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PROJECT PROPOSAL

ON

DESIGN AND DEMONSTRATION OF WORK ENVIRONMENT
IMPROVEMENT MEASURES

IN

AGATE INDUSTRY OF GUJARAT

Submitted By

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1. BACKGROUND

The 'Agate' Stone, considered semi-precious, is available locally in Gujarat. They are processed into a wide variety of articles such as rings, beads, lockets, necklaces etc. in different sizes and shapes as also the decorative items. Transforming these stones in the desired forms and finish involves a number of skill based processing stages. Traditional as the industry is, multi-step processing is accomplished at different locations in the premises of the artisans themselves. As such it is an unorganised household industry, and is concentrated in Khambhat region of Gujrat.

It is estimated that almost half the population of Khambhat i.e. about 50 thousand individuals, are engaged in this industry. While, most of the people work on individual basis, there is also a practice of contracting out certain specific processing jobs to the Contractors. There are over 50 such contractors who employ skilled artisans on piece rate basis.

A substantial portion of the articles made out of "agate is exported. It is estimated that nearly 20 tonnes of Agate stones are processed every day. Considering that half of the raw material input quantity is wasted during processing, the finished goods turnover is estimated to be of the order of Rs.5 lakhs per day. Thus, the Industry produces goods worth about Rs.18-20 crores every year.

2. PROCESSING STAGES

The raw stones as mined are first given natural or the external heat treatment before skin removal. They are then broken into requisite sizes and are heat treated again to change the tinge of their colour. These stones are subsequently processed for giving them requisite shapes. The most common variety i.e. beads or drums are mechanically rounded in a rotary drum and are gound individually on the grinding wheels. In the beads and drums, holes are drilled through electronic drilling machines before they are subjected to final finishing and polishing in a rotary drum containing wet media comprising of Emery Powder and Alluminium Oxide. Subsequently, depending upon the need, they are given heat treatment again.

3. THE PROBLEM AREAS

From the work environment point of view, in the entire processing, there are two specific areas which affect the health of the artisans and also pose specific hazards. These two areas are :

a) Breaking and Shaping of the Stones

This is a manual process wherein the artisans take individual stones and reduce them into the requisite size with the help of a Hammer on an iron rod dug into the ground. During this operation, the hazard essentially emanates not from the fear of hitting the fingers but from the flying stone-chips leading to injuries specifically into sensitive areas such as eyes. It may be mentioned that the Hammer is made of animal horns. However, it is not from the point of view of lessening the impact of the Hammer on the fingers but more to protect the stones.

b) Grinding of Agate Stones

The second problem area is the grinding of Agate stones on the grinding wheels. It is estimated that nearly 4-6 kg dust is generated on a grinding wheel every day. As per the studies carried out by NIOH, Ahmedabad, nearly 60% of dust is of less than one micron size. The particle size distribution indicates that nearly 80-90% of the dust is in the respirable range. Dust concentration in the work environment is of the order of 200-500 milligrams per cubic meter. The workers, therefore, are forced to inhale a very high quantity of such respirable dust leading to impairment of lung-function causing ultimately early deaths. There is an increased incidence on Pneumoconiosis, Pulmonary tuberculosis, Acute and Chronic Bronchitis, Asthma and Tropical Eosinophilia. The very fact that four brothers belonging to family of five, all of them engaged in grinding of Agate stones, died before the age of 40 and the last and the youngest surviving brother is already suffering from respiratory problems and might meet a similar fate, as that of his elder brothers.

4.0 SOLUTIONS & CONSTRAINTS

In the past, several attempts have been made to reduce the exposure of the artisans to the occupational hazards and dusty work environment. Owing to the constraints of finance as well as problems encountered by the artisans in their working, none of the solutions in the past could become acceptable. As a result, there is not much of an improvement in the work environment, although, there is a greater awareness today.

5.0 THE PROPOSAL

Considering the fact that all the earlier attempts to solve the dust problem failed as the expenses incurred on experimenting different ideas were borne by the individual artisans themselves or some of the progressive contractors, and that such efforts in the past did not lead to cost effective and acceptable solutions, it is no longer possible to motivate agate workers, once again, to invest in further experimentation.

It must also be mentioned that the people involved in evolving solutions were largely academic with little exposure to the practical situation in the field. In addition, it seems that the concerned experts and scientists also did not have any knowledge of design operation and maintenance of cost effective control measures. It is, therefore, proposed that a demonstrative study at no cost to the artisans is carried out. In this effort pollution control specialists from National Productivity Council could be associated.

The entire study would comprise of following 3 phases:

- Phase - I : Problem assessment, data collection etc.
- Phase - II : Design of a cost effective and artisan friendly hazard and dust control systems
- Phase - III : Installation, operation and commissioning of the demonstrative systems evolved in Phase - II as a package and its evaluation.

6. TIME SCHEDULE

It is expected that the entire study shall take a total period of 6 months. The phase wise schedule is as follows:-

Phase - I : 2 months
Phase - II : 1 month
Phase - III : 3 months

7. PROJECT BUDGET

1. Professional Expenses	: Rs. 60,000/-
2. TA/DA	: Rs. 60,000/-
3. Hardware and instrumentation expenses	: Rs. 40,000/-
4. Documentation and miscellaneous	: Rs. 10,000/-
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Total	= Rs. 1,70,000/-
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ABOUT US

As an educational support organisation, Society for Participatory Research in Asia (PRIA), New Delhi, has been working on the theme since 1983. We have been working primarily with workers and their representatives to strengthen their understanding and capacity to deal with problems of occupational health and safety. We have conducted several studies to highlight problems of occupational health and safety of women workers, construction workers, agricultural workers as well as workers in the textile mills, chemical and engineering industries. Our activities, so far, have focused on conducting workshops, training programmes, publishing and disseminating information and sensitization of workers and their representatives.