Productivity Improvement in the Egyptian Automotive Feeder Industries

Volume II

Productivity Issues and Recommendations in Five Companies

Final Report

July 1984

Kearney: Management Consultants

VEHICLE ASSEMBLY FEEDER INDUSTRY IN EGYPT

PROJECT NO. 263-0090.r

EXECUTIVE SUMMARY

A. T. Kearney, with assistance from Rockwell International, Automotive Division, submits herewith the report required by Section VII 2 and 3 of the Scope of Work. This work was performed under the leadership of Dr. Adel Gazarin, Chairman, Engineering Industries Corporation and with the invaluable assistance of personnel from El Nasr Automotive Company. This report consists of three volumes:

I. PRODUCTIVITY IMPROVEMENT IN THE EGYPTIAN AUTOMOTIVE FEEDER INDUSTRIES

This volume analyzes:

- Worldwide Trends and Opportunities
- Egyptian Trends and Opportunities
- Goals of the Industry
- Obstacles to Growth and Productivity
- Recommendations to the Industry

It identifies opportunities and presents recommendations to improve productivity throughout the automotive sector of Egypt.

II. PRODUCTIVITY ISSUES AND RECOMMENDATIONS

This volume presents an analysis of opportunities for improving productivity in each of five feeder industry companies. Many of the conclusions in Volume I are based in part on these analyses. However, to maintain the confidential nature of the data, distribution of this volume is limited.

III. STRATEGY FOR THE USE OF AID RESOURCES

In this volume we recommend specific actions USAID might take to assist the Egyptian automotive industry. A three-phase program is suggested:

Phase 1) Industry Diagnosis and Planning. This phase, to be complete by the end of 1984, should outline development of the industry over the next decade.

Phase 2) Structural Development, a set of eight interventions from mid-1984 to mid-1985, programming the expansion of six private sector companies with U.S. technical partners, and creating the necessary industrial focus in Egypt for their success.

Phase 3) Investment and Production Growth, with interventions in late 1985-1988 of capital and technical operations assistance patterned on AID's successful aid to a public sector company in the automotive feeder industry (TRENCO, a tyre manufacturer).

General Metals Co.

Productivity Issues and Recommendations

July 1984

Kearney: Management Consultants

CONTENTS

CONTENTS

BACKGROUND, OBJECTIVES AND METHODOLOGY

BACKGROUND

This project was undertaken as part of a wider study of impediments to productivity in the Egyptian automotive feeder industries. It was funded by USAID. The Engineering Industries Corporation and El Nasr Automotive Company participated in the direction of the larger study including the selection of participating feeder companies.

Four other companies besides General Metals were also studied intensively. They were:

El Nasr Forging Industry

IAMCO

Giza Rubber

Iron Works Company for Metal Manufacture.

Similar reports were prepared for each of these companies.

OBJECTIVES OF THE STUDY

The purpose of the larger study was to identify the major obstacles to improving productivity in the Egyptian automotive industry and to recommend policies and programs to overcome these obstacles. To accomplish this task, we looked in depth at the four companies listed above and at General Metals. We then drew conclusions on the results of these five studies, checked them against a larger group of Egyptian companies, and then summarized our conclusions and recommendations in another document titled Productivity Improvement in the Egyptian Automotive Feeder Industry.

Within each of the five study companies, we were asked to accomplish five tasks:

Task 1: Estimate the opportunity for improving productivity in the company.

Task 2: Assess management impediments to improved productivity.

Task 3: Identify and assess the influence of human resources on productivity.

Task 4: Identify and assess technological impediments to productivity.

Task 5: Assess any other influences on productivity in the study company.

METHODOLOGY

Because of the relatively brief time we could spend in each company, we based our conclusions on five principal activities:

- Reviewing financial and operating data indicating utilization of capacity.
- Inspecting the physical facilities and observing operations.
- Reviewing selected operating data and procedures (e.g., reject rates) that might indicate productivity problems.
- Interviewing managers in the company.
- Interviewing assembly companies to obtain their perspective on quality, delivery and price performance.

We analyzed the data and then drew the conclusions upon which our recommendations are based.

REPORT ORGANIZATION

The next chapter, Executive Summary, presents what we believe are our most important conclusions and recommendations concerning General Metals. The following chapters focus on each of the five tasks defined in our scope of work.

EXECUTIVE SUMMARY

The General Metals Company is a public sector company that produces a wide variety of nonferrous metal products. It has several plants in the Cairo area, but all automotive products are produced in its main plant located in El Tebbin, approximately 30 km south of Cairo.

While automotive products represent less than 5% of the annual revenue and approximately 1% of the annual tonnage, there are significant opportunities for improvement in both quality and productivity. The opportunities are summarized below and specific recommendations are discussed in detail later in the report.

The most important opportunities for improvement are as follows.

MATERIAL HANDLING

In general, in process materials are handled too often using inappropriate methods and equipment. As a result, capacity is restricted by slow flow rates, many parts are damaged by handling and too many man-hours are spent in an activity that adds no value to the project.

We recommend four improvement activities:

- Design standard containers that both protect products and permit more efficient handling.
- Buy appropriate equipment (especially lifting devices) to reduce labor requirements.

- Reduce the distances that in-process materials must be moved in order to increase flow rates.
- Assign one engineer to plan and implement the above recommendations on a full-time basis.

QUALITY CONTROL

The quality system is primarily reactive. The system reacts to defects as they are detected rather than predicting out-of-tolerance conditions and defining corrective actions. As a result, the overall reject rate for die cast parts is running between 20% and 40%. The capacity is accordingly reduced.

We recommend that a more modern statistical quality control system be implemented. It would warn that the parts are approaching an out-of-tolerance condition and would allow time to adjust the production schedule to avoid unexpected interruptions. Such a system could increase output of automotive products 15% to 40%.

MAINTENANCE

The maintenance function provides basically two services: die repair, and equipment maintenance and repair. Both services are performed reactively. Little preventive maintenance is performed. The consequent interruptions in production caused by equipment breakdown and die removal reduce overall production capacity.

We recommend implementing a formal maintenance planning and estimating function. Our experience shows that when a maintenance job is effectively planned and appropriate tools and materials are

provided to the craftsman, the time required to complete the job can be reduced as much as 30%. Effective maintenance planning also permits the introduction of preventive maintenance activities and could, conservatively, add 2% to 3% (see Exhibit IV) to production capacity.

METHODS

While time standards exist for most jobs in the plant, performance is not recorded and tracked against those standards. The Production Planning Department primarily uses historical production figures for planning and scheduling purposes. The results are:

- Operators use inefficient historical methods rather than "engineered" methods, thus reducing capacity.
- Improvement efforts are focused on the wrong areas (or not undertaken) because there are no data available to suggest the need or establish priorities.

We recommend that an engineer be selected and formally trained in MTM (Method Time Management). He could then use these techniques to develop improved methods and to set better standards for production planning. Productivity could be improved as much as 10% through these changes.

SCHEDULING

The overall operation plan is manual, developed at the beginning of the year and based on forecasts from the customers. Because it is operated manually, this system cannot respond

effectively to the wide variances in demand experienced each month. The result is that machines are ineffectively utilized, capacity is constrained, and customer requirements go unsatisfied.

We recommend that the Company purchase a small computer. It would be used to plan, schedule, and control manufacturing. New schedules could then be quickly developed as customers' needs change or as production problems are encountered.

SUMMARY

Productivity, as defined at General Metals Company, it simply an increase in the number of parts produced. In a public sector company, employees must be kept on the payroll regardless of their value to the productive process. Therefore, any real "productivity" change is interpreted as an increase in capacity. Currently, General Metals claim they need more people to meet demand. Improvements in productivity such as outlined later in this report, can reduce that need and allow an increase in production without hiring more people.

Generally, the management at the El Tebbin Plant is highly motivated and understand their plant very well. As is typical of Egyptian industry, all of the production managers are graduate engineers who have received some training in management. However, there are no measures of productivity, and the systems required to provide the necessary data are not available. Thus, they do not know where to begin.

COMPANY PERSPECTIVE

General Metals is a public sector company that produces a wide variety of nonferrous metal products. Beginning from one plant in 1937, the Company now has three plants in the Cairo area.

