,000
	(Int)	780-790	610-680	465-635	510-585
PVC	(Dom)	38,000	44,438	44,200	41,000
	(Imp)	39,868	47,465	46,544	44,000
	(Int)	780-820	732-752	657-687	540-550

Source : Petrochemicals Data Services, Vadodara,

- Industry estimates as on March 1998

Abbreviations: LDPE- Low Density Polyethylene. LLDPE - Linear Low Density Polyethylene. HDPE - High Density Polyethylene. PP - Polypropylene. PS- Polystyrene. PVC- Poly vinyl chloride

(Dom)- Domestic and **(Imp)- Imported** prices are in Indian Rupees (INR). **(Int)- International** prices which are shaded are in US Dollars (at the time of writing this report 1 US\$ = 45 INR).

6.0 ESOH SCENARIO OF THE PLASTIC REPROCESSING UNITS

In seeking information on this aspect of the study, often one had to contend with a constant reference to other industries. On comparative note, this industry is said to be relatively safer. The owners preferred to avoid this whole subject, on the premise that

- . These would be used to bring about strictures and laws, which shall be inconvenient to comply with;
- . There is no authority in the country that considers plastics processing of any kind (in and by itself) harmful to the environment.
- . Their sizes of operation are so small, that by themselves they are insignificant.

All these arguments do not by themselves lend to conclude that, there are no environmental safety risks or risks of occupational hazards. To prove or disprove would be beyond the scope of this study.

Moreover, a matter such as Occupational Safety, is a matter of sensitivity to human needs. The lack of it among proprietors is an expected matter.

ENVIRONMENTAL SAFETY

When recovering waste plastic by melting it, the possible sources of environmental damage are:

- . Release of toxic fumes during the process of melting
- . The process of cleaning waste plastic
- . Disposal of rejected plastic
- . Sound levels
- . Particulate matter in air

All the owners of the RP units argue that none of the above factors are at levels, which would call for intervention. Only an occasional mention that, certain kinds of plastic when melted, or cleaned can be harmful.

Release of toxic fumes

Only in some very small units, particularly those processing road waste, (where very poor quality of machine is used) we have noticed fumes leaking from the extruder. We have not noticed this phenomenon in larger units or those that have been around for a long period of time.

Also most units are constructed such that they have some kind of ventilation and have an open space or yard for cleaning. Very often they have a large entrance, which enables aeration. All these ensure that a low likely hood of concentration of toxic fumes.

The extent of damage to workers and the environment at large, would be in the scope of other specific studies and at this stage we cannot rule out the possibility of environmental damage.

The process of cleaning waste plastic

All units segregate and clean plastic waste. This is done manually, wherein clean plastic is passed directly for melting and others are washed with water and dried.

The process of cleaning or segregation by itself cannot be associated with environmental damage. However, almost always there is a lack of well-designed drainage for the water used in cleaning.

Disposal of rejected plastic

Very little quantities of plastic is rejected by a re-processor. Rejected plastic is often of a different nature and should not be melted in one batch. This is often left to lie in the open outside units, until sufficiently large quantities of homogenous waste is accumulated. If this lot is sufficiently clean, it is sold again to a suitable party who can use it.

Sound Levels

The activity of crushing / shredding is what causes most noise in a unit. These levels of sound are common to most manufacturing units and the owners argue that it cannot be said to be offending to the environment at large and that traffic junctions would record higher decibels of sound..

Particulate matter in air

Waste plastic is broken down to small chips or shredded into smaller sizes. This process does cause solid particles to fly in the air. However, being heavier, it cannot be suggested to be floating in the air. Observably, there is a possibility of health risk to workers who are constantly exposed to such working environment. Especially, because they do not use facemasks / breathing filters.

OCCUPATIONAL SAFETY

Almost all owners and some workers insist, there is no visible effects on their health, by virtue of working in a plastic-recycling unit. They go on to substantiate their view, by quoting the number of years they have worked in the reprocessing business.

On further probing, they are willing to admit that burns and injuries are common among workers. These they insist are as a result of carelessness of the workers. We noticed an instance of worker insisting that he could work better with bare hands and preferred not to use gloves.

One can observe a general lack of priority given to occupational safety. High noise levels, particulate matter in the air, odour in the air are considered normal. In fact, some justify such situation as more acceptable than standing in the street corner.

Use of protective gear such as gloves, air filters, and fire extinguishers is rarely noticed. Working conditions without such equipment cannot be considered safe, however because no accidents have happened, they argue that it is not necessary.

A number of owners quote having been questioned by more than one person about negative health impact of working in this industry, but not one of them has proven / shown or demonstrated this. This has led to an assumption that such hazards do not exist.

7.0 OTHER STAKEHOLDERS IN THE INDUSTRY

The respondents were given an opportunity to identify such agencies / bodies that affect the plastic re-processing industry. The following table gives a picture of their perception of stakeholders to their industry.

Don't know / Can't say	45 %
Waste collectors	23 %
Banks	9 %
Virgin plastic manufacturers	2 %
R & D institutions	2 %

For most people, Government is the institution who can influence their industry. By use the term "Government", they mean any and all departments that may affect them. (Including SEB).

Noticeably, not one of the re-processors we met were aware of a national task force being set-up, that is framing guidelines about the setting up and functioning of such industries. Also the failure of a large percentage of re-processors to articulate stakeholders depicts a picture that they have not bothered to study their own industry.

Stakeholders to the industry include:

THE PLASTIC WASTE SUPPLIERS

The army of rag pickers, hawkers, traders and wholesalers who deal with all kinds of household and institutional rejects are the source of inputs to this industry. There is no alternate mechanism to obtain sufficient quantities of raw material, so their fortunes are influenced by those of the network that feeds them. Prices are solely dictated by supply-demand situation.

The trade of plastic waste is a complex affair. Bangalore receives waste from all over the state and it's neighbouring states too. Certain kinds of plastic waste is sent as far as Delhi.

THE STATE ELECTRICITY BOARD

All units use electrical power to melt plastic. After plastic waste, power is the second most important need. Electricity in the state is a state-controlled commodity. There has been and will continue to be a huge demand supply gap in the foreseeable future.

Electricity, its availability and pricing is a very political issue. It is also highly subsidised service of the Govt. The department only functions as a distribution agency. Its functioning and efficacy is politically controlled.

THE FINANCIAL INSTITUTION

The maximum investment in a small-scale industry is 2 Crores Rupees. PRP units have an investment of Rupees 2 to 3 Lakhs, at this investment scale they are considered as tiny and cottage industries. In the considerations of financial institutions, there is little difference between primary plastic processors and re-processors. They have no information about the re-processing sector.

The net value of the machinery required is very low, and they use reconditioned / rejected gears, motors and other components to make them. Such machinery has very low resale value. Generally, the plastics processing sector is said to have a bad re-payment track record.

In principal they are willing to fund and encourage plastic recycling activity / units. However, they are not sure of according any special status or treatment.

THE POLLUTION CONTROL BOARD

The pollution control board has no specific policies regarding the plastic recycling industries or plastic industries per se. They can be called up on to inspect air quality, effluent treatment and sound levels in any industries. However, their interaction with small and tiny scale industries is minimum. They have had no interaction with the plastics manufacturing sector.

LABOR DEPARTMENT

The department is entrusted with the responsibility of looking in to all labour related issues, including ESOH. However, their attention is normally at ensuring that administrative requirements are met with first, such as ESI, Leave records etc., are maintained. They prefer to visit larger units. The department also looks into labour disputes if any. Generally, as the PRP sector uses casual labourers on daily wages, so they do not get inspected with the same rigor that other industries get.

Strictly speaking, if an unit employees more than 8 workers, they need to fulfil a number of labour related laws. All PRP use as many or more employees, however, they do not declare so, and hence have a lot to hide from the Govt. The officials are not known to be strict about enforcing the laws in this regard. The owners consider their visits to the units an inconvenience.

MINISTRY OF INDUSTRIES & COMMERCE – FACTORIES & BOILERS

The Factories Inspector has wide ranging powers to inspect and regulate working conditions in all industries in his jurisdiction. Again, the officials prefer to visit Large factories and ignore small and unorganized units.

WASTE PICKERS (RAG PICKERS)

Though the waste pickers were not part of the original target group for the study, it was felt that getting their perceptions with regard to falling prices in plastics would be useful to validate the information on the one hand and see how it affects them on the other since they belong to a vulnerable group.

A sample size of 50 waste pickers were only possible and though this may not be a true representative, it does throw some light on this most important section of the sector.

The key findings were:

88% say their earnings have reduced since the past one year and

72% say they are collecting lesser waste than last year

Some of the reasons cited were:

- reduced prices
- cheating by traders
- lack of storage area
- increasing competition

On the whole their selling prices of waste have come down since last year as one can see from the table below

Colloquial term	Industry term	Percentage *
Pugga	HDPE	30%
Kadag	HDPE low grade	80%
White plastic	HM Paper	20-30%
Super	LD Super	30%
Kala Pugga	LD Black	50%
Bale Patti	PP Paper	40-50%
Gongotha	PVC	20-30%
Art piece	PVC low grade	50%
Road waste	Mixed road	40%

*Percentage reduction in selling price

From these findings it may be inferred that:

- Increased waste collection does not mean increased earnings
- Per capita effort is the same
- There is a limit to their collection
- Lack of storage is a major problem
- Will collect most profitable and therefore selective in type of plastic collected
- Number of waste collectors have increased
- One may forecast a certain specialisation in type of waste collected and grouping of collectors accordingly

Thus Increased consumption of plastics and in particular packaging will mean more waste in the Municipal stream but only those which are profitable will be collected and since prices are falling some types may not be collected at all thereby aggravating the environmental impact.

8.0 THEIR WILLINGNESS TO WORK TOGETHER

There is no specific association or union of re-processors in Bangalore. However, some of the older units are members of the Karnataka Small Scale Plastics Manufacturers Union. This union has an affiliation to the Karnataka Small Scale Industries Association. However, the KSSPMA has not had any specific attention to the activity of reprocessing.

The Marwadi community dominates the PRP sector in Bangalore. They account for nearly 70 – 80 % of all the units. They have an informal network within themselves. Of the remaining units, about 20 % of them are owned by people from the Muslim community.

Some of the units are members of local industrial area associations. Out visits and meeting with heads of these associations find that, the associations have no specific activities with regard to PRP activity. Many of the associations are for name sake and not active in any manner.

One of the possible reasons for, not forming an association, could be that many units have a lot to hide from the Govt. viz., tampering of meters, tax evasion etc. Questions about why they have not formed an association, elicited a common answer “ Who has the time for it.” However, they are willing to be members of any union formed, that is if it benefits them.

Only some of the units perceive, the possibility of jointly addressing issues such as meter deposits and tax laws applicable the PRP sector.

9.0 THE TASK FORCE

The ministry of Environment and Forests has setup a “National Plastics Waste Management Task Force.” They developed and released a set of guidelines, for consideration by the Government and Opinion Leaders.

The guidelines developed intend to:

1. Harmonise National measures concerning the management of plastics packaging and packaging waste.
2. As a first priority, prevent the production of packaging waste
3. Encourage re-using of packaging.
4. Encourage recycling, and other forms of recovering packaging waste.

The Task Force explicitly states that,

“Manufacturers and Consumers of plastics must recognize and meet the environmental considerations that are involved not only in producing basic plastic resins / manufacturing plastics products and using such products but also eventually disposing of the material or removing it. Source reduction practices shall be given high priority and evolve new ways of producing / using plastics products.”

About the Plastics Reprocessing Sector, it says:

“Recycling is not to be simply practiced as melt processing. Though ready made off the shelf systems are available for recycling. It is mandatory to see that these systems have proper controls so that the material is not degraded to give obnoxious fumes.”

The guidelines regarding setting up and functioning of reprocessing units are as follows:

Vents and Exhaust shall also be provided to check and control the emissions resulting from melt processing and also to improve the air quality in the work atmosphere.

