

Assessment of Business Solutions

Provision of Improved Quality Moulds for Plastic Manufacturing Enterprises



Prepared by:



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1. The Process

The Katalyst project’s plastic manufacturing industry analysis conducted between March to July, 2003 pinned down the major constraints besetting the value chain. For this analysis, 50 to 60 plastic and related SMEs were visited and interviewed. A total of 30 constraints were identified, described and catalogued. They fell into the following categories:

- Input supply
- Product development and process technology
- Policy
- Market access
- Business environment infrastructure
- Organization and management
- Financial

In response to these constraints, the team sketched eleven broad yet possible business solutions that can address or strengthen the sector.

The team then filtered the solutions via a set of three criteria (potential increase in income of the plastic manufacturers, potential number of beneficiaries of the solution, and appropriateness for Katalyst). The objective of this filtering was to identify two initial solutions to focus on. The selected solutions were: (a) access to better quality moulds at affordable prices and; (b) technical training for employees, owners and technical resource persons on plastic manufacturing machine operation. After a series of deliberations, the team selected the former for the first solution assessment exercise.

The team began by developing tools for assessing the demand (among plastic manufacturers) and supply (among mould makers) of better quality moulds. To gain deeper understanding of the constraints facing suppliers and users of moulds, the team preferred qualitative over quantitative data capture questions. A sampling frame consisting of seven solution providers (including both modern and traditional mould makers) and eight solution users (including high tech and low tech plastics manufacturers using both injection and blow moulds) was planned. The actual business solution assessment was carried out from 24 to 27 August, 2003. In the interviews, the team also visited scrap metal suppliers in Dholaikhal. See Box 1.

Box 1: SMEs Visited for the Business Solution Assessment

Enterprises	Type
Padma Engineering	Mould Maker
Azad Engineering	Mould Maker
Minnet Engineering	Mould Maker
Bismillah Engineering	Mould Maker
Kamaluddin’s Shop	Mould Maker
A & W Ashraf Engineering	Mould Maker
Mitali Traders	Scrap Delaer
Bhai Bhai Traders	Scrap Dealer
Ulfa Plastic	Plastics Producer Subcontractor
Sharna Plastic	Plastics Producer
Tisa Plastic	Plastics Producer Subcontractor
Sony Plastic	Plastics Producer
Baly Plastic	Plastics Producer
J & J Plastic	Plastics Producer

The team consolidated its findings on 28 August, 2003. During this session consensus was reached on the ten major constraints facing the supply and demand of moulds. During the session, the team also prepared for a Focus Group Discussion (FGD) which aimed to: (a)



validate constraints related to the supply and demand of quality moulds, and (b) propose initiatives to address these constraints and develop the markets for better moulds. The FGD was held at the BPGMEA¹ conference room from 3:30 to 8:30 pm on August 27, 2003 with 14 mould providers and users in attendance. See Box 2 below.

After the FGD, the team took a closer look at each proposed intervention and selected intervention areas that Katalyst may seriously consider. To do this, the team applied the following criteria: (a) extent of its impact (income, employment, etc.) on SMEs, (b) number of SMEs (both directly and indirectly) that will benefit, (c) cost-effectiveness of the intervention, (d) chances of the intervention yielding in sustainable results, (e) Katalyst's capacity (including availability of human and financial resources) to implement or manage the intervention, and (f) time needed to complete the intervention.

2. Description of the Solution (Provision of Improved Quality Moulds for Plastic Manufacturing Enterprises)

The development and growth of plastic manufacturing greatly depends on the provision and use of quality moulds by the plastics manufacturers. Moulds give the shape, size and texture of the desired plastic products. Generally, five moulds are used: hand moulds (e.g., for low end toys, combs, buttons, ball pens, etc.), injection (e.g., buckets, tableware, shoe soles, hangers, pharmaceutical packages, etc.), extrusion (e.g., PVC pipes), blow (e.g., water and soft drink bottles), and rotation moulds (e.g., for melamine products). This solution assessment report deals with injection and blow-moulds, being Bangladesh's most dominant (after hand moulds) and lucrative growth plastic processes.

Under this are moulds for making industrial plastic products (e.g., hangers for RMG exports, industrial containers, etc.) and household/consumer goods (pails, bottles, containers, etc.) of varying sizes, colours, shapes, thickness and resins (both virgin and recycled). The provision of quality moulds requires the mastery of various technical processes including: (a) selection and use of raw materials, (b) design, machining, assembling and finishing processes, (c) repair, maintenance, and mounting into the injection or blow mould machine.