Last year the Company lost L.E. 100,000 on sales of L.E. 32.8 million. The primary cause of the loss is a government requirement to sell zinc plate at a loss to another public sector company that produces dry cell batteries. They lost L.E. 1.2 million on this product last year.

The Company produced 22,772 tons of product last year. Thus they operated at 95% of their capacity of 24,000 tons per year. The Company's markets are growing, so they are now bringing a new continuous casting machine on stream that will boost capacity to 48,000 tons per year. Automotive production was only 231 tons, or 1% of total production last year as shown below.

General Metals Production
July 1982-June 1983
(Tons)

	Automotive Parts	Other Products	Total
Pressure Castings	23	238	261
Gravity Castings	208	48	256
Other Departments	0	22,255	22,255
Total	231	22,541	22,772
Percent of Total	1.0%	99.0%	100%

See Exhibit 1 for details.

Other products include lead pipe, sheet, strip, cast forms, wire, and ingots. All of these are sold in the commercial market in Egypt.

Beyond installation of the continuous casting machine, four major new projects are planned at El Tebbin over the next five years:

- Expansion of the lead foundry to 8,000 tons/year.
- Expansion of copper wire and bar capacity.
- Expansion of the pressure die casting foundry to 400 tons per year.
- Expansion of the gravity casting shop to 600 tons per year.

The automotive products are produced in the Company's plant at El Tebbin (which produces more than 95% of the Company's tonnage). They are produced in two foundries, pressure casting and gravity casting. As shown in the table above, the gravity casting foundry is largely devoted to automotive products, while only a small part of pressure die casting capacity is automotive. NASCO is the sole customer for automotive products at this time.

Though the management of General Metals is willing to respond to the needs of the automotive manufacturers, it does not know the future requirements of the industry. The current five-year plan provides money only for maintenance and replacement, so expansion is not likely in the near term.

The remainder of this report focuses on the pressure and gravity die casting foundries where we concentrated our work.

TASK 1: ESTIMATE PRODUCTIVITY IMPROVEMENTS

Although the die casting foundries are operating at nearly 100% capacity, we believe that improvement in methods could increase good production by as much as 40%. For automotive products, the value of the improvement could approach L.E. 150,000 per year. The principal improvement can be obtained through better process control so that reject rates are reduced. The table on the following page lists our estimates of potential improvements in productivity.

At present, NASCO stations a quality control inspector at General Metals to inspect every batch before it is shipped. As a result, quality of these products has not been a problem for NASCO.

We were unable to assess the current delivery performance of General Metals. However, the impression at NASCO is that delivery is not a problem today. Nevertheless, these foundries are working at nearly 100% capacity now, so deliveries are likely to be a significant problem as volume increases.

SUMMARY OF BENEFITS

Recommendation	Benefit
Material Handling (Exhibit II)	
Appoint Material Handling Engineer to perform specific tasks/projects	8%-10% headcount reduction (L.E. 30,000 to 40,000).
Quality Control (Exhibit III)	
Install statistical quality control system and improve predictive capacity	15%-40% process yield improvement (15% improvement = L.E. 100,000). Improved customer satisfaction.
Maintenance (Exhibit IV)	
Begin preventive maintenance program and maintenance planning function	2%-3% improvement in equipment run time.
Methods (Exhibit V)	
Concentrate on implementation of short-term, low capital improvement	10% (or more) productivity improvement.
Scheduling (Exhibit VI)	
Install a small computer for scheduling and inventory control	Improved machine utilization. Inventory reduction. Improved response to market demands.

TASK 2: ASSESS MANAGEMENT IMPEDIMENTS

INFORMATION SYSTEMS

The major management impediment is the lack of good information and control systems. Current systems basically report production volumes. The following kinds of information are missing:

- Cost Data. Expected cost data by product for each major operation are available. What is lacking is a comparison of actual versus expected cost that would help the factory manager identify problems and cost reduction opportunities.
- Quality Data. As noted later under technology impediments, data on quality of products are needed to guide both maintenance and the foundry manager.
- Production Scheduling. Production is planned annually based upon forecasts by customers. Machines are scheduled manually month by month in response to current conditions. When demand exceeds capacity, the production planning personnel negotiate with the customers or recommend importing additional quantities. This system cannot respond quickly enough to the monthly changes in demand. As a result, machines are inefficiently scheduled and operate at less than capacity despite excess demand.

Recommendation

An early task in an overall productivity improvement project must be development of information systems that suggest the need for action. These could be maintained on a small computer system. We recommend that the company purchase a small computer and arrange for several people to be trained to operate and develop it. Selection criteria should include:

- Upgradable. As the firm's requirements grow, the software should be transferable to larger computers of the same manufacturer without substantial modification.
- Available Software. The manufacturer should be able to offer software that, with little modification, can handle the basic accounting and production recording tasks. Development of a production scheduling system will require outside help.
- Maintainable. The manufacturer should demonstrate a record of reliable maintenance of machines in Egypt.
- Training. The manufacturer should be able and willing to train the Company's personnel to both program and operate the machine.
- Software Consulting. The manufacturer should offer software consulting for basic business functions.

Although we have not investigated requirements in detail, we believe a computer such as the IBM Datamaster would be a good

starter machine. The computer, printer, and associated disk drive would cost $17,000 to $20,000. Software costs would be much higher and would depend upon the systems chosen and how much work could be done by General Metal's personnel.

Benefits

Benefits are difficult to quantify with available data but would accrue in four ways:

- Increased production due to better utilization of equipment.
- Reduction in costs due to better control of actual costs by product.
- Reduced manpower (compared to Company sales and production) in the accounting department.
- Reduce inventories due to better control of individual items.

Despite much higher wages, most manufacturing information systems in the U.S.A. are justified on the basis of savings other than reduction of clerical personnel who were processing information manually.

ORGANIZATION

General Metals is a large company, and automotive products is only a small line. Because the Company is functionally organized, there is no clear responsibility for automotive parts. The die

casting foundries are managed by a third-level manager. We doubt that effective planning for the future or control over current business can be achieved with this structure.

Recommendation

A long-term solution is to establish the die casting operations as a separate company. In the near term, we suggest that General Metals consider restructuring the die cast products into a profit center managed by a General Manager who reports to the Chairman. The General Manager would manage all production, product and process engineering, and sales personnel for these products. He would have financial responsibility for revenues, costs, and direct investment.

Benefits

This structure would much more clearly fix responsibility and would permit more accurate analysis of productivity. More importantly, it should encourage closer attention to customer needs followed by higher levels of customer service and innovation.

TASK 3: IDENTIFY AND ASSESS INFLUENCE OF HUMAN RESOURCES

INDUSTRIAL ENGINEER

In general, we find that human resources available to General Metals are adequate. Nevertheless, there is a need for a skilled industrial engineer to develop improved manufacturing methods, procedures and standards.

Recommendation

An industrial engineer should either be hired or trained. He should then be given full-time responsibility to perform a variety of tasks that would improve productivity:

- Analyze material flows between machine operations and recommend changes in layout or methods that would increase production (see "Methods" in Task 4).
- Analyze the ways materials are handled and recommend new equipment and methods to reduce damage and handling costs.
- Design packaging or containers carrying the Company's products that protect the products and ease handling.
- Establish engineered standards that could be used to schedule machines more efficiently.

These tasks could easily take several years of work in the die casting foundries alone.

Benefits

The most important benefit is that General Metals should be able to increase production as much as 40% with little additional expenditure on capital assets or salaries. Better methods should also improve the working conditions and safety of the workers.

TURNOVER

Turnover rates do not appear excessive:

	1980	1981-1982	1982-1983	Total
Number of workers who left:				
Professional	4	7	9	20
Workers	68	69	52	18
Laborers	46	64	77	187
Total	118	133	138	396
Turnover*	7.9%	8.9%	9.3%	

* Based on current employment of 1,489 people.

See Exhibit VII for details on employment.

During the same period, the Company hired 468 people, thus more than replacing losses in every category. Company personnel believe that, except for skilled technicians, the number of people and their skills match the needs of the Company. We observe that better methods would significantly reduce the number of people required. Skills of production workers appear adequate for the equipment employed.