Air Quality Monitoring on periodic basis shall be obligatory so that any emission whatsoever does not go unchecked and necessary steps taken to reduce emissions and the OSHA standards (Factory Acts) are complied with.

Water Effluent, if any, shall also be checked in a like manner as above and effluent be suitably treated and only treated effluent be discharged.

The guidelines aim to lay mandatory obligations on re-processors regarding working conditions. A periodic routine medical checkup of all involved in the process of plastics waste recycling shall be practiced to understand the impact of the involved process on human health and thereby make efforts to minimize these impacts.

Preventive measures: Such as use of safety appliances / gadgets viz. masks gloves, glasses, tons etc. shall be adopted to prevent contact of materials / emissions with the body.

Good House Keeping in handling of material with minimum spillage can further lower, the impact on both the unit and workers.

Burning of plastic waste particularly unattended shall not be encouraged. Burning if at all required shall be carried out in incinerator only.

Emission Standards as proposed by Central Pollution Control Board (CPCB) are to be observed:

1. Particulate Matter	-	100 mg / NM ³
2. SO ₂	-	150 mg / NM ³
3. NO ₂	-	450 mg / NM ³
4. HCl	-	50 mg / NM ³
5. Min. Stack Height	-	30 mg / NM ³

Fire Protection and Preventive measures shall be provided in recycling units. Adequate fire fighting gadgets shall be installed at proper places and workers be trained to use the fire fighting equipment.

About the **Return, Collection and Recovery Systems**

“ It is an economic imperative for India, that the rag picker, shall be encouraged by providing them with appropriate incentives and tools for making the job more lucrative / remunerative.”

“In order to ensure that greater volumes of the total plastics waste generated in the country reaches the recycler, a more organised system of return, collection and recovery needs to be implemented. “

The task force is working with the Bureau of Indian Standards for developing marking and identification systems.

Expressing the need to support re-processing, the Task Force notes:

“Recycling, re-use and recovery offer a solution to reducing the volume of plastics wastes. These methods can be encouraged through incentives and penalties such as credits, taxes, deposits and other mandatory and voluntary restraints. The primary responsibility of collecting, sorting and recovery of municipal solid wastes belong to the local municipality or other relevant Government authorities. To effect efficient collecting, awareness regarding the proper disposal of waste has to be spread among the people. Due to the fact that plastics are used with customer comfort in view, it is also the responsibility of the consumer to ensure that the plastic products being used by them are recycled. In India, littering is a common feature and to curb this, stiff penalties shall be imposed on the offenders. Collection and sorting of plastics waste in public places and municipal dumps provide livelihood to rag pickers and waste dealers and for recyclers it is a blessing.”

Their recommendations included a strategy for effective management of plastic wastes through Reduction, Reuse and Recycling. This covers:

Preventive measures	Minimising use of plastics, segregation of wastes and compliance of environmental guidelines
Promotional measures	Improvement in waste collection system and recycling technologies
Mitigative measures	Public awareness programme and penalties for littering, fire protection and safety measures

The institutional mechanism envisaged is through establishment of concerned industry associations and the setting up of **Indian Centre for Plastics in the Environment (ICPE)** which will facilitate Government - Industry interaction.

The key points covered by the recommendations include:

- . Guideline on packaging
- . Bureau of Indian Standards (BIS) specifications
- . Limits to recycling
- . Circulation of dirty coloured plastics carry bags
- . Recycling logistics
- . Consumer awareness
- . Applications development research
- . Penalties for littering
- . Incentives
- . Recycling / Reprocessing machinery and equipment
- . Hazardous plastics waste
- . Fire protection and safety
- . Network of industry associations
- . ICPE

While indeed most of the recommendations are laudable an effective implementation mechanism in the country is yet to prove itself in any sphere. It is probably in this area that public interest groups have to work hard. More so in the absence of the non-government sector participation in formulating government policies that have public impact and in this case their non-inclusion on the Task Force.

(Full text of the Report is submitted as a separate document for further reading)

10.0 THE PILOT PROJECT

At the beginning of the study, we had no clear picture of the content and extent of a pilot project. The objective was to showcase, ESOH improvements for the industry. We needed to identify, units where ESOH aspects needed improvement and the owners were willing to co-operate in this matter.

In not one of the fifty units, the owners considered ESOH as a problem. They acknowledge the possibility of bringing forth improvement. But they accept no outside interference in the matter. They promise to attend to any lacunas pointed out or consider them not necessary.

The owners consider working conditions in the units equally safe as in any other industry. There are no specific rules or guidelines about the ESOH in the plastic reprocessing industry. Attempts to gain entry into the units with the introduction of our ESOH interests were futile. Only when we introduced ourselves as having other overall developmental interests, were we permitted to have discussions with them.

Esquires regarding safety of machinery, use of gloves, air filters were rebuffed with a remark, that the workers do not consider them necessary or normally they have them, and during our visit they forgot to use / follow them. Investments towards safety devices are considered luxuries.

Attempts to obtain inputs to a pilot project from the respondents elicited answers from a few respondents only. They were more on the lines of “Solve our problem” and by that they indicate the power situation mainly.

Considering the tone of their talk and attitudes, we feel it is unlikely that they will visit a demonstration unit and pickup / learn good housekeeping practices or safe manufacturing procedures. They are willing to make investments so long as it is productive / profitable.

That they do not have any association / union, we will need to establish lines of communication with the industry to begin with. A high degree of motivation is required to even get them to talk, as a group with common interests.

If the sector is provided with concessions, we would be in a position to demand acceptable ESOH standards for the units.

We have a national level policy initiative “The National Plastics Waste Management Task Force” (Ministry of Environment and Forest, Govt. of India.) working to bring about a set of guidelines to recognise, regulate safe disposal of waste plastic. ESOH concerns are a part of the mandate given to this committee.

Based on the mission visits, and the field work done during this study, we feel strongly that a pilot project must be on a policy level, rather than a micro enterprise level. Our rationale is :

- Any improvements that can impact plastics recycling can happen in the economic paradigm only. We cannot expect to accomplish the same from the micro level.
- Once we have clear policies, it is possible to work with units in implementing them.

Therefore, it would be desirable to support the formation of a working group to analyse and critique the Task Force Recommendations and create appropriate pressure among policy makers to implement all aspects of plastic waste management, which includes improving its Environmental Performance and Occupational Health and Safety

11.0 CONCLUSION

The prime needs of the PRP sector has been identified as:

1. Constant and regular power supply
2. Low cost / subsidised power
3. Rationalized / subsidised tax structure
4. Financial support

The inability of a pilot project to address these needs rests with the fact that power availability has and is generally much less than the demand. With such shortfall because of underutilisation of existing capacities, transmission losses, economically unfeasible distribution agency (due to free power to the agricultural sector), and no substantial addition in generation. While this is a problem all over the country, the situation in Karnataka is particularly poor. The power sector is controlled and run by the State which, due to socio-economic and political compunctions does not seem to meet the market demand and need. Given this scenario, expecting a rationalised or subsidised tax structure seems quite impossible for the PRP sector.

As for finance, most financial institutions whether banks or State industrial finance organisations have stringent conditions to lend to industry. This is thus accessible only to entrepreneurs 'educated' of the system and businesses with credibility and clout. SSI's have been encouraged as a policy but the time, effort and wherewithal to tap these resources are not available to small entrepreneurs running units in the unorganised sector by and large. The PRP sector is no exception. As a rule they depend on private financing available on personal guarantees and through known networks at very high interest rates.

We may thus conclude in general that the need at this point of time is to:

- . Ensure policy changes that will continue to make PRP a profitable activity. This ensures the market forces will attract private sector participation.
- . Form a Self-Interest-Group / Association / Union among the PRP's in Bangalore.
- . Work with Policy makers / Government in
 - Completing and realising the mandate of the Task Force. (In framing definite policies to deal with plastics packaging waste.)
 - Sensitising them about need to address SOH issues.
 - Recognising PRP as a special industry whose contribution to the society/environment is not directly tangible.
- . Improve the qualities (read properties) of re-processed plastics. Not limited to improved machines.
- . Set-up a mechanism to decimate technical and market information.
- . Develop / Identify re-processed plastic products that have a long life.

- . Ensure that cost of waste collection does not go up.
- . Certain kind of plastic waste viz. PET is not recycled currently within the existing informal system and methods on re-processing them on a small scale need to be explored.
- . Since plastic packaging is the largest component of discarded plastic, reduce the use of complex constituents.
- . Organise a scientific debate and environmental assessment about environmental performance of plastics.
- . Work with R&D institutions to develop standards for plastic products that are environmentally sound.
- . Explore opportunities to recover energy by incinerating plastic waste, particularly that which does not get picked from municipal waste and to avoid repeated recycling of plastic waste.

We strongly suggest that a Pilot Project that intends to showcase ESOH improvements not be initiated at this point of time. Our basis for stating so, is:

1. We perceive the ESOH situation in PRP units as a problem, and the owners do not. We will have to technically prove occupational hazards of plastic reprocessing.
2. Before we show case any project, we need to sensitise people about SOH needs.
3. As we observed, ESOH conditions are bad only in some units. (approx. 20 %)
4. The PRP is a very small sector, (in terms of number of units, size of operations, net value of units) for the stakeholders.
5. ESOH situations are comparatively not as bad as in certain other industries.
6. There are no visible health damages to workers as a result of working in this industry.
7. Waste in India has a certain economic value. Waste recovery is a business.
8. Unless we can demonstrate a correlation between increased profits / productivity and ESOH, the possibility of voluntary participation from a private enterprise is low.
9. National level policies are being developed that shall ensure acceptable ESOH standards if implemented.

As we see it, the options we have to bring about ESOH improvements, is to:

- . Ensure implementation of existing laws that the units will have to abide by (under the Factories Act, 1948 -see **annexure iv** for an abstract); or
- . Reward units maintaining basic minimum ESOH standards with incentives and subsidies.

ABBREVIATIONS

PRP	Plastic Re-processors
Govt.	Government
KSSIDC	Karnataka Small Scale Industries Development Corporation
KSSPMA	Karnataka Small Scale Plastics Manufacturing Corporation
KSSIA	Karnataka Small Scale Industries Association
KSFC	Karnataka State Financial Corporation
SIDBI	Small Industries Development Bank of India
SEB / KEB	State Electricity Board / Karnataka Electricity Board
MOEF	Ministry of Environments & Forests
ESOH	Environment, Safety & Occupational Health
RP	Reprocessed Plastic
OSHA	Occupational Safety, Health (Factories Act)

GLOSSARY

RE-PROCESSORS	Plastic industries engaged in recovering plastic from such plastic products whose first use life is complete and hence has been rejected.
VIRGIN PLASTIC PROCESSORS	Plastic industries which manufacture products with plastic resins for the first use.
LOAD SHEDDING	Time periods during which there shall be no power supply from the state electricity board.
METER DEPOSIT	A fee collected by the state electricity board for installing a precision electronic meter in the premises.
TASK FORCE	A committee instituted by the MoEF to address plastic waste management.
HT POWER CONSUMER	Industries consuming electrical power in excess of 67 Horse power.
LT POWER CONSUMER	Industries consuming electrical power below 67 Horse power.

**QUESTIONNAIRE
PLASTIC RECYCLING**

PROFILE

NAME

ADDRESS

YEAR OF ESTABLISHMENT

FLOOR SIZE OF UNIT

VOLUME OF OPERATIONS

SPECIFIC NATURE OF RECYCLING

MANPOWER UTILIZED (Number and ethnic
background)

ETHNIC BACKGROUND

PREVIOUS EXPERIENCE

NATURE OF PLASTIC RECYCLED

FINISHED PRODUCTS PRODUCED

PROBLEMS

1a. PLEASE DESCRIBE THE NATURE OF PROBLEMS FACED, IN YOUR INDUSTRY?