Box 2: ATTENDANCE IN THE FGD

Md. Moniruzzaman, Baly Plastic
Mr. Paresch Chandra Mondal, Padma Eng'g
Mr. A.K. Azad, Azad Engineering
Mr. Shaahjahan Alam, Azad Engineering
Mr. Alauddin, Minnat Engineering
Md Yakub, Ullfa Plastic
Mr. Alauddin, Minnet Engineering
Mr. Lutfar, Mitali S. S. Store
Mr. Shahadat Hossain, Sharna Plastic
Md. Shafique A. Chowdhury Raju, J & J Plastic
Mr. A. S. M. Kamal Uddin, Luna Plastics
Mr. Yousuf Ashraf, BPGMEA
Mr. Mokboul, Broker and Informant

3. Related Sub-sector Constraints

The lack of quality moulds results in low quality finished products and high rejection rates. This impedes plastic manufacturers from exploring the more lucrative higher-

¹ Bangladesh Plastics Goods Manufacturers and Exporters Association



end markets in both domestic (e.g., industrials) and export markets. It is particularly acute for those intending to move into exports. This constraint is likewise linked with the low mould making skill of many workers that further exacerbates the already low productivity in the sub-sector.

4. Market Information (Supply and Demand of the Solution)

4.1. Introduction

With respect to technology levels and the markets they serve, the mould makers (solution providers) polarize in two extremes, modern and traditional.

(a) Modern

Most modern mould makers are not in Lalbagh. They have larger workforces complemented by support staff including a supervisor, costing personnel, etc. The equipment is generally new (e.g., less than five years old). Some even have EDM and pantograph machines. They handle moulds for plastic products for export and higher-end domestic markets. There are approximately ten mould makers in this category.

Box 3: The Objectives of the Focus Group Discussion

- ✓ Validate constraints related to the supply and demand of quality moulds
- ✓ propose initiatives to address these constraints and develop the markets for better moulds

(b) Traditional

The traditional makers prevail in Lalbagh, which hosts roughly 150 of the estimated 200 units nationwide. The owner-manager doubles as part-time worker and supervises some 2 to 5 paid or part-time workers. Their equipment is rudimentary, such as one or two lathes (with beds up to 6 feet long) and grinding and milling machines of varying sizes. Most of their machines are purchased as second-hand, and are at least eight years old. They produce moulds for a very large variety of household products.

4.2. Market Size and Penetration

There are no reliable estimates of the number of plastic manufacturers in Bangladesh. According to a recent Katalyst-initiated survey, the sub-sector could have as many as 800 plastics manufacturers using plastic injection and/or blow-mould technologies; more than 90% of whom are in Dhaka. The aggregate mould requirements are filled mostly by the local mould makers.

4.3. The Demand-Side: The Mould Users

Plastic manufacturing is extremely competitive. Products are highly sensitive to ever changing market needs (e.g. can sometimes be fleeting fad) and generally short market life. Consequently, plastic manufacturers increasingly demand better quality



moulds with shorter and shorter “product-to-market” frames. This challenges the mould makers to produce quality moulds with shorter lead times.

As with mould makers, plastics manufacturers fall under two types: the high- and low-end producers. The high-end producers cater to industrial products serving the RMG, pharmaceuticals, food processing, and other chemicals industries. They also produce hangers and RMG accessories for exports. The low-end producers focus on plastic household products largely for the domestic market.

4.3.1. Satisfaction

Overall, the plastics manufacturers are dissatisfied with the moulds they use. They complain about the extensive use of scrap metals (e.g., from Chittagong’s ship breaking industry) and the limited skills and equipment of local mould makers. . The results are plastic products with uneven surface, larger risers (or flashes) and consequently high rejection rates. They also reported the mould makers’ unreliability in meeting their delivery dates (e.g., some orders are delayed as long as six to seven months). High-end producers are unsatisfied with the hardness of the metal which can only be improved by importing pre-hardened metal or by importing softer high-quality metal and then hardening it locally (all stated that hardening of scrap metal would not be effective). They stated that high quality hardened metals would significantly improve moulds’ quality (e.g., smooth in and out surface, cooling system, nickel plating and durability or longevity). From their mould makers, the high-end producers look for quality, commitment to delivery schedule, and expertise in handling complicated designs. Meanwhile, the low-end producers and production subcontractors are price sensitive. They reported that high quality moulds are available locally, but the prices are double or triple their low quality equivalents. They explained that given the market they serve and the limited production runs they have, that it would not make economic sense for them to spend more than 50% than what they are currently spend for an improved quality mould.

4.3.2. Awareness

The high end producers know the reputable (modern) mould makers. Frequently mentioned are : Padma Engineering, A&W Ashraf, Azad Engineering, and Hai Engineering. Even if they know the modern mould makers, the low-end producers are reluctant to approach them due to their high prices and long delivery time. These producers are all aware, however, of traditional mould makers.