INCENTIVES

Bonuses are paid on the basis of net (after rejects) output. Last year, they amounted to 80% of base wage costs. As in most companies, the primary purpose of the bonus is to increase salaries, not necessarily increase productivity.

TASK 4: IDENTIFY AND ASSESS TECHNOLOGICAL IMPEDIMENTS

MATERIAL HANDLING

Improved methods of handling in-process parts between machines could substantially improve productivity by reducing labor and damage.

An example of excessive handling is movement of engine cylinders in the gravity die casting shop. They are first taken from the die and placed on the floor. Then, they are carried 40 to 50 feet away where a band saw is used to remove excess material. They are again placed on the floor after this operation before being picked up one-at-a-time and placed on a buggy for transport to the finishing operation. A simple conveyor, an improved layout, and a proper container or rack would substantially (and cheaply) reduce labor.

Recommendation

A simple action such as supplying extra "boxes" to the die casting foundry could reduce material handling labor by 72% (see Exhibit II) or by 36 people across the entire plant.

To obtain this reduction, the industrial engineer recommended in Task 3 should:

- Design standard containers so that groups of the product may be handled together. This will reduce damage from handling.

The same racks designed in earlier work by A. T. Kearney for NASCO for stators manufactured by General Metals provide an example of the containers needed.

- Recommend appropriate equipment (especially lifting devices) to reduce labor requirements.
- Improve the flow of materials by reducing the distances parts must be carried.

Benefits

As production increases, additional people would not have to be added for material handling. Ultimately, we believe a 10% reduction in material handling cost per unit of output could be achieved. On today's volume that would be worth LE 30,000 to 40,000 per year.

METHODS AND STANDARDS

In the previous subsection, we discussed the opportunity for improving transfer of in-process parts between machines. In this subsection we focus on improving processing at a machine.

Although time standards exist for most production tasks, detailed records of actual performance compared to the standard are not maintained. Without these data, priorities cannot be set for focusing improvement effort. Our impression is that little attention is in fact being given to improvement in this area.

Recommendation

An example of the potential for improvement is shown in Exhibit IV. The rotor casting operation in the gravity die shop is laid out such that operators must walk long distances to get to the molten metal and to the die cooling solution. Since both of these activities occur outside of the machine cycle time, operator time on them should be minimized. If the equipment were rearranged, we estimate the total casting time could be reduced 10%, from 396 seconds to 355 seconds (see Exhibit V).

To obtain control over methods we recommend the following steps:

- Assign a specific engineer to focus on methods improvement.
- Train the engineer how to use MTM (Method Time Management) to improve methods. Programmed learning courses for MTM are available.
- Document the methods currently used.
- Collect data showing actual time consumed.
- Focus improvement on major time-consuming activities external to the machine cycle time.

These steps could be applied to two machines at a time until the entire plant is under control.

Benefits

We believe that improved methods could boost actual output 10% at little cost in capital assets. The work would also provide better inputs to the production scheduling system thus enabling the company to react more swiftly to changing demands of customers.

QUALITY CONTROL

General Metals has an inspection system that prevents shipment of a significant number of defective parts. Nevertheless, rejects in the plant have ranged from 20% to 40%, primarily due to porosity in the casting.

There are several causes for the high level of rejects:

- Lack of systematic statistics on the nature, location, trends, and causes of rejects. These statistics could be used to focus remedial action.
- Lack of standards for sample sizes or inspection frequency.
- Lack of use and maintenance of gauging and measurement devices on the shop floor.
- Lack of preventive maintenance on dies and equipment based on trends in measurements of good production.

Recommendation

We recommend the following steps to achieve plantwide improvement in quality of products and the accompanying increase in production:

- Select a limited area of the plant (say two machines in the die cast foundry) for intensive effort at quality control.
- Obtain a complete set of specifications for the machines and perform any maintenance required to bring them into conformance with the specifications. Design a preventive maintenance program to ensure that these two machines remain within specifications.
- Obtain a complete set of specifications for each product and provide them to the inspector. Identify the most likely problem areas for special attention.
- Calculate the ideal sample size for each part and the measurements to be made. Prepare the forms required to collect the data.
- Determine what gauges or measuring instruments are needed by the floor inspector and make them available (one person should be designated to obtain and maintain the gauges needed throughout the plant).
- Set criteria for action by machine operators and foremen depending upon trends in the quality control data.

- Collect and post the data quickly as production proceeds. Prepare daily, weekly, and monthly reports that show trends and permit detection of patterns of quality problems.
- Instruct foremen how to predict problems from the data before an excessive number of products begin to fail specification.
- Add another machine and other products to the list when control of the initial machines and products is achieved. Continue this process until the entire plant is under control.

Benefits

Better quality control offers the greatest potential for improvement in productivity at General Metals. If rejects could be held at 5% or less (as would be expected in a U.S. die casting shop) output could be increased 15%-40% depending upon the product (see Exhibit III for details). Though investment in system design and some tools and gauges would be required, no investment in major equipment is needed and substantial savings in raw materials and salaried would be realized.

MAINTENANCE

The maintenance department provides two basic services: die repair and equipment repair. In both cases, service is typically provided only after production of out-of-specification parts or equipment breakdown. Little preventive maintenance is performed. When maintenance is performed, it is often inefficient because it is not planned. Our experience elsewhere demonstrates that effective planning reduces the time to complete the job by 25% to 30%. Given the high demand for production and current downtime rates, a good maintenance program could add 2% to 3% more production (see Exhibit IV for details).

Recommendation

Improvement in equipment maintenance should follow this program:

- Select two to four candidates for the position of maintenance planner. They should be trained in maintenance planning and scheduling. (E.I.D.D.C. has offered appropriate courses in the past and presumably will in the future.)
- After they finish the course, ask them to begin planning and scheduling maintenance in one of the die casting foundries. This planning will include:

  Estimating the nature of the job.

  Estimating the parts required and arranging for them to be picked and prepared.

- Estimating the skills and time required and scheduling appropriate personnel to do the job.
- Monitoring actual results compared to plan so that future estimates are better.

Requirements for preventive maintenance can be added to the list of jobs and planned with the repair jobs. When control is achieved in the first foundry, expand to others.

Maintenance could achieve a second major step toward improvement by assuming full responsibility for die repair. Currently dies are repaired at the request of the operating management. As the planning function matures they should contact the quality control inspectors directly. On the basis of trends data, dies should be scheduled for repair before any defective parts are actually produced. This action will reduce both rejects and unexpected interruptions in production schedules.

Benefits

The principal benefit would be an increase in equipment availability. That could provide a 2%-3% increase in output with no change in salaries or equipment. Longer term, the company should also be able to reduce investment in spare parts as better predictions of needs are developed.

TASK 5: ASSESS OTHER INFLUENCES ON PRODUCTIVITY

General Metals is not afflicted by some of the major obstacles to productivity we found in other companies. The following factors, mentioned as important impediments for Egyptian companies in our summary report, are not important for General Metals:

- Volume: General Metals is already operating at close to 100% of capacity in the die casting foundries. Expansion of facilities would not necessarily lead to greater productivity even if the market were available.
- Labor: As already mentioned, except for a few skilled technicians and a good industrial engineer, General Metals has an adequate labor force.
- Material. Nearly all of the raw materials that General Metals requires for automotive products are produced in Egypt. Quality is acceptable.
- Technology: General Metal's equipment is as modern as that found in many U.S. die casting foundries. Better management is needed to reduce rejects and avoid damage.

The other areas mentioned in the summary report are problems for General Metals:

- Industry Structure: The horizontal integration of General Metals prevents substantial top management attention to automotive products. See the discussion under Task 1.

- Laws and Regulations: General Metals labors under the burdensome rules regulating worker discipline, promotion, investment, and pricing.
- Information: General Metals has little information regarding the future nature and growth of the automotive industry. Lacking such information, it has planned little expansion in capacity to produce automotive products despite the high demand today.
- Industry Relationships: With respect to automotive products, General Metals has limited its relationships to NASCO. No active sales effort is directed to other assemblers such as General Motors and AAV.
- Management Practices: Substantial development of management practices is needed at General Metals (see discussion under Tasks 2, 3, and 4). General Metals has recognized this need and has already asked for help from MDP.