1b. PLEASE DESCRIBE THE IMPACT OF PLASTIC RECYCLING ON THE ENVIRONMENT?

1c. PLEASE DESCRIBE THE "OCCUPATIONAL HAZZARDS" IN THE PLASTIC RECYCLING INDUSTRY?

1c. DO YOU THINK PEOPLE IN THIS INDUSTRY FACE ANY HEALTH PROBLEMS?

Yes 1 No 2.

IF YES, PLEASE DESCRIBE THEM

2. HERE ARE SOME PROBLEMS MENTIONED BY OTHERS, PLEASE TELL ME

1. IF YOU THINK IT IS A PROBLEM
2. DO YOU FACE THIS PROBLEM IN YOUR UNIT

1 2

	V/N	V/N
AVAILABILITY OF FUNDS / CASH FLOW		
ELECTRICITY – CONSTANT AVAILABILITY		
MANPOWER – SKILLED & UNSKILLED		
TECHNOLOGY		
WASTE DISPOSAL		
RAW MATERIAL		
HIGH SOUND LEVELS		
HIGH PARTICULATE MATTER IN AIR		
ALLERGIES		
NEGATIVE REACTIONS TO CHEMICALS USED		
BURNS		
POOR QUALITY OF MACHINES AVAILABLE		
RAW MATERIAL AVAILABILITY – QUALITY		
RAW MATERIAL AVAILABILITY – QUANTITY		
THE MARKET - SELLING THE FINISHED PRODUCT		
THE MARKET – COMPETITION		
TECHNOLOGY ISSUES		
THE GOVERNMENT – NO SUPPORT		
THE GOVERNMENT – HARRASSMENT		

CONCEPT TESTING

3a. What issues, initiatives or programs can be undertaken to support the plastic recycling industry?

3b. Reactions to participation of the government in such programs.

3c. Reactions to participation from other stake holders in such programs.

3d. Suggestions for the content of a pilot project.

3e. Reactions to

Management trg. Programs	
Efforts to reduce pollution	
Developing of training	
ESOH improvement	

4a. Would you be interested in participating in a pilot project, wherein your unit may be used for demonstration and research purposes?

NATURE OF RELATION WITH OTHER STAKE HOLDER

3a. WHICH GOVT. DEPARTMENTS DO YOU INTERACT WITH

3b. HAVE YOU HAD TO FACE ANY PROBLEM FROM THEM? PLEASE DESCRIBE THEM.

3c. WHAT SUPPORT DO YOU EXPECT FROM THEM?

THE GOVT. OVERALL
 POLLUTION CONTROL BOARD
 HEALTH DEPARTMENT
 INDUSTRIAL SAFTEY DEPARTMENT
 LABOUR DEPARTMENT
 ELECTRICITY BOARD

Fout!	Bladwijzer	niet	Problems & Expectations

2. **OBSERVATIONS**

MACHINERY (LIFE, BALANCE, COMPLETENESS)

ELECTRICITY

WATER

WORKING ENVIRONMENT

NEIGHBOURHOOD

ERGONOMICS

SOUND LEVELS

DUST LEVELS

DRAINAGE

VENTILATION

DISCUSSION GUIDE

PLASTIC REPROCESSING IN BANGALORE

Fout! Bladwijzer niet gedefinieerd.**INTRODUCTION**

- . BACKGROUND OF UWEP, GROUP CONSULT
- . OUR INTERESTS IN PLASTICS REPROCESSING
- . OUR ROLE TODAY
- . WHAT WE EXPECT FROM THEM TODAY

WE HAVE MET PEOPLE, AND STUDIED THE INDUSTRY FOR SOME TIME, THERE ARE SOME ASPECTS THAT WE ARE AWARE OF, AND SOME THAT WE ARE NOT, WE SHALL BEGIN BY TAKING STOCK OF WHAT WE KNOW AND WHAT WE DON'T KNOW:

A NUMBER OF STUDIES HAVE BEEN DONE, MANY PEOPLE HAVE SHOWN INTEREST, MANY FOREIGNERS HAVE COME, BUT TODAY THE SCENE IS DIFFERENT THAN THAT OF SIX MONTHS AGO.

WE WILL TELL OUR OBSERVATIONS, YOU CAN CONFIRM OR DENY THE SAME.

THE INDUSTRY HAS SOME NEW PLAYERS, ALSO WE UNDERSTAND SOME UNITS HAVE CLOSED DOWN,

- . HOW MANY DO YOU THINK HAVE STARTED
- . HOW MANY DO YOU THINK HAVE CLOSED
- . WHY ARE THERE NEW UNITS, WHEN SOME ARE CLOSEING – REASONS FOR STARTING AND CLOSING
- . IF YOU WANT TO BE PROFITABLE IN THE INDUSTRY WHAT ARE THE INGREDIENTS.
- . WHY DO SOME PEOPLE HAVE MORE THAN ONE UNIT?

VIRGIN PLASTIC HAVE COME DOWN AND THERE IS INCREASED QUANTITY OF VIRGIN PLASTIC IN THE MARKET.

- . HOW DO YOU THINK THIS WILL AFFECT THE INDUSTRY
- . WHAT WERE THE PRICES 3 YEARS AGO, 2 YEARS AGO, 1 YEAR AGO
- . HOW DO YOU THINK THE PRICES WILL CHANGE IN DAYS TO COME
- . AT WHAT PRICES IS IT UNPROFITABLE TO REPROCESS PLASTIC

HAS THE QUANTITIES OF PLASTIC REPROCESSED CHANGED OVER TIME

- . INCREASED, DECREASED, REMAINED SAME – RECORD SPECIFICS AND REASONS THEREOF

HAS THE PRICES OF RAW MATERIAL CHANGED OVER TIME

- INCREASED, DECREASED, REMAINED SAME – RECORD SPECIFICS AND REASONS THEREOF

HAS PRODUCTIVITY IN YOUR UNIT

- INCREASED, DECREASED, REMAINED SAME – RECORD SPECIFICS AND REASONS THEREOF

DISCUSSION ON FACTORS THAT AFFECT PROFITABILITY IN THE INDUSTRY IS IT WORTHWHILE TO HAVE A GENERATOR

DEBATE ON ISSUES NOT SPOKEN ABOUT SO FAR

- COST OF VIRGIN PLASTICS
- COST OF RAW MATERIAL
- COST OF POWER
- UPTIME – AVAILABILITY OF POWER
- LABOUR ISSUES
- QUALITY OF RAW MATERIAL – IE. UNIFORMITY, FREE FROM IMPURITIES. WHAT DO YOU UNDERSTAND BY QUALITY OF RAW MATERIAL

WILL IT BE VIABLE TO HAVE ONE LARGE UNIT. WHAT IS ITS IDEAL CAPACITY

DEBATE ON PROBLEMS FACED BY THE INDUSTRY. (EXCLUDE TOPICS ALREADY TALKED)

- POWER
- CASH FLOW, LIQUIDITY
- LABOUR
- PROFITABILITY
- RAW MATERIAL
- TAXES

WHAT ARE THE NEEDS OF THE INDUSTRY TODAY (YOUR NEEDS)

WHAT ARE YOU WILLING TO BRING TO THE PARTY?

- WHAT SPECIFIC SUPPORT DO YOU EXPECT FROM THE GOVT.
- SHOULD WE INVOLVE THE GOVT?
- THERE ARE NO POLICIES/GUIDELINES /STRICTURES/BODIES THAT GOVERN THIS INDUSTRY, DO WE NEED THEM.

DISCUSS TECNOLOGY ISSUES, UNDERSTAND LEVELS OF KNOWLEDGE REGARDING UPCOMING TECHNOLOGIES.

- . CHANGES THAT HAVE TAKEN PLACE
- . PROCESSING OF PVC
- . PROCESSING OF PET
- . OTHER METHODS OF RECOVERING PLASTIC WASTE
- . INFORMATION NEEDS

ESOH ISSUES IN PLASTICS REPROCESSING INDUSTRY

MACHINES

WHAT IMPROVEMENTS CAN BE MADE?
 IS IT TRUE THAT ON EXISTING MACHINES ONLY ONE TYPE OF
 PLASTIC CAN BE PROCESSED
 HOW OFTEN DOES THE MACHINE COME TO REPAIR
 WHAT IS AN AVERAGE COST OF REPAIR

WHAT IS THE LIFE OF FINISHED PRODUCTS

NEW PRODUCT INNOVATIONS

DEBATE ON MARKETING OF RECYCLED PRODUCTS

KNOWLEDGE, ATTITUDES, PRACTICES ABOUT PLASTICS AS A
 POLLUTANT

SUGGESTIONS FOR A PILOT PROJECT

WHAT CAN BE DONE TO COLLECTIVELY DONE TO IMPROVE
 WASTE COLLECTION.

WILLINGNESS TO COME TOGETHER AND WORK FOR SUSTAINING
 REPROCESSING.

REACTIONS TO A SEMINAR BY UWEP AND SIDBI

WHERE DO WE GO FROM HERE

ANNEXURE III
LIST OF PLASTIC REPROCESSORS MET

<p>Raghuveer Gupta Aanchal Plastics No.101/3,1st Main Muthachari Industrial Estate Nayandahally,Mysore Road. Bangalore 560039 (PP)6613758</p>	<p>Sanjay Yaduka Aar Kay Plastics No. 17/A,854,1st Main patel Puttaiah Industrial Estate Deepanjali Nagar.Mysore Road Bangalore 560026 (O)6615375</p>
<p>Dawood Supreme plastic No. 148/1,Muthachari Industrial Estate, Nayandahalli. Mysore Road. Bangalore 560039 (PP)606483(Res)223823</p>	<p>Rajendra Pugalia Trishla Poly Plast No. 50/10,Site NO.1,Sheds No.3&3A Muttachari Industrial Estate, Nayandahalli, Mysore Road. Bangalore 560039. (PP)606964</p>
<p>M.B.Nagendra Prasad Nagashree Plastic Industries No. 50/1,Nayandahalli, Mutthachari Industrial Estate. Mysore Road. Bangalore 560039 (O)620387(Res)3302430</p>	<p>G.C.Gupta G.M.Plastic Industries Muniyappa Coconut Garden,Hoskerehalli Road Ganapathinagar Mysore Road Extn. Bangalore 560026</p>
<p>Kaki Plastics No.155,Aziz Sait Industrial Town, Kaki Street, Nayandahalli Bangalore 560039 (O)6679383(O)627492(Res)3306369</p>	<p>Saleem Fout! Bladwijzer niet gedefinieerd.HTM Plastic Industry Aziz Seth Industrial Estate Mysore Road Bangalore (O)6702848</p>
<p>Ramu Fout! Bladwijzer niet gedefinieerd.Uma Maheshwari Plastics No.112,Aziz Seth Industrial Town Nayandahally, Bangalore (O)3405604</p>	<p>Munir Layar Palya,Near Aziz Seth Industrial Estate. Bangalore (Res)2870452</p>
<p>Surendranath V.K.Plastics No.14/1,P.P Industrial Estate, Deepanjali Nagar,Mysore Road Bangalore (O)6601015</p>	<p>Sheetal Industries No.13,Patel Puttaiah Industrial Estate, Deevatage Ramanhalli,West of BHEL, Mysore Road. Bangalore 560026 (O)625645</p>
<p>Lal Ratan Patawari Oswal Plastics No.845/15,Patel Puttiah Industrial Layout, Deepanjali Nagar Mysore Road Bangalore 560026 (O)602973(Res)3302607</p>	<p>Sampangi Pentagon Poly Pet No.40,Hoskarehalli Road Ganapathy Nagar, Mysore Road Bangalore</p>