4.3.3 Usage and Transactions

The relatively short shelf-life of many plastic products pushes the demand for plastic moulds. Last year, a high-end manufacturer who has 400 moulds in stock purchased moulds valued at almost US\$ 0.4 Million (40 percent of which were imported). Usage estimates for low-end users vary. One producer purchased 14 moulds last year and now needs at least three moulds monthly. Another small low-end producer spent about Tk 70,000 (\$1,200) for moulds. Subcontractors producing low quality products also noted increased demand for moulds. Last year, they reported average purchases of 4 to 5 moulds yearly. In the first six months of this year, they procured about 8 to



10 moulds, each averaging Tk 60,000 (\$1,000) For every order, the plastics producers pay 30 to 40 percent of the purchase price as down payment.

4.4 The Supply-Side: The Mould Makers

As described in section 4.1 above, mould makers can be roughly classified as "modern" and "traditional". There are also a few mould importers though these tend to be brokers who will find foreign suppliers of many different kinds of products for their clients. Some manufacturers also import moulds from foreign suppliers on their own.

4.4.1 Diversity of Production and Product Features

The modern mould makers provide higher-quality moulds primarily to large-scale high-end producers like Baly Plastics, Poly Plastics and Bengal Plastics, all of whom serve high end domestic and/or export market needs. One modern mould maker (serving industrial clients like Lever Brothers) produces injection and blow moulds for a large variety of plastics products for the automotive, electronics, home appliances, telecommunications, mechanical, containers, and toys industries. Another delivers moulds for injection, blow, vacuum forming and thermoforming for many medium to larger industrial plastics manufacturers (such as Berger) and subcontractors (e.g., about 25% of total production).

The traditional makers produce moulds for a wide variety of lower-end domestic products such as plates, toys, and containers for powder, shampoo, and lotion. Some also make moulds for big household containers. Usually, the traditional mould makers maintain at least 7 to 8 clients who can either be machine owners (about 50%) or production/subcontractors. While most clients (more than 50%) are from Lalbagh, some other clients can come from as far as Rajshahi, Khulna, Jamalpur and Comilla.

4.4.2. Relationships and Transactions

Plastics producers usually visit the mould makers, show samples of the products they want moulds made for, and pay up to 50% up front. Modern mould makers provide guarantees (e.g., up to 0.5 million pieces shot) and will repair defective moulds. Some traditional mould makers provide up to one year guarantee plus some after-sale-solutions, while others do not.

4.4.3. Users, Trends and Marketing

All modern mould makers envisage a trend towards better quality moulds. This is fuelled by strong growth in the RMG, pharmaceutical, food processing and other industrial sectors. To a lesser extent, the traditional mould makers share this perspective too. They feel that mould designs need to be better.

Proactive marketing is not practiced. Both the modern and traditional mould makers rely on word of mouth. They allow quality to speak for their mould making ability. Others get customer references from past orders. One mould maker periodically asks its industrial customers for references. The traditional makers rely on walk-in



customers. Use of cell phones to contact prospective clients is becoming more popular with some.

All modern mould makers feel that 20 to 50% of the plastic manufacturers will favour better quality moulds in the near future. Of these, about a quarter will be willing to pay even double the price for better metals for their moulds.

5. Constraints and Opportunities

Once discussions with suppliers and users of moulds was completed, the Katalyst team identified ten main constraints that hinder the provision and use of improved quality moulds. These were then presented, discussed and validated by providers and users of moulds during the FGD. Of the ten, the participants claimed that three were not true constraints. These were then omitted from further analysis. The seven remaining constraints were:

1. Lack of appropriate iron and steel for mould making contributes to inability to meet the demands of high-end plastics producers. Moulds made with ship break metal result in high cooling time, higher wastage, need to use greater amount of materials, frequent repair needs, etc.
2. Lack of CNC lathe/milling machines, CNC Machining Center, EDM Wire Cut, and EDM machines among modern mould makers result in missed opportunity to produce higher quality moulds for producers catering to the export and domestic industrial markets.
3. Lack of pantograph machines among traditional mould makers result in inability to create intricate mould designs and respond the needs of many plastic producers².
4. Lack of skilled operators for high tech machines (e.g. CNC lathe/milling machines and EDM machines) discourages investment in these machines.
5. Workers of traditional mould makers lack the skills to do intricate finishing of moulds (by hand) and design the moulds' cooling system. Most lack the basic concepts and principles for mould production
6. Lack of knowledge in use of AUTOCAD results in inability to produce new products (without samples) or adapt existing products.
7. Inappropriate hard chrome facility in Bangladesh prevents mould makers from producing certain high quality moulds

6. Providers of Moulds to Target by Katalyst

Both the modern and traditional mould makers are potential targets for intervention. Both have differing competencies and ability to cope with the challenges posed by the plastic manufacturers. Approaches for enhancing the capacity of each of these will vary, given their differences in size and sophistication.