EXHIBIT I

OVERALL SUMMARY

(SALES)

	1981 L.E. (000)	1981 %	1982 L.E. (000)	1982 %	1983 L.E. (000)	1983 %
Pressure Cast*	90.4	.3	117.2	.4	73.9	.2
Gravity Cast*	603.9	2.0	875.0	3.0	1,120.0	3.4
All Other	27,886.0	97.7	28,485.3	96.6	31,584.6	96.4
Total	28,580.3		29,477.6		32,778.3	
%			+3		+15	

CASTING SUMMARY

(SALES)

Pressure	90.4	13	117.2	12	73.9	6
Gravity	603.9	87	875.0	88	1,120.0	94
Total	694.2		992.2		1,193.7	

* All automotive parts are manufactured in these two shops.

EXHIBIT II

MATERIAL HANDLING IMPROVEMENT

ESTIMATED IMPACT

(PROVIDING ADDITIONAL BINS ONLY)

L. DUPUY 11/22/83

Classification	# People		Est. M.H. Activity		# People Involved In M.H.
Labourers	279	x	10%	=	28
Transportation	15		100%		15
Helper	7		70%		5
Insp/Production Control	28		10%		3
			Total		51
			Reduction*	x	72%
					36

TEBBIN PLANT REDUCTION = 36/440 = 8.3%

36 People x L.E. 840/yr = L.E. 30,240
44 People x L.E. 840/yr = L.E. 36,960

* Time study estimate by Lynn Dupuy (A. T. Kearney, Inc.) using predetermined time system.

EXHIBIT III

IMPROVED QUALITY CONTROL

Estimate of Impact

		Approximate Process Yield
Current		
* Visual inspection rejects	2 - 5%	
* X-ray inspection rejects	20 - 35%	
Total	22 - 40%	78 - 60%
Estimated		
* Visual inspection rejects	1 - 3%	
* X-ray inspection rejects	10 - 15%	
Total	11 - 18%	90 - 82%

Resulting from:

* Implementation of control charts and statistical analysis
* Implementation of final product quality audit
* Development of gauge design and control program
* Improved in-process checks

OVERALL PROCESS YIELD IMPROVEMENT

15 - 40%

* Estimate based on similar experience by L. Dupuy (A. T. Kearney, Inc.)

EXHIBIT IV

MAINTENANCE IMPROVEMENT

Current		Machine Idle for Maintenance	
* Gravity die casting		2.8%	)
* Pressure die casting			) 82/83
- Die maintenance		4.1%	) Annual
- Machine maintenance		4.2%	)
	Total	11.1	

Estimate*		
* Gravity die casting		2.2%
* Pressure die casting		
- Die maintenance		3.3%
- Machine maintenance		3.4%
	Total	8.9

Resulting from:

* Instituting preventive maintenance program on dies and equipment

* Planning all maintenance to avoid unexpected/emergency downtime and production interruption

OVERALL PRODUCTIVE TIME IMPROVEMENT

2% to 3%

* Estimate based on similar experience by L. Dupuy (A. T. Kearney, Inc.)

EXHIBIT V

METHOD IMPROVEMENT

ROTOR CASTING

ESTIMATE *

	(Seconds) Current	Proposed
Die Prep.		
* Disassemble die	15	15
* Aside part	5	5
* Cool pouring funnel	30	10
Pouring		
* Obtain ladle of molten metal	30	15
* Pour	10	10
Cool Time (5 minutes)	300	300
	396	355

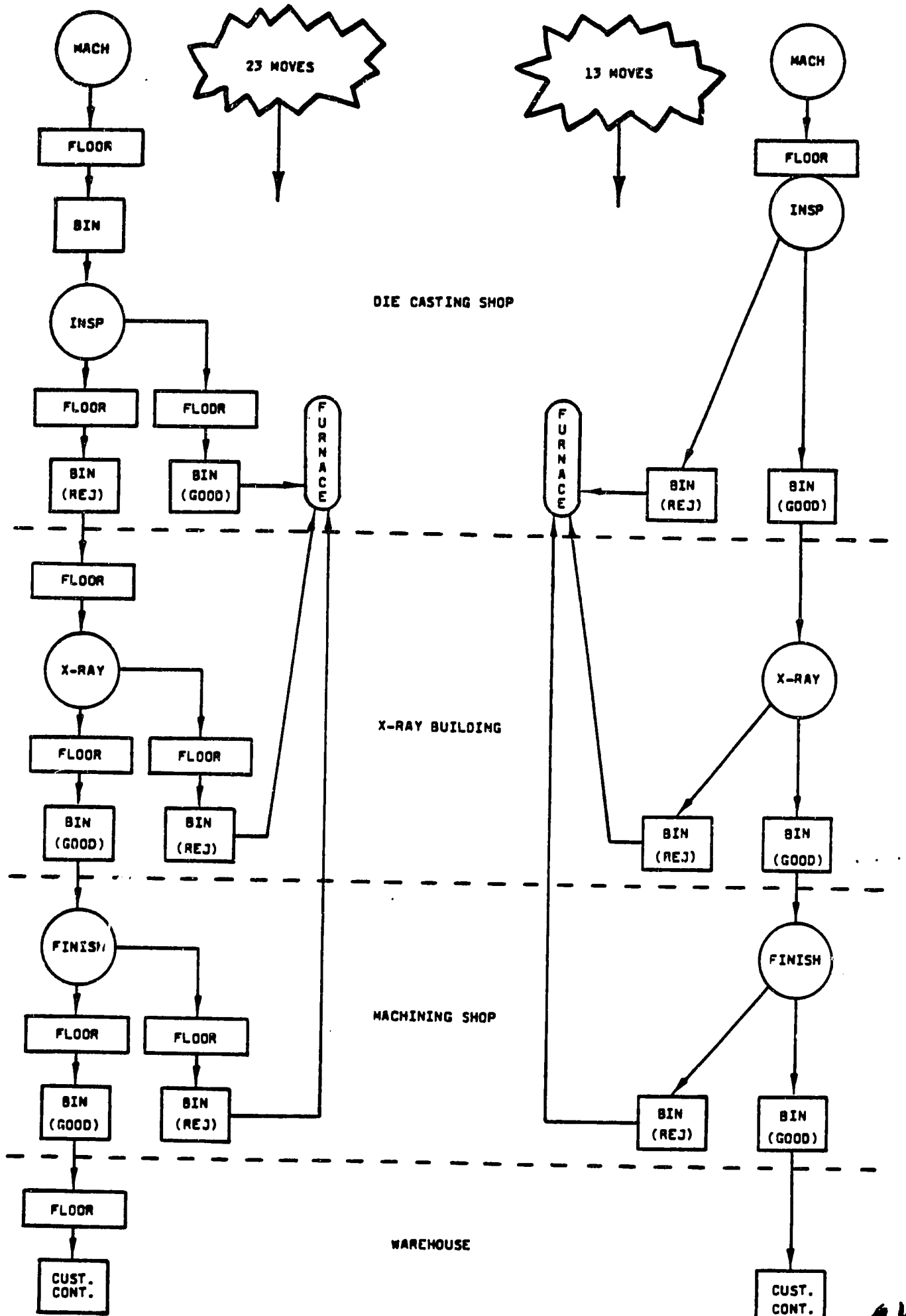
OVERALL PRODUCTIVITY IMPROVEMENT

10%

* Estimate by L. Dupuy (A. T. Kearney, Inc.)