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<p>Muddu Raju Madu Plastics 2nd Cross,Hosakerehalli Road Ganapathy Nagar,Mysore Road. (Near National Packaging Industries) Bangalore</p>	<p>Vinod Kumar Swastik Plastic P.P Industrial Estate Bangalore (O)6621573</p>
<p>Shree Jee Udyog No.1/2,1st Main Road, Byatarayanapure Avalahalli, Mysore Road, Bangalore (O)6600823</p>	<p>A.U.Khan No.181,Aziz Sait Industrial Town Nayandahalli, Bangalore 560039</p>
<p>Mohammad Rafi Quadri Plastics Near Everset Plastics Aziz Seth Industrial Town Bangalore 560039</p>	<p>V.Sardar Royal Plastic No.854/B,Deepanjali Nagar Patel Puttiah Industrial Layout, Mysore Road Bangalore 560026 (O)602650</p>
<p>P. Parthiban Rashmi plastic industries No. 43, 4th cross Ganapathi nagar Hosakerahalli main Road, Mysore Road Bangalore</p>	<p>S.R.Khan alias Babu Patel Plastics No.7,1st Cross,Nizamuddin Mohalla Opp.St.Joseph High school,Sultan Road Near Mysore Road Church, Bangalore 560002 (O)6670208(O)626437(Res)609021</p>
<p>Jitendar Soni Products Deepanjali Nagar,(Opp M.S.I.L &Kwality Biscuits), Mysore Road cross, Bangalore 560026 (O)2234217(Fact)6601427</p>	<p>S.Jaffer Ali Techno Plastics No.38/1,Avalahalli, New Timber Yard Layout Mysore Road Bangalore 560026 (O)6618748</p>
<p>K.Dinesh Shenoy Kasturi Polymers No.377/388,Andanappa Buildings, Kamakshipalya Magadi Road, Bangalore 560079 (O)3488104(Res)2220971(Res)2241129</p>	<p>C.R.Vishwanath Madhu Plast No.58,Chennigappa Layout,Kamakshipalya, Magadi Road, Bangalore 560079 (O)3357689</p>
<p>Sandeep Indopak No. 14, 1st Main, 'A' Street, Near Guddalahalli, Mysore Rd. Bangalore – 560 026</p>	<p>Rajesh Hindustan Plastics 285, 8th Cross, Prakash nagar Bangalore – 560 021</p>
<p>Narule Suman Plastic No.38/2 New Timber Yard Layout Avanahalli Bangalore 560026 (O)6678517</p>	<p>Mahendra V.Sakariya Jalore Plastics Private Limited No.472/4,NTY Layout Mysore Road,Avalahalli Bangalore 560026 (O)6676612(O)6605549</p>

<p>K.Rudra Murthy Viswakala Plastic Industries (P)Ltd No.61,K.B.G.Road, Near Devaiah Park, Srirampuram, Bangalore 560021 (O)3321909</p>	<p>A.K.Plastics No.12/1 Magadi Road Bangalore 560023</p>
<p>Pandey Vinay Plastics No.59,5th Main Shed 'B' Sreerampuram Behind Devi Cinema Bangalore 560021 (O)3350756(O)3355219(Res)3306577</p>	<p>Ravi Jain Jain Plastics 2nd Cross,hosakerehalli Road Ganapatahy Nagar Off Mysore Road Bangalore (O)601519</p>
<p>Padma Plastics Next to Rashmi Plastics,45,Ganapathy Nagar Hosakerehalli Main Road Mysore Road Bangalore</p>	<p>Pranesh Sri Vignesware Plastics No.53,Aziz Seth Industrial Estate. Mysore Road Bangalore (O)3355636</p>
<p>Ananth Sen & Ramadutta Sri Venkateshwara Plastics No.53,Hanumanthappa Layout Aziz Sait Industrial Town Mysore Road, Bangalore (O)3408629</p>	<p>S.S.Sharma Sri Balaji Commercial Corporation HPC Industrial Estate,Opp.MSIL,Deepanjali Nagar Mysore Road Cross, Bangalore 560026 (O)6617449(O)6613959(Res)3388649 (Mobile)9844030562</p>
<p>Arjun Nakoda Polymers No.53,'c',Hanumanathappa Layout Aziz Sait Industrial Town Mysore Road Bangalore</p>	<p>Nirmal Azad Plastics (factory) No.52,Aziz Seth Industrial Estate (off)No.35 & 36,2nd Floor,22 Kumbarpet Bangalore 560002</p>
<p>Sheikh Sardar Vikas Polymers No.64,Aziz Seth Industrial Estate Mysore Road Bangalore</p>	<p>Shree Ambica Industries 25/32, 2nd Main, Rd, Industrial Town, Rajajinagar, Bangalore – 560 044</p>
<p>Pradeep Super Plast No.55,New Timber Yard Layout Mysore Road Bangalore (O)623081</p>	<p>Ramesh Raghavendra Plastic Industries Muthachari Industrial Estate Bangalore</p>
<p>Sethia Remco Industries 854/16, Patil Puttahiah Indl. Layout, Deepanjali Nagar, Mysore Rd. Bangalore – 560 024</p>	<p>Kamal Nahata Nahata Plastics Industries No.38/2,Avalahalli,345/3,timber Yard Layout Mysore Road Cross Bangalore 560026 (O)620318(O)6603789(Res)2225781, 2219200</p>

<p>C.Prakash Sri Raj Plastics No.299,Nanjundeshware Nilaya, Kamakshipalya,Karekallu, Bangalore 560079 (Res)3481416</p>	<p>K.Hirawat GEM Plastics L3 KCG Industrial Estate Magadi Road Bangalore (O)3489149</p>
<p>Dilip Kothari Shri Krishna Plastics No.114/14,Deepangali Nagar Patel Puttiaha Industrial Layout Mysore Road, Bangalore 560026 (O)609643</p>	<p>Rajkumar Gupta Sandeep Plastics Muttachari Industrial Estate, Nayandahalli, Mysore Road, Bangalore – 560 039 Tel : 6614389</p>

LIST OF STAKEHOLDERS MET

Mr. D'Souza, Karnataka Small Scale Plastic Mfr. Assn. C/o. Myplast, No.4, MSR. Indl. Estate, Gokul, Bangalore 3360508	Dr. T.M. Basavaraju Medical Inspector of Factories 280, 17 th Main 3 rd Block, Rajajinagar, Bangalore 10 3353239
Mothiram Pawar Under Secretary Health and Family Welfare Dept. Anand Rao Circle. Bangalore	N. Sriram Jt. Director Industries & Commerce Dept. 14/3 anrupatunga Road Bangalore 2 2212503
E Lakshmappa Asst. Labor Comm. VISL House, J.C. Road, Bangalore – 2 2222784	Jeejabai Manay R Commercial Taxes Dept. Kalidasa Road,Bandhinagar Bangalore 9 2267245
Venkataramahiah Dy. Ch. (IE's) Rajajinagar KSSIDC Industrial Estate, Rajajinagar Bangalore 44	S. Palakha Asst. Gen. Mgr. KSFC 48, Church Street Bangalore 1 5586520
Sreedhar P Karnataka State Pollution Control Board Public Utility Bldg. M.G. Road, Bangalore 1 5586520	Gangadhar H R Karnataka Industrial Area Devpt. Board 14 /3, Rastotham Parishat Bldg. Nrupatanga Rd. Bangalore 2 2211066
Karnataka Small Scale Industries Association 2/106, 13 th Cross, MC Road, Vijayanagar, 3353250	Sharma O Small Indust. Devpt. Bank of India. Centenary Bldg. M.G. Road, Bangalore
Pillappa P G.M. Planning & Devpt. State Bank of Mysore K.G. Road, Bangalore 9	Raghavendra Rao Exec. Engr Karnataka State Electricity Board, Blore west 2262409
Balram Asst. Exec Engr. W6 Sub Divn. KEB Byatrayanpura Bangalore 26	R. D. Chapekar Kalimata Plastic Machinery mfrs pvt. Ltd. A5, 3 rd Stage, Peenya Indl. Estate Bangalore 8394699
S. meeranji Everest Plastic Machine Tools Plot 130, Aziz Sait Indl. Town Mysore Road Nyandahalli Bangalore 39 3354622	Pramod B A H R M Machine tools Plot 4, Aziz Sait Indl. Town Mysore Road Nayanadhalli Bangalore 39
Gopal Rao G P Enterprises 5nd Cross,hosakerehalli Road Ganapatahy Nagar Off Mysore Road Bangalore	Sri Ram Newmann Engg. No.18/2 New Timber Yard Layout Avanahalli Bangalore 560026

Annexure IV

THE FACTORIES ACT, 1948

Only sections relevant to and having a bearing on ESOH have been extracted with the writers comments in italics in box.

1 & 2 Short titles and interpretations....

...:worker” means a person employed, directly or by or through any agency (including a contractor) with or without the knowledge of the principal employer, whether for remuneration not, in any manufacturing process, or in cleaning any part of the machinery or premises used for a manufacturing process, or in any other kind of work incidental to, or connected with , the manufacturing process, or the subject of the manufacturing g process (does not include armed forces...)

..”factory” means any premises including the precincts thereof-

whereon ten or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on with the aid of power, or is ordinarily so carried on, or

whereon twenty or more workers are working or were working on any day of the preceding twelve months and in any part of which a manufacturing process is being carried on with the aid of power or is ordinarily so carried on - does not include mine workers, armed forces.

Since the Plastic Recycling Sector, by and large, is in the informal sector, which means that since they employ most often less than ten workers, they do not come under the purview of the Act. Nevertheless, it is the only Act that covers ESOH in a factory situation. For information, key sections of the Act is elaborated below to indicate that the law exists, but does not cover the very large informal sector in the country. This is an area that needs further legal investigation.

Approval, licencing and registration of factories

1. The State government may take rules :-
 - a) requiring, for the purpose of the Act, the submission of plans of any class or description of factories to the Chief Inspector or the State Government;
 - b) requiring the previous permission in writing of the State Government or the Chief Inspector to be obtained for the site on which the factory is to be situated and for the constriction or extension of any factory or classes or description of factories;
 - c) requiring for the purpose of considering applications for such permission the submission of plans and specifications;
 - d) prescribing the nature of such plans and specifications and by whom they shall be certified ;

- e) requiring the registration and licensing of factories or any class or description of factories, and prescribing the fees payable for such registration and licensing and for the renewal of licenses.
- f) Requiring that no license shall be granted or renewed unless the notice specified in section 7 has been given.

[.....:- A factory shall not be deemed to be extended within the meaning of this section by reason only of the replacement or addition does not reduce the minimum clear space required for safe working around the plant or machinery or adversely affect the environmental conditions from the evolution or emission of steam heat or dust or fumes injurious to health]

1. Notice by occupier (read owner)

1. The occupier shall, at least fifteen days he being to occupy or use any premises as factory, send to the Chief Inspector a written notice containing :--
 - a) The name and situation of the factory;
 - b) The name and address of the occupier
 - c) The name and address of the owner of the premises or building (including the precinct therefore) referred to in section 93;
 - d) The address to which communication relating to the factory may be sent
 - e) The nature of the manufacturing process--
 - I. carried on in the factory during the last twelve months in the case of factories in existence on the date of the commencement of this Act; and
 - II. to be carried on in the factory during the next twelve months in the case of all factories;
 - a) the total rated horse power installed or to be installed in the factory , which shall not include the rated horse power of any separate stand - by plant;
 - b) the name of the manager of the factory for the purpose of this Act ;
 - c) the number of workers likely to be employed in the factory
 - d) the average number of workers per day employed during the last twelve months in the case of a factory in existence on the date of the commencement of this Act
 - e) such other particulars as may be prescribed

CHAPTER II

THE INSPECTING STAFF

7A. General duties of the occupier

1. Every occupier shall ensure , so far is reasonably practicable , the health , safety and welfare of all workers they are at work in the actuary.
2. Without prediction to the generality of the provisions of sub-section (1) the matter to which to which study duty extends, shall include--
 - a) the provision and maintenance of plant and system of work in the factory that are safe and without risks to health

- b) the arrangements in the factory for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;
 - c) the provision of such information , instructions, training and supervision as are necessary to ensure the health and safety of all the workers at work.
 - d) the maintenance of all places of work in the factory in conditions that is safe and without risks to health and provision and maintenance of such means of access to and egress from such places as are safe and with out such risks.
 - e) the provision, maintenance or monitoring of such working environment in the factory for the workers that is safe , with out risks to the health and adequate as regards facilitates and arrangements for their welfare at work.
3. Except in such cases as may be prescribed, every occupier shall prepare and as often as may be appropriate, revise a written statement of his general policy with respect to the health and safety of the worker at work and the organisation and arrangements for the time being in force for carrying out the policy and bring the statement and any revision therefore to the notice of all workers in such manner as many may be prescribed.