² The constraints related to machinery (e.g., items 2 and 3 above) were combined into one after the FGD.



7. Potential Impact (of improved moulds) on the Plastic Products Subsector

By improving the quality of moulds, the plastics manufacturing sub-sector is expected to: (a) achieve higher quality finished products, (b) reduce production costs, (c) minimize materials wastage, and (d) upgrade the technical skills of the workers. Directly, the plastics manufacturers can increase the volume of products exported or delivered for the high-end consumers, and assist low end producers to access or penetrate the higher-end markets. Both can reduce their production costs and wastes thereby increasing the sub-sector's competitiveness.

Producing higher quality moulds will allow mould makers to gain better access to industrial markets hitherto unexplored (agro-processing, food packaging, industrial chemicals, etc.) and eventually usher in the advent of the electronics industry in the country.

9. Illustrative Interventions

During the FGD, the participants proposed a variety of interventions that could help to address the constraints mentioned above (it was understood that the Katalyst project could play a key role in facilitating the implementation of these interventions) These included:

Constraint 1: Lack of appropriate iron and steel for mould making contributes to inability to meet the demands of high-end plastics producers. Moulds made with ship break metal result in high cooling time, higher wastage, need to use greater amount of materials, frequent repair needs, etc.

Proposed Facilitation Activities

- LUNA (existing mould production company) will import a trial consignment and put up 75% of the cost. Other mould makers will put up the 25% balance
- LUNA will also sell to the other mould makers including the scrap metal dealers
- Ways that Katalyst can support this process:
 - will provide general support to LUNA (and any other importer) who is interested in doing this
 - work with key actors in the sector to lobby the government about reducing the tariffs on imported metal for moulds

Box 4: Katalyst's Interventions Selection Criteria

- ✓ Extent of its impact (income, employment, etc.) on SMEs,
- ✓ Number of SMEs (both directly and indirectly) that will benefit
- ✓ Cost-effectiveness of the intervention
- ✓ Chances of the intervention yielding in sustainable results
- ✓ Katalyst's capacity (including availability of human and financial resources) to implement or manage the intervention
- ✓ Time needed to complete the intervention



- give importer a price list of the different kinds of raw materials and what countries they come from
- assess six month demand
- carry out an awareness campaign with manufacturers about the value of improved quality materials
- carry out feasibility study of heat treatment facility (to harden moulds made with imported materials) and share this with interested entrepreneurs (Azad, etc.).

Constraint 2: Lack of CNC lathe/milling machines, CNC Machining Center, EDM Wire Cut, and EDM machines among modern mould makers and pantographs among the traditional mould makers result in missed opportunity to produce higher quality moulds for producers catering to the export and domestic industrial markets.

Proposed Facilitation Activities

- Promote linkages between the interested mould makers and different finance or leasing companies to determine what kinds of soft loans, etc. might be possible to procure the needed machines.
- Identify foreign investment programs that are interested in supporting such investments and link them with interested mould makers
- Promote linkages between the interested mould makers and different finance or leasing companies to determine what kinds of soft loans, etc. might be possible to procure the needed machines.

Constraint 3: Lack of skilled operators for high tech machines (e.g. CNC lathe/milling machines and EDM machines) discourages investment in these machines.

Proposed Facilitation Activities

- Support foreign specialists to come to institutions like BITAC to sponsor three-month (cost share) courses in the use of advanced machines. Specialists could come from India (due to the language facility) or China
- Promote these courses with interested mould makers.
- Send selected employees to foreign companies or organizations to learn use of machines

Constraint 4: Workers of traditional mould makers lack the skills to do intricate finishing of moulds (by hand) and design the moulds' cooling system. Most lack the basic concepts and principles for mould production

Proposed Facilitation Activities

- Bring in specialists and/or develop capacity of local specialists to offer training in basic concepts and principles of mould production
- Identify interested low tech mould makers

Constraint 5: Lack of knowledge in use of AUTOCAD results in inability to produce new products (without samples) or adapt existing products.



Proposed Facilitation Activities

- Identify or develop the capacity of a solution provider who can provide CAD solutions to mould makers. This specialist must be able to handle both mould production and CAD. It can take more than one year to learn about mould design.
- Create linkage with these specialists in India or Thailand and work with them

Constraint 6: Inappropriate hard chrome facility in Bangladesh prevents mould makers from producing certain high quality moulds

Proposed Facilitation Activity

- Assist existing hard chrome providers to improve their capacity to provide quality hard chrome

10. Conclusions

Following the FGD the team selected four areas for Katalyst interventions. These are: promoting importation and use of improved metal (raw material), promoting acquisition of advanced mould making machines, training mould makers in advanced machine operation, and basic training in mould development and production (for both modern and traditional mould makers). These interventions will be further explored and more detailed implementation plans will be developed.