RECOMMENDED SCEDULING IMPROVEMENT

EXHIBIT VI



LABOR DISTRIBUTION*

TEBBIN PLANT

(AS OF NOV. 16, 1983)

Classification		Pressure Casting	Gravity Casting	Finishing Shop	Cold Rolling	Wire Drawing	Lead Oxide	Zinc Foundry	Workshop and Maintenance	Total	%
Labour	(D)	15	30	40	106	29	19	40		279	63.2
Metal Prep.	(D)	1	2	-	-	-	-	4		7	1.6
Transportation	(I)	1	2	8	2	1	1	-		15	3.4
Helper	(D)	1	-	2	2	1	1	-		7	1.6
Maintenance	(I)	2	-	1	-	-	-	-	86	89	20.2
Supervisor	(S)	1	1	1	4	1	1	1		10	2.3
Chief	(S)	1	1	1	1	1	1	-		6	1.4
Insp/Prd. Ctrl.	(I)	4	4	8	8	2	1	1		28	6.3
Total		26	40	61	123	35	24	46	86	441	
		5.9	9.1	13.8	27.9	7.9	5.4	10.4	19.5		

* The validity of these numbers is questionable. However, the percentages are probably reasonably accurate.

LABOR SUMMARY*

TEBBIN PLANT

Category	No.	%
Direct Labor	293	66
Indirect Labor	132	30
Salaried	16	4
Total	441	

Ratios

Direct:Indirect	=	2.2 : 1
Direct:Salaried	=	18.3 : 1
Direct:Maintenance	=	3.1 : 1
Direct:Inspection/ Production Control	=	10.5 : 1

* The validity of the total number of employees is questionable. However, the ratios are probably reasonably accurate.

El Nasr Forging Industry

Productivity Issues and Recommendations

July 1984

Kearney: Management Consultants

CONTENTS

BACKGROUND, OBJECTIVES AND METHODOLOGY

BACKGROUND

This project was undertaken as part of a wider study of impediments to productivity in the Egyptian automotive feeder industries. It was funded by USAID. The Engineering Industries Corporation and El Nasr Automotive Company participated in the direction of the larger study including the selection of participating feeder companies.

Four other companies besides El Nasr Forging Industry were also studied intensively. They were:

General Metals

IAMCO

Giza Rubber

Iron Works Company for Metal Manufacture.

Similar reports were prepared for each of these companies.

OBJECTIVES OF THE STUDY

The purpose of the larger study was to identify the major obstacles to improving productivity in the Egyptian automotive industry and to recommend policies and programs to overcome these obstacles. To accomplish this task, we looked in depth at the four companies listed above and at El Nasr Forging. We then drew conclusions on the results of these five studies, checked them against a larger group of Egyptian companies, and then summarized our conclusions and recommendations in another document titled Productivity Improvement in the Egyptian Automotive Feeder Industry.

Within each of the five study companies, we were asked to accomplish five tasks:

Task 1: Estimate the opportunity for improving productivity in the company.

Task 2: Assess management impediments to improved productivity.

Task 3: Identify and assess the influence of human resources on productivity.

Task 4: Identify and assess technological impediments to productivity.

Task 5: Assess any other influences on productivity in the study company.

METHODOLOGY

Because of the relatively brief time we could spend in each company, we based our conclusions on five principal activities:

- Reviewing financial and operating data indicating utilization of capacity.
- Inspecting the physical facilities and observing operations.
- Reviewing selected operating data and procedures (e.g., reject rates) that might indicate productivity problems.
- Interviewing managers in the company.
- Interviewing assembly companies to obtain their perspective on quality, delivery and price performance.

We analyzed the data and then drew the conclusions upon which our recommendations are based.

REPORT ORGANIZATION

The next chapter, Executive Summary, presents what we believe are our most important conclusions and recommendations concerning the Company. The following chapters focus on each of the five tasks defined in our scope of work.

EXECUTIVE SUMMARY

El Nasr Forging Industry has been supplying drop forge components to Egyptian and export markets for 19 years. They were commissioned under an arrangement with Russian advisors in 1964. El Nasr Forging still operates using the original technology, management systems, and operating methods.

Approximately 25% of their current activity is for the automotive industry.

The purpose of this assignment was to assist El Nasr Forging to identify opportunities for improving productivity. Key areas that would most quickly improve productivity are:

- Marketing.
- Materials Handling and Housekeeping.
- Quality Control Systems Implementation.
- Methods Improvements.

MARKETING

El Nasr Forging is operating at approximately 50% of capacity. A strong effort is needed to find new products and new markets to fill up the available capacity. Both domestic and export markets should be considered. Sales could be doubled with little change in personnel or equipment so the potential improvement in productivity is nearly 100%.

MATERIAL HANDLING

El Nasr Forging's material handling systems and equipment, as well as housekeeping, are outdated and inadequate. These conditions diminish their image as a competently managed automotive supplier. "A PLACE FOR EVERYTHING AND EVERYTHING IN ITS PLACE" is an important concept in well-run forging companies. El Nasr Forging should give high priority to a well thought out, properly implemented material handling and housekeeping program.

QUALITY CONTROL

The next most important area requiring attention is quality control. Management understands the basic concepts of quality control but needs help in fashioning it into a tool to accomplish the following:

- Improve quality input.
- Predict operational problems.
- Reduce customer complaints.
- Pinpoint areas requiring methods changes.
- Improve company's image.

Properly established quality control systems would also improve El Nasr Forging's acceptance as a competent supplier to available markets.

METHODS AND SYSTEMS

The third most lucrative area for productivity improvements is that of methods and systems. Efforts should be concentrated in the areas of:

- Parts handling during operation.

- Parts flow.
- Tooling utilized in chip making areas.
- Overall facility and shop layout.

Efforts in these areas will not only improve productive capability but will also help change the image of El Nasr Forging to one of having modern, forward thinking management.

The knowledge and expertise for accomplishing the above exists within El Nasr Forging Industry. All that is lacking is the long- and short-range planning and the direction to implement.

COMPANY PERSPECTIVE

El Nasr Forging Industry, a public sector company, was engineered, built, and commissioned with the assistance of Russian advisors. Design capacity is 16,000 tons per year on a three-shift basis. It is the only forging company in Egypt.

Operations began in 1964. Output reached a peak of 12,343 tons in 1974 but declined to 8,300 tons in 1977 after exports to the U.S.S.R. stopped. During the past five years, sales have ranged from 5,100 to 7,900 tons:

Year	Sales (Tons)
1978	5,103
1979	5,123
1980 (6 mos.)	3,233
1980/1981	7,875
1981/1982	5,972
1982/1983	6,610

Originally, automotive products were expected to utilize the major part of capacity. However, demand did not develop and the company searched for other markets. Today, they sell over 1,000 different products to a variety of markets:

	Engineered Capacity(1) (Tons)	1982/1983 Sales	
		Tons	Percent
Automotive	9,300	1,700	25.7%
Railway	600	1,600	24.2
Hand Tools	500	-	-
Chains	650	600	.1
Crushing Balls	700	200	3.0
Shop Machinery	300	200	3.0
Spare Parts	-	500	7.6
Irrigation Components	-	200	3.0
Electrification Carriers	-	1,000	15.1
Miscellaneous	-	410	6.2
Total	12,500	6,610	100.0%

Note: (1) On a two-shift basis.

Nevertheless, sales of automotive parts are increasing both in total and as a percent of company sales:

	Sales					
	Weight (Tons)			Volume (LE 000's)		
Year	Total	Automotive	Percent	Total	Automotive	Percent
1980/1981	8,477	1,137	13.4%	8,852	1,436	16.2%
1981/1982	5,603	1,752	31.3	7,207	2,139	29.7
1982/1983	6,166	2,512	40.7	8,860	3,675	42.3

TASK 1. ESTIMATE PRODUCTIVITY IMPROVEMENTS

Substantial opportunities exist to improve productivity. Details are presented in later sections but are summarized below:

		Opportunity(1)
1.	Increase Sales. El Nasr Forging could double its sales with little increase in personnel or equipment.	100%
2.	Materials Handling. Through better materials handling, the Company could reduce damage and loss while increasing speed of production.	20%
3.	Quality Control. By improving quality control systems the percent of product unconditionally acceptable to NASCO could be increased from 69% to 99%.	15%
4.	Methods Improvement. By changing layouts, materials flow, and tool use, production can increase and costs will be reduced.	20%

Note: (1) Opportunity is the estimated percent improvement of productivity on labor and equipment that could be realized.

TASK 2. IDENTIFY AND ASSESS MANAGEMENT IMPEDIMENTS

MARKETING

The most outstanding fact about El Nasr Forging Industry is that they have been operating at approximately 50% of capacity for the past five years. Obviously vigorous action must be taken to develop new products and markets for the Company in order to increase utilization.