These rules are by and large not adhered to in the small scale industry sector and indeed in the whole spectrum of the informal sector

7B. General duties of manufactures, etc. as regard and substances for use in factories.

- 1. Every person who designs, manufactures, imports or supplies any article for use in any factory, shall--
 - a) ensure, so far as is reasonable, that the article is so designed and constructed as to be safe and without risks to the health of the workers when properly used;
 - b) carry out or arrange for the carrying out of such tests and examination as may be conceded necessary for the effective implementation of the provision of clause.
 - c) take such steps as may be necessary to ensure that adequate information will be available.
 - I. in connection with the use of article in any factory;
 - II. about the use for which it is designed and tested, and
 - III. about any conditions necessary to ensure that the article, when put to such use, will be safe and with out risks to the health of the workers;

PROVIDED that where an article is deigned or manufactured outside India, it shall be obligatory on the part of the importer to see -

- a) that the confirms to the same standards if such article is manufactured in India, or
 - b) if the standards adopted in the country outside for the manufacture of such articles is above the standard adopted in India, that the article conforms to such standards.
2. Every person who under takes to design or manufacture any article for use in any factory may carry out arrange for the carrying out of the necessary research with a view to discover and so far as reasonably practicable the elimination or minimisation of any risks to the health or safety of the worker to which the design or article may give rise.
 3. Nothing contained in sub-sections (1) and (2) shall be constructed to require a person to repeat the testing , examination or research which has been carried out otherwise than by him or at his instance in so far as it is responsible for him to rely on the results therefore for the process of the said sub-section.
 4. Any duty imposed on any person by the sub-section (1) and (2) shall extend only to things done in the course of business carried on by him and to matters within control.
 5. Where a person designs, manufactures , imports or supplies an article on the basis of a written undertaking by the user of such articles to take steps specified in such undertaking to ensure, so far as is reasonably practicable, that the article will be safe and with out risks to the health of the workers when properly used, the undertaking shall have the effect of reliving the person designing, manufacturing, importing or supplying the article from the duty imposed by clause (a) of sub-section (1) to such extent as is reasonable having regard to the terms of the undertaking.
 6. For the purpose of this section, an article is not to be regarded as properly used if it is used with out regard to any information or advice relating to its use which has been made available by the person who has designed, manufactured, imported or supplied the article.

Explanation : For the purpose of this section, “articles” shall include plant and machinery

COMMENTS:

A diesel engine is a machinery. Machinery does not cease to be machinery merely because it has to be used in conjunction with one or more machines. Nor does it cease to be machinery merely because it is installed as part of a manufacturing or industrial plant:--Commissioner of Income tax V. Mohmmad Ali AIR 1964 SC 1693

8. Inspector :

1. The State Government may be notification in the official Gazette appoint such persons as posses the prescribed qualification to be Inspectors for the purposes of this Act and may assign to them such local limits as it may think fit.

2. The state Government may, by notification in the official Gazette appoint any person to be a Chief Inspector who shall, in addition to the powers conferred on a Chief Inspector under this Act, exercise the powers of an Inspector through the state.
 - (2A) The state Government may by notification in the official Gazette appoint many Additional Chief Inspectors, joint Chief Inspectors and Deputy Chief Inspector and to exercise such of the powers of the Chief Inspector as may be specified in such notification.
 - (2B) Every additional Chief Inspector and every other officer appointed under sub-section (2A) shall, in addition to the power of a Chief Inspector specified in the notification by which he is appointed, exercise the powers of an Inspector through out the state.
- 3 No person shall be appointed under sub-section (1), sub-section (2) [sub-section (2A)] or sub-section (5) or having been so appointed, shall continue to hold office, who is or becomes directly or indirectly interested in a factory or in a process or business carried on therein or in any patent or machinery connected therewith.
4. Every District Magistrate shall be an Inspector for the district.
5. The State Government may also, by notification as foresaid, appoint such public officers as it thinks fit to be additional Inspectors for all or any of the purposes of this Act, within such local limits as it may assign them respectively.
6. In any area where there are more Inspectors that on the state Government may by notification as foresaid, declare the powers which such Inspectors shall respectively exercise and the Inspector to whom the prescribed notices are to be sent.
7. Every Chief Inspector, Additional Chief Inspector, Deputy Chief Inspector and every other officer appointed under this section shall be deemed to be a public servant within the meaning of the Indian Penal Code (45 of 1860), and shall be officially subordinate to such authority as the State Government may specify in this behalf.

Comments :

Under section 8(1) of the Factories Act the State Government can only appoint persons as inspectors of Factories for the purpose of discharging the powers and functions under the said Act. The State Government may frame rules for the purpose of recruitment of Inspector of Factories and for that purpose may lay down any qualification and pay scale that does not mean that the State Government can appoint persons other than Inspector of factories.

9. Powers of Inspectors

Subject to any rules made in this behalf, as Inspector may, within the local limits for which he is appointed--

- a) enter, with such assistants, being the persons in the service of the government or any local or other public authority, [or with an expert] as he thinks fit, any place which used or which he has reason to believe is used as factory
- b) make examination of the premises, plant machinery, article or substance;

- c) inquire into any accident or dangerous occurrence, whether resulting in bodily injury, disability or not and take on the spot otherwise of any person which he may consider necessary for such inquiry.
- d) Require the production of any prescribed register or any portion thereof as he may consider necessary in respect of any offense under this Act, which he has reason to believe, has been committed
- e) direct the occupier that any premises or any part thereof, or anything lying therein shall be left undisturbed (whether generally or in particular respects) for so long as is necessary for the purpose of any examination under clause (b)
- f) take measurements and photographs and make such recordings as he considers necessary for the purpose of any examination under clause (b), taking with him any necessary instrument or equipments
- g) In case of any article or substances found in any premises, being an article or substances found any premises, being an article or substance which appear to him as having caused or is likely to cause danger to the health or safety of the workers, direct it to be dismantled or subject it to any process or test (but not so as to damage or destroy it unless the same is, in the circumstances necessary for carrying out the purpose of this act), and take possession of any such article or substance or a part thereof, and detain it for so long as necessary for such examination.
- h) Exercise it for so long as may be prescribed

PROVIDED that no person shall be compelled under this section to answer any question or give any evidence tending to incriminate himself.

COMMENTS:

Neither the factories act, 1948 nor the rules made thereunder confer power upon the Inspector of factories to give direction to the proprietor of the factory as to make the payment of routine wages Ltd. V. Chief Inspector of factories, Directorate of factories, Asbestos Cements limited. Govt. Of W.B 1984 IC549.

Inspectors are expected to give proper advice and guidance so that there may be due compliance with the provisions of the Act. Inspector on finding a building or machinery not in good condition as being dangerous to human life or safety may serve a notice and there by save the factory owner from bearing the consequence of not repairing the premises or machinery in time - D.C Mills Limited V. Chief Commissioner of Delhi AIR 1971 SC 344.

Inspectors as can be seen have far ranging powers but generally do not show interest or visit the smaller unorganised sector preferring to visit the larger units (employing more than 10 to 20 workers) as stipulated by the act.

10. Certifying surgeons

1. The State Government may appoint qualified medical practitioners to be certifying surgeon for the purpose of this act with in such local limits or for such factory or class or description of factories as it may assign to them respectively.
2. A certifying surgeon may with the approval of the State Government authorities any qualified medical practitioner to exercise any of his powers under this Act for such period as the certifying surgeon may specify and subject to such conditions as the State Government may think fit to impose and references in this Act to certifying surgeon shall be deemed to include references to a qualified medical practitioner when so authorized.
3. No person shall be appointed to be or authorised to exerceise the powers of a certifying surgeon or having been so appointed or authorised , continue to exerise such powers who is or becomes the occupier of a factory or is or becomes directly or indirectly interested herein or in any process or business carried in the employ of the factory.

PROVIDED that the State Government may, by order in writing and subject to such conditions as may be specified in the order , except any person or class of persons from the provisions of this sub-section in respect of any factory or class or description of factories.

4. The certifying surgeon shall carry out such duties as many be prescribed in connection with -
 - a) cases of illness having occurred which is reasonable to believe are due to the nature of manufacturing process carried on other conditions of work prevailing, therein.
 - b) By reason of any changes in the manufacturing process carried on or in the substances used there in or by reason of the adoption of any new manufacturing process or of any new substances for use in a manufacturing process there is a likelihood of injury to the health of the workers employed in that manufacturing process.
 - c) Young persons are or are about to be employed in any work which is likely cause injury to their health.

Explanation: In this secession “qualified medical practitioner “ means a person holding qualification granted by the authority specified in the schedule to the Indian Medical Degrees Act 1916 (7 of 1916) or in the schedule to the Indian Medical Council Act , 1933 (27 of 1933)

CHAPTER III HEALTH

11. Cleanliness :

1. Every factory shall be kept clean and free from effluvia arising from any drain, privy or other nuisance and in particular-
 - a) accumulation of dirt and refuse shall be removed daily sweeping or by any other effective method from the floors and benches of workrooms and from staircases and passages and disposed of in a suitable manner.

- b) The floor of every workroom shall be cleaned at least once in every week by washing using disinfectant where necessary or by some other effective method.
- c) Where a floor is liable to become wet in the course of any manufacturing process to such extent as is capable of drained, effective means of drainage shall be provided and maintained
- d) all inside walls and partitions all ceilings or tops of rooms and all walls, sides and tops of passage and staircase shall-
 - I. where they are [painted otherwise than with washable water paint] or varnished at least once in every period of five years.
 - II. Where they are painted with washable water-paint, be repainted with at least one coat of such paint at least once in every period three years and washed at least once in six months.
 - III. Where there are painted or varnished or where they have smooth impervious surfaces be cleaned at least once in every period of fourteen months by such method as may be prescribed.
 - IV. In any other case ,be kept white washed or colour washed and the white washing or colourwashing shall be carried out at least once in every period of fourteen months.
- e) All doors and windows frames and other wooden or metallic frame work and shutters shall be kept painted or varnished and the painting or varnishing shall be carried out at least once in every period of five years .
- f) the date on which the purpose required by the clause (e) are carried out shall be entered in the prescribed register.

12. Disposal of water and effluents

- 1) Effective arrangements shall be made in every factory for the treatment of waste and effluents due to the manufacturing process carried on therein, so as to render them innocuous, and for their disposal.
- 2) The State Government may make rules prescribing the arrangements to be made under sub-section (1) or requiring that the arrangements made in accordance with sub-section (1) shall be approved by such authority as may be prescribed.

13. Ventilation and temperature

- 1. Effective and suitable provision shall be made in every factory for securing and maintaining in every workroom.
 - a) adequate ventilation by the circulation of fresh air, and
 - b) such a temperature as will secure to workers therein reasonable conditions of comfort and prevent injury to health.

and in particular :-

- I. walls and roofs shall be of such material and so designed that such temperature shall not be exceeded but kept as low as practicable.
- II. where the nature of the work carried on in the factory involves, or is likely to involve the production of excessively high temperatures, such adequate measures as are practicable shall be taken to protect the workers therefrom, by separating the process which produces such temperatures

from the workroom, by insulating the hot parts or by other effective means.