The obstacle to taking this action is an apparent attitude of management that potential customers will come to El Nasr Forging. In fact, that apparently is not happening. The Egyptian economy (and most likely the need for forgings) has grown nearly 50% in real terms during the past five years but the Company's sales (in tons) have not.

A new "can do" attitude is needed. By undertaking the following steps, management could begin to generate the required sales:

- Establish a small team of the most creative engineers in the Company and send them out to scour Egyptian industry for opportunities to sell forgings. Special attention should be given to General Motors and Arab American Vehicles. If possible, pay the engineers a certain percent of sales as a motivator.
- Help promote feeder companies that would use forgings from the Company.
- Undertake a marketing and sales program in other Middle Eastern countries. For example, the Company

might be able to produce grinding media for cement plants in Saudi Arabia.

- At the same time, the recommendations presented later in this report need to be pursued vigorously in order to reduce costs and increase quality so that the Company can be a truly qualified competitor.

INFORMATION FLOWS

The Company collects basic data on production and sales. However, detailed data such as listed in Appendix II of the Part I report are not developed. Thus, an early task should be implementation of some simple measures of productivity so that priorities can be set.

TASK 3. IDENTIFY AND ASSESS INFLUENCE OF HUMAN RESOURCES

There is good evidence that labor productivity in terms of man-hours at El Nasr Forging is low:

Estimated Forging Outputs per Man per Year by Country for Drop Hammer Forging (Tons per Year per Employee)

England	40
U.S.	75-80
Germany	50
Japan	75-80
El Nasr Forging	3-5

Labor costs are also low so unit labor costs are nearly comparable to other countries. A forger in the U.S. might earn $15/hour or $2,640/month compared to LE 120/month (U.S. $110 at the unofficial rate) for the Egyptian forge worker. At those rates, the Egyptian output of three tons per worker is comparable to U.S. output of 75 tons per worker in terms of labor cost.

An often cited reason for low labor productivity is low wages. Wages at El Nasr Forging are very low compared to Western Europe or the U.S.:

	Average Monthly Wage	
	LE	U.S. $ (1)
Senior Manager	150-250	127-212
Experienced Engineer	100-150	85-127
Die Maker	120	102
Experienced Forger	120	102
Laborer	60	51
Bus Driver	130	110

Note: (1) Exchange rate: $1.00 = LE 1.18.

Wages were even lower but several years ago an incentive system was established and today incentives average 100% of base salary.

Nevertheless, the incentives are administered from the point of view of legally increasing the general wage level rather than as an incentive to improving productivity. This is suggested by dividing total output in tons by the number of workers.

El Nasr Forging Industry
Labor Productivity

Year	Tons of Output per Employee
1978	2.70
1979	2.69
1980/1981	3.95
1981/1982	3.01
1982/1983	3.27

If 1980/1981 were ignored, productivity of labor has steadily increased. The high productivity in 1980/1981 was caused by much higher sales. Obviously, there is sufficient capability to permit stabilizing or even reducing the work force.

One obstacle to worker productivity is short runs. Running a forge is an art and there is a significant experience curve that rewards higher levels of production. El Nasr Forging depends on sales of a wide variety of products thus denying itself of the benefits of operating further up the experience curve.

Therefore, we do not believe that current low productivity should be attributed to worker skills. It should rather be attributed to lack of management's success in selling products.

TASK 4. IDENTIFY AND ASSESS TECHNOLOGICAL IMPEDIMENTS

An IESC volunteer worked with El Nasr Forging for a few months in 1980. At that time he identified their obsolete heat treatment facility as the major problem hindering high-quality production. This is now being rectified through installation of a new furnace with better controls.

Three important impediments remain:

- Material handling.
- Quality control.
- Methods.

They are each discussed below.

MATERIAL HANDLING

The El Nasr Forging complex consists of eight separate shops connected by roadways. The shipping area is a large pile of finished parts on the roadway between four key buildings.

Throughout these areas we found a mixture of finished parts, raw materials, spare parts, refuse, in-process inventory, and unused dies. This lack of organization has several bad consequences:

- Parts get damaged or rust before they are shipped.
- Batches or at least individual parts get lost.
- Material handling equipment cannot be efficiently used.
- An excessive amount of manual labor must be used to sort and move inventories.
- Dies are damaged and tools are lost.

A multistage improvement program is needed:

1. Pick up all of the scrap and obsolete parts and either sell it or remove it to its own designated area.

2. Appoint a materials handling engineer to supervise the remaining steps. He should also be responsible for plant cleaning.

3. Develop an overall material handling plan for the factory. Each shop should be studied to provide better die storage, materials flow, and materials receipt and issues. Space should be explicitly designated for dies, raw materials, and in-process and finished goods.

4. Design appropriate racks or pallets on which raw materials, and in-process and finished goods can be stored and moved.

5. Obtain the racks and pallets. Move all existing items to their designated storage space.

6. Purchase for trucks to handle the racks and pallets and assign them to the areas in which they can be most productive.

7. Designate an area for shipping and install a portable dock to make shipping easier.

This program could be performed using people already at the plant. Sophisticated expertise and systems knowledge are not needed - only common sense and a desire to manage efficiently.

The estimated costs for equipment are LE 315,000:

	Cost (LE)
Shop Storage Racks	50,000
Outside Storage Racks	25,000
Portable Dock	20,000
10 Forklift Trucks	200,000
In-Shop Slides	20,000
Total	315,000

Not all of these items must be bought at once. The fork trucks especially might be phased in over several years.

The most important benefit of this program should be improved quality through reduced damage and increased pride of workmen in their factory and demonstration that management cares about good work.

QUALITY CONTROL

Quality of forging has been a major problem for NASCO. Last year, for example, only 69% of forgings supplied by El Nasr Forging were unconditionally accepted. After salvage, acceptance reached 97% due to NASCO's extreme need for these products. To help, NASCO sponsored the IESC engineer in 1980 and has continued to work with El Nasr Forging to improve quality. With the installation of the new furnaces, the major pieces of equipment are in place to provide good-quality products. A management system to plan and control high-quality production is still lacking.

Another multistep improvement process is required:

1. Obtain and review all of the specifications for major

products. Where necessary, initiate negotiations with buyers to change dimensions, tolerances, or raw materials in order to facilitate better quality. For example, drop forged parts require a draft angle; press forged parts do not.

2. For each product, determine the major probable causes of quality problems. Develop new quality control procedures and forms, and teach the inspectors to use them. These procedures should be designed so that failures are discovered before they have passed through more than one additional process step. Where feasible, design the quality control function into the job of the operator.

3. Implement the system and begin gathering data.

4. Analyze the data to determine what additional procedures or methods might reduce the incidence of poor quality.

5. Establish a preventive maintenance system for dies to ensure that they are repaired before they begin producing faulty products.

METHODS

The methods installed when the plant was built in 1964 are still being used. Changes are needed for several reasons:

- The product mix has been considerably altered. Small lots of many more products are being produced.
- Industry elsewhere has found better ways of accomplishing tasks. These better ways have not been transmitted to El Nasr Forgings.

- The plant itself has changed. There have been additions and some equipment is now 20 years old.

Attention is required for parts handling, parts flow, equipment layout, and cutter tooling:

- Parts Handling. Balances and slides are needed for each work station to improve labor productivity and to reduce damage during forming and heating.
- Parts Flow. The excessive manual handling of parts between operations (often three times) could be significantly reduced by changing over from trucks to forklifts with pallets.
- Equipment Layout. Each shop needs attention. Equipment to support key operations is often located too far from the operation. Dies, tongs, and other needed tools are too often stacked outside the operational area.
- Cutter Tooling. All cutters used in the chip making areas were of the brazed carbide type. This type requires special grinding jigs of fixtures, brazing equipment, and much labor. Throw-away carbide insert tips eliminate sharpening, special adjustments, and special support equipment.

Finally, consideration should again be given to drop forging automotive parts that may be press forged elsewhere. Our experience in the U.S. demonstrates that many of these parts can be drop forged if minor adjustments in design are made. For

example, Rockwell produces front steering knuckles on drop forges.

These actions would increase productivity through:

- Reduced downtime.
- Reduced use of specialized labor.
- Increased feeds and speeds.
- Reduced direct operation time.
- Reduced costs of cutters.

Total improvement in labor and equipment productivity could reach 20%.

TASK 5. IDENTIFY AND ASSESS OTHER IMPEDIMENTS

SERVICE INDUSTRIES

El Nasr Forging is hampered by the lack of service industries. Most important is machining. The Company has only limited machining capability so prefers to supply unmachined forgings to customers. However, many potential customers do not have machining capacity so they cannot use these forgings.

El Nasr Forging has discussed sending these forgings to selected military factories for machining but has been discouraged by the high prices they quoted.

A new effort is needed that includes seeking bids from private sector machinists. Through negotiations on design and dimensional control of finished forgings, we believe economical arrangements could be made.

At present, El Nasr Forging performs all of its own die maintenance and repair in a modern up-to-date shop. This shop could potentially become a "Center of Excellence" if outside business were sought and the revenues used to upgrade it still further.

Most of the equipment at El Nasr Forging was bought from the Soviet Union. The Company can no longer get spares. A high-tech service company that specializes in manufacturing spare parts would be very helpful to El Nasr Forging as well as many other companies.

STANDARDIZATION

Standardization of design specifications would be very helpful to El Nasr Forging. Standardization is needed in three areas:

- Materials. El Nasr Forging could both reduce inventories and buy in larger quantities if it did not have to buy forging steels that vary only slightly because U.S., European, and Japanese standards are not identical.
- Tolerances.
- Measurements.

A major industrywide effort is required to attain the needed level of standardization.

IAMCO

Productivity Issues and Recommendations

July 1984

Kearney: Management Consultants

CONTENTS

BACKGROUND, OBJECTIVES AND METHODOLOGY

BACKGROUND

This project was undertaken as part of a wider study of impediments to productivity in the Egyptian automotive feeder industries. It was funded by USAID. The Engineering Industries Corporation and El Nasr Automotive Company participated in the direction of the larger study including the selection of participating feeder companies.

Four other companies besides IAMCO were also studied intensively. They were:

El Nasr Forging Industry

General Metals

Giza Rubber

Iron Works Company for Metal Manufacture.

Similar reports were prepared for each of these companies.

OBJECTIVES OF THE STUDY

The purpose of the larger study was to identify the major obstacles to improving productivity in the Egyptian automotive industry and to recommend policies and programs to overcome these obstacles. To accomplish this task, we looked in depth at the four companies listed above and at IAMCO. We then drew conclusions on the results of these five studies, checked them against a larger group of Egyptian companies, and then summarized

our conclusions and recommendations in another document titled Productivity Improvement in the Egyptian Feeder Industry.

Within each of the five study companies, were were asked to accomplish five tasks:

Task 1: Estimate the opportunity for improving productivity in the company.

Task 2: Assess management impediments to improve productivity.

Task 3: Identify and assess the influence of human resources on productivity.

Task 4: Identify and assess technological impediments to productivity.

Task 5: Assess any other influences on productivity in the study company.

METHODOLOGY

Because of the relatively brief time we could spend in each company, we based our conclusions on five principal activities:

- Reviewing financial and operating data indicating utilization of capacity.
- Inspecting the physical facilities and observing operations.
- Reviewing selected operating data and procedures (e.g., reject rates) that might indicate productivity problems.
- Interviewing managers in the company.

- Interviewing assembly companies to obtain their perspective on quality, delivery and price performance.

We analyzed the data and then drew the conclusions upon which our recommendations are based.

REPORT ORGANIZATION

The next chapter, Executive Summary, presents what we believe are our most important conclusions and recommendations concerning IAMCO. The following chapters focus on each of the five tasks defined in our scope of work.

EXECUTIVE SUMMARY

IAMCO is a small but active firm, employing up to 20 workers, producing an assortment of die cast and pressed metal products. The principal owner, Mr. Kamal M. Khella, also imports machine tools and battery chargers.

Annual sales are approximately LE 300,000. Roughly a third of the factory output consists of parts for the automotive sector. The major products are fan pulley wheels, 12 volt horns and tail lights for trucks and battery clamps. NASCO purchases about 60 percent of the automotive production while the balance is sold to "dealers." Other nonautomotive products are primarily die cast and pressed metal items. The owner estimates that only 20 percent of the factory's machine capacity is being used at present.

The principal constraints to improvement of production levels (and gross profits) at IAMCO, and recommended actions, are as follows.

STRATEGIC DIRECTION

IAMCO has grown by taking advantage of opportunities presented to the owner. This is a reasonable course for a small company. To grow profitably to a significant size, however,

effort must be concentrated in a few areas of expertise. Several factors prevent such concentration:

- Lack of a consistent, clear government policy regarding the automotive industry.
- Lack of data on the size and nature of opportunities in the automotive industry.
- Lack of time on the part of the owner/management to gather the data and do the analysis.

A long term, government approved plan for the automotive industry plus readily available data on market size and growth would be helpful in overcoming this problem. MDP could help by guiding the company through a strategic decision process.

IAMCO is anxious to link its resources with those of another firm to invest in new equipment to produce new products such as coils for starter motors or wiring harnesses. Guidance from MDP and ITAP, plus an introduction to the manager for local procurement for GM, would be welcome and appropriate.

MARKETING

Currently all sales effort is made by the company owner. Since he has many other responsibilities, little time can be devoted to this task. Thus, the company is running far under

capacity. The owner recognizes the problem but is reluctant to hire a salesman because:

- If the person fails, he cannot be easily fired.
- Applicants from the public sector are reluctant to leave secure jobs for this more risky position even though it pays twice as much.

A change in the law that lengthens the probationary period from three months to one year for professional and managerial employees would encourage companies to hire such skills.

POOR COMMUNICATIONS

Another major problem, experienced not only by IAMCO but also by other firms, is the difficulty of communications between companies in Egypt. One means of alleviating this is to develop associations of industries of, for example, the automotive sector, the light metals sector, the engineering equipment sector, and so on. The MDP and ITAP groups can help promote affiliations of like-minded companies to solve common problems.

RAW MATERIALS

Mr. Khella noted that he carries extensive inventories of raw materials and industrial supplies because he cannot rely on local wholesalers to supply quality items at a fair price in timely fashion. In order to ease these problems, organizations such as the Egyptian Federation of Industry should support the expansion

of responsible industrial supply houses. The MDP and ITAP organizations could contribute to this effort by identifying the problems more precisely and recommending remedial actions.

COMPANY PERSPECTIVE

BACKGROUND

IAMCO is a small private sector firm employing 15 to 20 workers to produce assorted die cast and stamped metal products, utilizing both steel and nonferrous metals. The factory is located about five kilometers from the eastern perimeter of the Cairo airport, close to the main highway heading from Cairo to Ismailia. The plant would be difficult to find without a guide and does not have a telephone.

The principal owner, Kamal M. Khella, also operates a commercial business and imports equipment, primarily machine tools and battery chargers, from West Germany. Mr. Khella's main office is at 77 Ramsis Street, Cairo, telephone 7799661. He is an engineer, trained in Germany, and has two sons who also have been trained in Germany. Mr. Khella's brother Michel Khella is the firm's bookkeeper and general factory manager.

OUTPUT/SALES

Annual production volume during the past three years is estimated by Mr. Khella at 900,000 pieces of assorted metal parts valued at about LE 300,000.

Production of automotive parts in recent years has included:

- Fan pulley wheels from pressed steel; about 3,000-5,000 units/year.

- Horns, 12 volt for trucks; about 3,000 to 5,000 units/year.
- Tail lights for trucks; about 10,000/year.
- Battery cable terminals and clamps (number not estimated).

About 60 percent of automotive parts are sold to NASCO with the balance purchased by automotive "dealers."

Production of other (nonautomotive) products has included:

- Levers for toilets; about 100,000 units.
- Assorted hardware for kitchen and bathroom (numbers not estimated).

Current output of all items utilizes only about 20 percent of the factory's capacity in terms of machine availability.