2. The State Government may prescribe a standard of adequate ventilation and reasonable temperature for any factory or class or description of factories or parts thereof and direct that [proper measuring instruments, at such places and in such position as may be specified, shall be provided and such records, as may be prescribed, shall be maintained]
3. If it appears to the Chief Inspector that excessively high temperatures in any factory can be reduced by the adoption of suitable measures, he may with out prejudice to the rules made under sub-section (2), serve on the occupier an order in writing specifying the measures which , in his opinion , should be adopted ,and requiring them to be carried out before a specified date.

14. Dust and Fumes :

1. In every factory in which, by reason of the manufacturing process carried on there is given off any dust or fumes or other impurity of such a nature and to such an extent as is likely to be injurious or offensive to the workers employed therein, or any dust in substantial quantities, effective measures shall be taken to prevent its inhalation and accumulation in any workroom, and if any exhaust appliance is necessary for this purpose, it shall be applied as near as possible to the point of origin of the dust , fumes or other impurity and such point shall be enclosed so far as possible.
2. In any factory no stationary internal combustion engine shall be operated unless the exhaust is conducted into the open air , and no other internal combustion engine shall be operated in any room unless effective measures have been taken to prevent such accumulation of fumes therefrom as are likely to be injurious to workers employed in the room.

16. Overcrowding :

1. No room in any factory shall be overcrowded to an extent injurious to the health of the workers employed therein.
2. Without prejudice to the generality of sub-section (1), there shall be in every workroom of a factory in existence on the date of commencement of this Act at least ¹ [9.9 cubic meters] and of a factory built after the commencement of this Act at least ² [14.2 cubic meters] of space for every worker employed therein, and for the purposes of this sub-section no account shall be taken of any space which is more than ³ [4.2 meters] above the level of the floor of the room.
3. If the Chief Inspector by order in writing so requires, there shall be posted in each workroom of a factory a notice specifying the maximum number of workers who may, in compliance with the provisions of this section, be employed in the room.
4. The Chief Inspector may by order in writing exempt, subject to such conditions, if any, as he may think fit to impose, any workroom from the provisions of this section, if he is satisfied that compliance therewith in respect of the room is unnecessary in the interest of the health of the workers employed therein.

17. Lighting :

1. In every part of a factory where workers are working or passing there shall be provided and maintained sufficient and suitable lighting , natural or artificial, or both.
2. In every factory all glazed windows and skylights used for the lighting of the workroom shall be kept clean on both the inner and outer surface and so far as compliance with the provisions of any rules made under sub-section (3) of section 13 will allow, free from obstruction.
3. In every factory effective provision shall, so far as is practicable be made for the prevention of
 - a) glare either from a source of light or by reflection from smooth or polished surface.
 - b) the formation of shadows to such an extent as to cause eye-strain or the risk of accident to any worker.
4. The State Government may prescribe standards of sufficient and suitable lighting for factories or for any class or description of factories or for any manufacturing process.

18. Drinking Water :

1. In every factory effective arrangements shall be made to provide and maintain at suitable points conveniently situated for all workers employed herein a sufficient supply of wholesome drinking water
2. All such points shall be legible marked “Drinking Water “ in a language understood by the majority of the workers employed in the factory, and no such point shall be situated within [six meters of any washing place, urinal, latrine, spittoon, open drain carrying sullage or effluent or other source of contamination] unless a shorter distance is approved in writing by the Chief Inspector.
3. In every factory wherein more than two hundred and fifty workers are ordinarily employed , provision shall be made for cooling drinking water during hot weather by effective means of distribution therefore.
1. In respect of all factories or any class or description of factories the State Government may make rules for securing compliance with the provisions of sub-section (1),(2) and (3) and for the examination by prescribed authorities of the supply and distribution of drinking water in factories

19. Latrines and Urinals :

1. In every factory :-
 - a) sufficient latrine and urinal accommodation of prescribed types shall be provided conveniently situated and accessible to workers at all times while they are at the factory.
 - b) separate enclosed accommodation shall be provided for male and female workers
 - c) such accommodation shall be adequately lighted and ventilated, and no latrine or urinal shall unless specially exempted in writing by the Chief Inspector, communicate with any workroom except through an intervening open space or ventilated passage.

- d) all such accommodation shall be maintained in a clean and sanitary condition at all times.
 - e) sweepers shall be employed whose primary duty is to keep clean latrines, urinals and washing places.
2. The State Government may prescribe the number of latrines and urinals to be provided in any factory in proportion to the number of male and female workers ordinarily employed therein and provide for such further matter in respect of sanitation in factories, including the obligations of workers in regard , as is considered necessary in the interest of the health of the workers employed therein.

20. Spittoons :

- 1. In every factory there shall be provided a sufficient number of spittoons in convenient places and they shall be maintained in a clean and hygienic condition.
- 2. The State Government may make rules prescribing the type and the number of spittoons to be provided and their location in any factory and provided for such further matters relating to their maintenance in clean and hygienic conditions.
- 3. No person shall spit with in the premises of a factory except in the spittoons provided for the purpose and a notice containing this provision and the penalty for its violation shall be prominently displayed at suitable places in the premises.
- 4. Whoever spits in contravention of sub-section (3) shall be punishable with fine not exceeding five rupees.

CHAPTER IV

SAFETY

Fencing of machinery :

- 1. In every factory the following, namely :
 - I. every moving part of the prime mover and every flywheel connected to the prime movers, whether the prime mover or flywheel is in the engine house or not.
 - II. the headrace and the tailrace of every water-wheel and water turbine
 - III. any part of a stock-bar which projects beyond the head stock of a lathe; and
 - IV. unless they are in such position or of such construction as to be safe to every person employed in the factory as they would be if they were securely fenced, the following namely --
 - a) every part of the electric generator, a motor or rotary converter;
 - b) every part of transmission machinery; and
 - c) every dangerous part of any other machinery

shall be securely fenced by safeguards of substantial construction which [shall be constantly maintained and kept in position] while the parts of machinery they are fencing are in motion or in use:

[PROVIDED that for purpose of the determining whether any part of machinery is in such position or is of such construction as to be safe as aforesaid, account shall not be taken of any occasion when--

-) it is necessary to make an examination of any part of the machinery aforesaid while it is in motion or, as a result of such examination, to carry out lubrication or other adjusting operation carried out while that part of the machinery is in motion, or
-) in the case of any part of a transmission machinery used in such process as may be prescribed (being a process of a continuous nature the carrying on of which shall be or likely to be, substantially interfered with by the stoppage of that part of the machinery), it is necessary to make an examination of such part of the machinery while it is in motion or as a result of such examination to carry out any mounting or shipping of belts or lubrication or other adjusting operation while the machinery is in motion;

and such examination or operation is made or carried out in accordance with the provisions of sub-section (1) of section 22]

2. The State Government may by rules prescribe such further precaution as it may consider necessary in respect of any particular machinery or part thereof, subject to such conditions as may be prescribed for securing provisions of this section.

22. Work on or near machinery in motion :

.....while the machinery is in motion , such examination or operation shall be made or carried out by a specially trained adult male worker wearing tight fitting clothing (which shall be supplied by the occupier) whose name has been recorded in the register prescribed in this behalf and who has been furnished with a certificate of this appointment, and while he is so engaged -

- a) such workers shall not handle a belt at a moving pulley unless --
 - I. the belt is not more than fifteen centimeters in width
 - II. the pulley is normally for the purpose of drive and not merely a fly-wheel or balance wheel (in which case a belt is not permissible);
 - III. the belt joint is either laced or flush with the belt
 - IV. the belt including the joint and the pulley rim, are in good repair;
 - V. there is reasonable clearance between the pulley and any fixed plant or structure;
 - VI. secure foothold and where necessary, secure handhold, are provided for the operator; and
 - VII. any ladder in use for carrying out any examination or operation aforesaid is securely fixed or lashed or is firmly held by a second person;]

- b) without prejudice to any other provision of this Act relating to the fencing of machinery, every set screw, bolt and key on any revolving shaft, spindle, wheel or pinion, and all spur, worm and other toothed or friction gearing in motion with which such worker is would otherwise be liable to come into contact, shall be securely fenced to prevent such contact.
- 2) No woman or young person shall be allowed to clean, lubricate or adjust any part of a prime mover or of any transmission machinery while the prime mover of transmission machinery is in motion, or to clean, lubricate or adjust any part any machine if the cleaning, lubrication or adjustments thereof would expose the women or young person to risk of injury from any moving part either of that machine or any adjacent machinery.
- 3) The State Government may, by notification in the official Gazette, prohibit, in any specified factory or class description of factories, the cleaning, lubricating or adjusting by any person of specified parts of machinery when those parts are in motion.

23. Employment of young persons on dangerous machines :

- 1. No young person [shall be required or allowed to work] at any machine to which this section applies, unless he has been fully instructed as to the dangers arising in connection with the machine and the precautions to be observed and -
 - a) has received sufficient training in work at the machine, or
 - b) is under adequate supervision by a person who has a thorough knowledge and experience of the machine.
- 2. Sub-section (1) shall apply to such machines as may be prescribed by the State Government being machines which in its opinion are of such a dangerous character that young persons ought not to work at them unless foregoing requirements are complied with.

24. Striking gear and devices for cutting off power :

- 1.In every factory suitable devices for cutting off power in emergency from running machinery shall be provided and maintained in every workroom.....
- 1. When a device, which can inadvertently shift from ‘off’ to ‘on’ position, is provided in a factory to cut off power, arrangements shall be provided for locking the device in safe position to prevent accidental starting of transmission machinery or other machines to which the device is fitted.

30. Revolving machinery :

- 1. In any factory in which the process of grinding is carried on there shall be permanently affixed to or placed near each machine in use a notice indicating the maximum safe working peripheral speed of every grindstone or abrasive wheel the speed of the shaft or the spindle necessary to secure such safe working peripheral speed.
- 2. The speed indicated in notices under sub-section (1) shall not be exceeded

3. Effective measures shall be taken in every factory to ensure that the safe working peripheral speed of every revolving vessel, cage basket, fly wheel, pulley ,disk or similar appliance driven by power is not exceeded.

31. Pressure plant :

1. If in any factory any plant or machinery or any part therefore is operated at a pressure above atmospheric pressure, effective measures shall be taken to ensure that the safe working pressure of such plant or machinery or part is not exceeded....

Extruders tend to build up pressure if not properly operated. Cases of the extrusion dies blasting off the screw housing and seriously damaging workers have been reported.

32. Floors, stairs and means of access :

In every factory -

- a) all floors, steps, stairs, passages and gangways shall be of sound construction and properly maintained [and shall be kept free from obstructions and substances likely to cause persons to slip], and where it is necessary to ensure safety, steps, stairs, passages, and gangways shall be provided with substantial handrails;
- b) there shall so far as is responsibly practicable be provided and maintained safe means of access to every place at which any person is at any time required to work.
- c) When any person has to work at a height from where he is likely to fall, provision shall be made, so far as is reasonably practicable, by fencing or otherwise, to ensure the safety of the person so working.

34. Excessive weights

- 1) No person shall be employed in any factory to lift, carry or move any load so heavy as to be likely to cause him injury.
- 2) The state Government may make rules prescribing the maximum weights which may be lifted, carried or moved by adult men, adult women, adolescents and children employed in factories or in any class or description of factories or in carrying on any specific process.

35. Protection of Eyes

In respect of any such manufacturing process carried on in any factory as may be prescribed, being a process which involves -

- a) risk of injury to the eyes from particles or fragments thrown off in the course of the process, or
- b) risk to the eyes by reason of exposure to excessive light,

the state government may rules require that effective screens or suitable goggles shall be provided for the protection of persons employed on, or in the immediate vicinity of, the process.

36. Precautions against dangerous fumes, gases etc.

- 1) No persons shall be required or allowed to enter any chamber, tank, vat, pit, pipe, flue or other confined space in any factory in which any gas, fume, vapor or dust is likely to be present to such an extent as to involve risk to persons being overcome thereby, unless it is provided with a manhole of adequate size or other effective means of egress.
- 2) No person shall be required or allowed to enter any confined space as is referred to subsection 1 until all practicable measures have been taken to remove any gas, fume, vapor or dust, which may be present so as to bring its level within the permissible limit and to prevent any ingress or such gas, fume, vapor or dust ,and unless -
 - a) a certificate in writing has been given by a competent person, based on a test carried out by himself that the space is reasonably free from dangerous gas, fume, vapor or dust, or
 - b) such person is wearing suitable breathing apparatus and a belt securely attached to a rope the free end of which is held by a person outside the confined space.

Similar statutes exist for precautions regarding the use of portable electric light, explosives or inflammable dust, gas etc., precautions in case of fire, safety of building and machinery and maintenance of buildings and safety officers in factories employing more than a thousand workers.

*As can be seen from the above extracts from the Act, the issue of Occupational Health and Safety and some on Environment (though this is covered more fully under the Environment Protection Act) has been covered in explicit detail. If the recommendations of the Taskforce on Plastics Waste Management is also taken into consideration and an **effective and workable implementation mechanism** put in place, much of the issues on ESOH would have been positively addressed.*

MISSION REPORT

THE URBAN WASTE EXPERTISE PROGRAMME (UWEP) - WASTE, HOLLAND PLASTICS RECYCLING IN BANGALORE

REPORT OF THE MISSION VISITS TO CHENNAI, MUMBAI, DELHI AND MYSORE APRIL AND MAY 1998

BACKGROUND

The UWEP programme in Bangalore for the Plastics Reprocessing sector intended to initiate a Pilot Project to address its ESOH aspects. A needs assessment was commissioned to understand perceptions and needs of the sector and its stakeholders. To gain further insights into how assumed stakeholders could be involved and learn from their experiences from working on similar issues with other sectors of industry, visits were planned to Chennai, Mumbai and Delhi.

The visit was also intended to gain information on government initiatives in addressing plastics and the environment and its possible advantages/ impact for the proposed Pilot Project. This report highlights the key findings of these visits.

CHENNAI 1.

UNIDO - United Nations Industrial Development Organisation

Contact person: Mr. Jurgen Hannak, Co-ordinator, Work Environment related issues

The UNIDO Regional Programme for Pollution Control in the Tanning Industry in South East Asia was launched in 1995 with its headquarters in Chennai, India. The programme was determined to contain the problem of tannery pollution in some countries of the region including China, India, Nepal and Indonesia with technical assistance from UNIDO who has been engaged in tackling the problem of pollution in Latin America, Africa and Asia for many years.

Although the vast employment opportunities and large foreign exchange resources generated by this industrial sector are indeed much needed in these countries, this expansion has resulted in increased pollution caused by solid and liquid wastes from the tanneries.

The programme took a holistic and comprehensive view of the problem. The basic strategy has been to demonstrate in operational tanneries proven cleaner tanning technologies that help reduce pollution load quantitatively and qualitatively; and thence treat the resultant effluent cost effectively to meet the national standards.

In addition to the demonstration of cleaner technologies and end of pipe treatment, training of personnel in these countries to operate and maintain these facilities is a major activity under the programme. Regional workshops to facilitate sharing of experiences among the participants are also organised. Specialised training is provided for experts from these countries in well established technical institutions in the UK, France and other countries of Europe.

The other major objectives are

- *Facilitating improvement of Occupational safety and health of workers in the tanneries and*
- *Facilitating increased participation of women in tanning and allied industries*

The programme's approach has been to promote **know how through show how**. Though the units were conservative and reluctant to change, the approach was to involve the Leather tanning association from the outset. To improve the environmental performance and Occupational Health and safety, the focus was to stress on improved productivity. The programme was implemented on a cost sharing basis where the tanneries were expected to

invest in modernising production to bring it to an acceptable level and technical inputs were provided by UNIDO.

Currently, 8 units in Tamil Nadu, 1 in Nepal, 1 in China and 3 in Indonesia are working demonstration centres for the programme.

To address workers health issues a regional workshop was convened in July 1997 in Chennai under UNIDO's regional programme on occupational safety and health and women's participation in the tanning industry. The workshop marked the end of the survey/ planning phase and the start of the implementation phase of the umbrella project activities in these two areas.

Hazardous conditions in tanneries and effluent treatment plants result from poor work place layout, inadequate maintenance, ventilation, illumination and improper housekeeping. Poor machine safety, poor or little active passive safety devices and the absence of preventive maintenance result in unsafe conditions for workers, besides having a negative effect on the quality of leather. Moreover, poor general practices in the use of chemicals at work such as storage, marking, labelling, dosing etc. contribute to accidents and diseases reported often. Even if safe working conditions are assured there is always the risk that workers for lack of awareness and information follow poor work practices.

To tackle these issues, the main efforts have been on the implementation of various OSH improvement measures in the fields of machine safety, safety in the use of chemicals at work, work ecology, work place monitoring and emergency response mechanisms in selected tanneries. Simple and effective low-cost improvement measures pertaining to all these areas are being implemented and documented. Any tanner is free to replicate and implement the improved practices as to his/ her schedule and desire.

Some trials with proto-type devices have been initiated to reduce noise generated by various tanning machines such as teflon gears for wash drums. Work is still underway and proposed to be completed by the end of this quarter.

A tannery specific labour safety manual is under preparation and will provide employers and supervisors in the tanneries with a comprehensive guideline in dealing with OSH related issues. Once the manual has been endorsed by the authorities concerned in the participating countries, the actual training programme will be launched to inform and train managers, supervisors, workers and representatives of regulatory agencies, on-site at the demonstration centres.

The All India Skin and Hide Tanners and Merchants Association, Indian Leather Industry Foundation, Central Leather Research Institute, UNIDO and Sri Ramachandra Medical College and Research Institute have entered into an agreement for monitoring parameters relating to occupational health and safety of tannery workers. It aims to start a monitoring facility as well as to conduct research on related aspects and to offer it for use.

Comments

The UNIDO programme has had a good measure of success owing to a couple of key facts **Comments** The leather tanning industry was perceived as a highly polluting industry by all. The tanners knew it as well as the state regulatory agencies such as the pollution control boards and the general public.

As a result of poor environmental performance and the resultant severe pollution the sector caused, Public and NGO pressure forced legal intervention to close down a large number of tanneries in Tamil Nadu.

Pressure was also mounted from major importing countries to improve and upgrade processing and indeed Germany banned the purchase of Indian Leather that contained banned chemicals.

Under these conditions, UNIDO's programme while having to deal with attitudinal barriers did have market conditions that left the tanners with little choice but to improve and be in business or shut down. Therefore bringing together stakeholders as active allies and participants was possible.

The Plastics reprocessing/ recycling sector in contrast is not strictly perceived as a polluting sector by anyone, least of all the plastics sector itself. Therefore they are not able to see how they are poor environmental performers.

Given the small/ micro and mostly unorganised level of their business and the simple manual measures for segregation and mechanical reconversion and processing of plastics they are unable to perceive any ESOH issues that affect their industry and in fact cite a number of other more polluting and hazardous sectors.

The sector is also not collectively formed into an association and view each other and outsiders with a certain suspicion and reserve. This is probably because it is a profitable activity and they wonder why so many people are taking interest in their sector with much research being conducted and many people talking to them but apparently nothing coming out of it.

Other stakeholders do not see any role in participating in improving ESOH of the sector in the view of the overall status of how small and micro enterprises in general operate in the country given the economic conditions that drive the market such as a demand for cheap plastic products and availability of cheap labour.

2. Central Institute of Plastics Engineering Technology - Chennai **Contact person: Mr. S. Sugumar, Manager processing**

The headquarters for the country and regional centre for the south, this central government autonomous institute under the Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers, has played a key role in promoting improved technology and training for the mainstream plastics sector in India. Set up with UNDP assistance, it is the only institute of its kind in India where all facilities like designing, tooling, processing and testing of plastics are available under one roof. It provides for the needs of the plastic industries through manpower training, testing, consultancy, advisory and developmental services.

CIPET has established eight extension centres throughout the country - Ahmedabad, Amritsar, Bhubaneswar, Bhopal, Hyderabad, Imphal, Mysore and Lucknow. Each has been entrusted with a specific thrust area for development. Plastics recycling and reprocessing does not figure in any of its activities though there is a proposal to include a short training course for plastics reprocessing in the future.

The main objectives of CIPET are

Manpower development

Long and short term training programmes
Modular training programmes

Tailor made training programmes

Inplant training

Overseas training

Entrepreneur development **T**

Technical services

Testing and Standardisation

Developmental activities

Product design/ development

Mould design/ fabrication
Moulding services
Consultancy and advisory services
Placement activities

While CIPET - Chennai had conducted a workshop about Plastics Recycling in 1997 where papers were presented and a book brought out, they are not directly addressing the performance of the sector and can only provide expertise and consultancy if the request comes from an entrepreneur. Given the size of operation of the PRP sector this need has not arisen since technology options from CIPET would cost more than the sector will be willing to invest.

CIPET, Chennai were unable to see a clear role they could play in the UWEP programme.

3. Central Institute of Plastics Engineering Technology - Mysore

Contact persons: Mr. Jagadeesh, Managing Director and Mr P Poomalai, Chief Manager

Since the UWEP Pilot Project is planned for Bangalore, the researcher found it relevant to visit the CIPET centre at Mysore, which is 200 kms away and thus could be a more willing partner.

Being one of the extension centres, CIPET, Mysore is well equipped with modern and sophisticated testing instruments and a shop floor for on the job training and production with injection moulding and processing machinery.

After extensive discussions CIPET explained that though they have not previously worked with Plastic Reprocessors, they would be willing to provide information and technical expertise to the sector. They were sceptical about the participation of reprocessors in upgrading their processes and technologies since they were aware that the sector operates on a small and unorganised level. Nevertheless, they would be interested to participate in a workshop which UWEP may conduct in Bangalore to provide technical inputs.

NEW DELHI

1. International Labour Organisation

Contact Person: Heike katharina Junger, Associate Expert, Program Officer

Mr Gerry Pinnigan and Mrs Tegmo Reddy were not available as suggested by Ms Inge. Ms Junger did not see any specific role ILO could play in the UWEP Project. They also did not have any scope for funding UWEP activities for the Plastics Recycling Sector in Bangalore.

2. World Health Organisation

**Contact Persons : A Pierre Hirano, Environmental Health Engineer,
J C John Pospisilik, Environmental Engineer**

WHO indicated that they are not working in the areas of waste or plastics recycling and therefore the UWEP program does not fall within their purview of activity. They are also not working directly with OSH activities and therefore do not have any funds. They are currently downsizing their existing programs on sanitation and health after having spent many years in developing modules for Central Government programs. They were very critical of government apathy and inaction in areas that they have been working on and recommendations they have made and as a result are not very optimistic of seeing any tangible improvements in the programs they have so far been doing. They suggested we speak with NEERI, SHRISTI and VATHAVARAN, which are institutions and organisations working on waste management. They also thought it was a good idea to form co-operatives of waste workers.

3. Development Alternatives

Contact Person: Dr Mrs K Vijaya Lakshmi, Senior Environmental Scientist

DA has been working over the past year with the Electroplating sector in an area of a cluster of hundred units who are in the tiny and cottage industry sector in Delhi. Two units have been identified for a demonstration to improve its environment performance and reduction of pollution. So far the program has been studying the various plating processes and samples have been gathered for analysis. The units are being visited about once a month and sometimes once a week. The entrepreneur was approached with the idea of facilitation in improving his processes, the idea being not to intimidate him. Key points were identified and put across to the owner, manager and staff. Areas where changes were required were also identified. The Electroplating Association was approached and the President is a co-operative man. Subsequently other stakeholders were also included such as the Chemical suppliers, resident associations, large buyers of electroplated parts. The Central Electrochemical Research Institute in Karaikudi, Tamil Nadu did not show much interest to participate in the program.

Some of the problems that were identified in the sector were:

- The workers were in contact with cyanides and heavy metals
- The units had a high staff turnover
- Their morale is low
- Owners have no control over safety practices of staff

DA has suggested that to improve environmental performance of the sector it is essential to group the units together and discourage small units. That mainly good housekeeping practices will go a long way in improving environmental performance. It is necessary to identify who is getting the primary benefits and target the program to them. From discussions it is evident that DA'S approach has been slow and painstaking. It did not seem apparent that tangible benefits will accrue to the sector as a whole in a reasonable timeframe. Therefore, it may not seem a sustainable approach to emulate for the plastics recycling sector in Bangalore given the peculiar dynamics of this particular sector.

4. Ministry of Environment and Forests

Contact Persons: Dr Subramanyan, Dr Saroj, Joint Directors

Dr Subramanyan presented a paper on Waste Minimisation at the Recycling Workshop organised by Indian Environmental Society in New Delhi and was co-operative in providing information on key areas of MOEF activities. His department had no specific role to play in the UWEP program and he suggested and put the researcher on to Dr Saroj who is the Chairperson of the Plastics Waste Management Taskforce constituted by the MOEF. Unfortunately, Dr Saroj was not free for a discussion and assured she would send details of the Taskforce recommendations to us. At the time of writing this report, these details are still awaited. It may be noted that all information about the taskforce and its recommendations which is included in the main report have been collected from various other sources.

5. National Productivity Council

Contact Persons : Dr Saxena, Director, Mr M A Patil, Deputy Director

Though the NPC conducted a national conference in March 1988 on hazardous waste management, they were unable to provide any discernible inputs for the UWEP program and did not show any inclination to participate. Mr Patil was commissioned the MOEF to do a study on environmentally sound technologies for plastics waste management, but a copy of the report was not available for the public.

The NPC operates in the four metros of Calcutta, New Delhi, Chennai, Mumbai and is largely a paid consultancy organisation. Their focus areas are currently in agro residual waste management and waste minimisation in pesticide formulations.

NPC cannot play any role in the UWEP program.

6. National Cleaner Production Centre **Contact Person: Dr P K Gupta, Deputy Director**

The NCPC is hosted by the NPC and sponsored by UNIDO and UNEP. NCPC's objectives are to demonstrate cleaner production concepts in Indian industries, particularly in the small scale. They also conduct demonstration projects, training programs, workshops, disseminate information on cleaner production and policy level interventions.

NCPC has seven centres in the country and conducts training programs and capacity building exercises for waste minimisation. Their approach has been to train experts who will in turn form waste minimisation circles (WMC) in given sectors of industry to promote cleaner production practices. This has so far been done for the textile dyeing sector in India.

NCPC at this moment in time does not have any scope to address plastics waste management and therefore is unable to actively participate in the UWEP program.

7. SRISHTI **Contact person: Mr. Ravi Agarwal, Chief Coordinator**

Srishti is an NGO working on issues related to Hospital Waste Management and other areas of Public concern in Delhi. By far the most meaningful meeting in Delhi was held with Mr. Agarwal. In discussions with him the following points emerged:

1. That the OSH of the Plastics recycling sector can best be addressed through economic and market interventions
2. The Task Force of the MOEF is a government and industry committee with no involvement or participation of NGO's as a result the informal sector is not represented at all.
3. The mainstream plastics industry is a powerful sector and are quick to respond aggressively to any statements on the environmental status of plastics. They quickly justify themselves.
4. The cost of collection / recycling is high and therefore the sector is forced to operate at the level they do. A shift to better practices can only happen in the economic paradigm where the Polluter Pays principle is instituted.
5. There is a need to define how introduced products can and should be recycled.
6. There is a need to map and follow the cradle to grave approach.
7. The plastic re-processor is mostly industry driven not consumer or market driven.
8. There is global move for more investments in larger markets such as India which will see increased use of plastics
9. Some states have banned the use of Plastic carry bags and this needs to be made law for the entire country
10. We need a plastics conscious policy that will look at all the issues that are connected with it and institute appropriate measure to deal with it.

One of the ideas discussed was the possibility of forming a National Working Group on Plastics and the environment with a view to pressure and influence government policy for the larger benefit of all sections of society. This NWG could comprise of key people from the north, south, east and west of the country where adequate representation is ensured for the informal sector.

Groups working on plastics and the environment may be identified and brought together for a workshop. The Working Group may be formed as a result of this workshop. Key areas that need to be included are OSH/ economics/ eco tariffs/ with regard to plastics recycling.

Given the current status of Plastics Recycling and the existing policies and market conditions it does not seem feasible to initiate a Pilot Project on the micro level.

8. Toxics Link

Contact person: Deepika Pawar

TL Delhi is a fairly recent initiative for India and provides information on toxics and toxicity of various materials its every day implications and its approved threshold levels by law. They assured that any information they may be able to get on plastics production/ use/ recycling and toxicity will be forwarded to us.

9. Centre for Science and Environment (CSE)

Contact person: Ms. Sunita Narain, Dy Director

Ms. Narin was introduced to the researcher as a board member of UWEP and discussions with her brought out the following points:

Plastic carry bags are banned in four centres in India. Impact of these bans need to be studied if not done so already.

There seems to be a declining market for recyclables and if so why? It seems that when supply of virgin plastics were less than demand, the prices were high. Taxes were also higher and therefore it made recycling more economically attractive.

When large additional capacities are being added and economic liberalisation has brought prices down for virgin plastics, it is becoming less attractive to recycle

There is increasing consumption of plastics in real terms and a subsequent increase in recycling. It is not possible to quantify this given the mostly informal scale of operations in plastics recycling.

The demand for recycled goods have not gone up in relation to its production. Reduced demand reduced production thereby recycling.

To improve quality, introduce newer products and create newer markets is essential to bolster recycling. Therefore the right market instruments will help.

Without these basic market interventions, it would be very difficult to address the ESOH issues of the sector on a sustainable basis and to make tangible benefits in these areas for the sector as a whole. At best ground level interventions at this stage could make changes in a negligible number of units with no guarantee of replication.

10 P Ratra, Former Dy. Chief, Building Materials Technology Promotion Council (BMTPC), New Delhi

Mr. Ratra is currently a consultant and was on the task force for the MOeF for Plastics and the environment. He has produced a video film on plastics waste management. The report he produced Plastics Waste Management: Systems and Policies included recommendations of the task force and its key features are included in the section on the main report Task Force".

He was of the opinion that interventions on the micro level would be very difficult to implement since the sector that works with waste do not perceive occupational health as an issue let alone a priority. He felt that the issue would anyway be best addressed through the recommendations made by the task force. He did make himself available for any professional consultancy if required.

11. Urban Management Program in Asia and the Pacific

Contact person: Mr Dinesh Mehta, Coordinator

The UMP is a global technical cooperation program of the UN. UMP had a series of workshops in India and Bangalore was one such city where a workshop was co-ordinated by CIVIC a local NGO. In discussions with Mr Mehta, it became evident that the UMP program largely dealt with formulating a collective vision and a strategic action plan to improve urban governance and environmental management through public private partnerships.

Therefore, UWEP's specific program on plastics recycling did not fall within this purview though there are implications in the larger perspective of UWEP's and UMP's programmes. Therefore it may of use to network with this effort.

MUMBAI 1.

1 Colour Publications

Contact Person: Mr Mani, Manager Colour Publications publish the Indian Packaging and Plastics Journal which covers all trends in the plastics and packaging in India. They were met with to get further contacts and information while in Mumbai. Mr Arvind S Athalye is a plastics consultant and expert but was unavailable at the time.

2. PlastIndia Foundation

Contact Person: Mr P P Kharas, Managing Director, EcoPlast Limited

Mr Kharas is the Chairman of the EnviroPlast Committee formed by the PlastIndia Foundation to address issues of plastics and the environment. The PIF itself is a federation of plastics manufacturers association of the country and was formed largely to improve the image of the industry, its technology, performance and overall international competitiveness. Mr Kharas was on the Taskforce of the Ministry of Environment and Forests.

Mr Kharas was of the opinion that plastics recycling is a much needed activity and environmental concerns that have been voiced were by and large baseless. There is a need, he felt, to upgrade technologies and bring in certain policy changes. Both of these were being done, he said, through the recommendations of the Taskforce and he was confident that in a couple of years these issues would have sorted out. With regard to occupational health and safety, he said, that given the fact that they are largely from the unorganised sector, they were bound to be poor as in many other sectors of small industry. This, he felt, was a national issue, across the board for many developing countries. He suggested media campaign to educate the people in general and thereby put plastics in its right perspective is essential. By right perspective he means that plastics perse are not environmentally dangerous but poor management of waste by people who have a tendency to litter is the real problem. He talked about the instance of railways where millions of passengers who travel and use hundreds of tons of plastics by way of packaging and coffee/water cups get thrown out and littered indiscriminately.

He was, nevertheless, cooperative and willing to participate in any pilot project that we may conceive though the content of the pilot project is still not evident. In all likelihood, he

indicated, it may be better to set up a demonstration plant with modern technology to showcase how better and varied products could be made with commingled waste plastics.

Mr Kharas also suggested that we speak with Chem Systems, UK who have an office in Chennai are the consultants to draw up a project study for the Indian Centre for Plastics and the Environment, which is an institute recommended by the Taskforce to address key issues of plastics and its management.

3. Indian Plastics Institute

Contact Person: Mr. Gopalan, Manager

The IPI is a professional registered society for the benefit of the Plastics industry. They are represented throughout the country with their head office in Bombay. They bring out a journal the IPI Plastics journal on the latest trends in and events in the sector.

Mr. Gopalan said that there are no short cuts other than to educate the people on better waste disposal practices and banning plastics is neither desirable nor feasible. With regard to SOH of the reprocessing sector he said it was under the purview of the factories inspector who is empowered by law to look into this matter for all sectors of industry and ensure minimum standards are met. He was not confident any pilot project to address the OSH issues would work, given the lack of importance employers and employees accord it.

Conclusions

From the visits, it may be concluded that: Other attempts at improving EOSH were under its own peculiar market conditions such as UNIDO which is dealing with the leather tanning sector which was already widely viewed as a highly polluting sector and many had to be closed down due to poor environmental performance. UNIOO is a well known large international organisation and started its work with the Central Pollution Control Board and indeed their office is located in the CPCB office in Chennai. Both of this gives the programme the advantage of the 'higher profile entry*'. The Plastics Reprocessing sector has a completely different profile.

The approach taken by DA though commendable is a painstakingly slow and laborious process and calls for a high level of motivation of the programme implementor (DA). It is still not evident who could play that role (if at all) for the PRP sector in Bangalore.

Though CIPET and Plastindia Foundation indicated interest to participate in a workshop one cannot be sure what useful purpose that would serve given the current lack of interest among the PRP sector itself (see main report) and other stakeholders.

It may be of better use to 'pitch' the UWEP programme to address ESOH issues in the Plastics recycling sector through policy level attempts. Though the MOeF's Task Force did not specifically have NGO participation, in all fairness, they have done a pretty comprehensive job of addressing main areas of concern on a policy level.

It may be useful to support the formation of a working group or pressure group comprising of a few key individuals who can critique the Task force recommendations and work meaningfully and realistically in plugging any gaps. It may be useful to start talking with Chem Systems, the consultants drawing up the proposal for the ICPE and find out if ESOH issues are included and how they propose to be implemented.

Overall, it seems better to wait till the recommendations of the task force are put in place before attempting to initiate a pilot project.