The capacity of major equipment is listed by the owner to be:

- Die casting; 50,000 pieces/year.
- Machining; 70,000 pieces/year.
- Electroplating; 80,000 pieces/year.

PRODUCTION EQUIPMENT

Major pieces of production equipment include the following:

- One pressure die cast machine, hand fed, with melting furnace.
- Electronic die making machine, Eleroda 400, Mikon (not in use at times of plant visits).

- Assorted galvanizing, electroplating and polishing equipment.
- Several metal presses, grinders and drill presses.
- Tool room machinery, including medium size lathe and shaper.

A few major pieces of production equipment are relatively new including the gravity die cast machine and die making equipment. Other machines are old but in working condition. IAMCO buys its dies from abroad but maintains them in-house.

EXPENSE ALLOCATION

An outline of the proportion of IAMCO's typical expenses, given by Mr. Khella, is as follows:

Income	Expenses	
Sales 100%	Direct Labor	35%
	Material	35
	Factory Overhead	5
	G.S. & A. Include Engineering	5
	Taxes	10
	Profit	10
	Total	100%

TASK 1: ESTIMATE PRODUCTIVITY IMPROVEMENTS

The principal constraint to improvement of production (and gross profit) at IAMCO is the low volume of output for automotive parts and other production items, estimated to require only 20 percent of the time that major pieces of machinery are available.

Mr. Khella is responsible for performing most of the major corporate functions of production management, R&D, purchasing, finance and also marketing. He is currently seeking the services of an engineer who can assist in marketing IAMCO's production capabilities. IAMCO appears to require such services urgently.

Another major problem is a paucity of organized communication between buyer and sellers in Egyptian business scene. Although Egyptian businessman such as Kamal Khella have a wide range of business contacts, there is little organized communication among those who produce products, such as automotive parts, and those who might buy these items. IAMCO, for example, needs to know the production plans of NASCO, General Motors or Arab American Vehicles and to be appraised on a regular basis of potential sales opportunities.

It is possible for individual firms to solicit information on an ad hoc basis. A more preferable method, however, may be to establish an Association of Automotive Companies which would, among other functions, facilitate interindustry communications.

MDP and ITAP could effectively assist in improving such relationships.

Production skills for items currently made at IAMCO appear to be adequate in most cases. Only 20 percent of plant capacity is being used, and it is not possible to make meaningful observations on factors of cost, profit, system downtime, or financial ratios for major functions.

A few suggestions are offered which should improve the efficiency of operation even within the existing low level of utilization of plant capacity. IAMCO should, for example:

- Manufacture in-house simple material handling containers, shelves and trolleys and use them to keep production items off the floor, properly counted and easily movable from machine to machine or process to process.
- Develop simple systems to trace the movement of materials and parts from the input of raw materials and parts to the completion of finished goods in order to improve the calculation of production costs and inventory. As IAMCO endeavors to sell more sophisticated production in competitive markets, the managers will need more authoritative data on costs of production in order to make optimum bid quotations.

- Increase efforts to sell to other companies IAMCO's capacity to make dies.
- Explore the possibility of exporting battery clamps and terminals to the European automotive market.

TASK 2: ASSESS MANAGEMENT IMPEDIMENTS

IAMCO is owned and operated principally by Kamal Khella and the company's management structure is predictably simple and direct. Mr. Khella is developing the talents of two sons to assist him in tasks of marketing, engineering and production.

In order to expand business opportunities in the automotive field, IAMCO should develop a long term (2 to 5 year) plan of production opportunities and needed investments, based on a survey of the market for parts and services. Then, after the company has a clearer understanding of future opportunities and risks, IAMCO's marketing efforts can be focused on the most attractive targets of opportunity.

MDP could effectively assist IAMCO to prepare such a strategic plan and, based on the results, offer assistance in preparing an analysis of investment requirements and marketing opportunities.

TASK 3: IDENTIFY AND ASSESS INFLUENCE OF HUMAN RESOURCES

IAMCO's labor force ranges from 15 to 20 workers including three foremen, a few semiskilled workers and unskilled laborers who assemble parts and move production from place to place. Morale appears to be fair. Working conditions are acceptable.

Take-home wages, according to IAMCO, range from LE 4.0 per day for full-time regular laborers to LE 12 per day for some workers when high production is attained, for example, at the die cast machine. These figures include incentive pay.

Mr. Khella noted that contrary to general opinion, private firms such as IAMCO experience some difficulty in engaging the services of trained workers since the public sector offers extensive social benefits, job security and does not demand the full effort of workers.

Measures of productivity of workers were not available. Worker skills appeared to be adequate for the production processes which, in IAMCO, generally do not require close tolerances, extensive machining or special engineering capacity.

Worker turnover is not a problem at IAMCO. In the past three years, one worker resigned, one retired and one died. IAMCO occasionally employs part-time skilled workers from the public sector companies for selected maintenance work ("moonlighters").

Mr. Khella is seeking to hire a good engineer to increase the firm's marketing effort and would be willing to pay double the rate of LE 100 to 200 per month generally paid by public sector companies.

TASK 4: IDENTIFY AND ASSESS TECHNOLOGICAL IMPEDIMENTS

Acquisition of technology is not a major problem for IAMCO. For example, during the past five years IAMCO personnel have developed processes and equipment to make deep draw covers for electric motors (for military factory 27) and fan pulleys for NASCO. These items now account for 20-25 percent of total sales. Workers also built a semiautomatic machine to drill battery cable clamps.

Utilization of technology is a problem. IAMCO equipment presently is being utilized at approximately 20 percent of capacity. Particularly underutilized is an expensive, modern, electronic die cutting machine, a large press and, to a lesser extent, the gravity die cast machine and some of the tool room machinery.

Mr. Khella also operates a commercial business importing selected machine tools. Thus, it is understandable the IAMCO should have a new electronic die cutting machine even though, to date, it has been seldomly used. The company is anxious to sell to other factories the services of this machine. ITAP and VTP should be able to advise on industries that would be willing to have IAMCO make dies on this machine. Other inputs required to utilize this equipment would be, of course, the special die steels and, possibly, additional training of the machine operators.

Mr. Khella would like to improve his technology for horn production through association with an international producer. Nevertheless, we doubt that the methods used by U.S. and European manufacturers would suit the volume of production and labor economies of the European market. Within Egypt, he is already price competitive with foreign suppliers.

The technology for product and process development rests primarily in the experience and education of Kamal Khella plus contributions from the skilled factory workers. Mr. Khella welcomes collaborations from NASCO, GM or other knowledgeable sources to develop other production processes.

TASK 5: ASSESS OTHER INFLUENCES ON PRODUCTIVITY

INVENTORY

IAMCO has extensive inventories of a number of commodities including multiple years supply of refractory materials for the die cast furnace, specialty steels, fasteners and other industrial consumables such as screws and bolts. IAMCO pays 15 to 35 percent duty on imported materials, plus transportation, bank fees, insurance and other related costs.

Mr. Khella noted that while he would prefer to purchase smaller quantities, he could not rely on local wholesalers, some of these government owned, to supply quality items at a fair price in timely fashion. He added that when ordering steel from the Egyptian Iron & Steel Company, IAMCO paid for the order in advance and then waited four months for delivery.

In order to ease these problems, several industry managers have proposed that organizations such as the Egyptian Federation of Industries should support the long term development of responsible wholesalers for industrial products. The MDP or ITAP organizations could contribute to this effort by identifying more precisely the problems inherent in operating industrial supply houses in Egypt and recommending remedial actions.

Another proposal, designed to alleviate inventory problems in the short run, is to encourage NASCO (or other large firms) to

purchase selected materials such as specialty steels on behalf of feeder industries in order to reduce unit costs and curtail the amount of inventory that must be carried by individual small firms.

IMPORT LICENSING

Licenses to import materials and equipment must be approved by the Government. According to Mr. Khella, such licenses are not approved if a comparable item is produced locally. He notes that sometimes it is difficult to ascertain which Egyptian factory makes the required product or material. Also, locally made items may not be available promptly or at competitive prices and quality.

In one recent case, IAMCO wanted to purchase a small bench lathe from board, but the import license was denied because large lathes, not suitable to IAMCO in terms of price or productivity, are made in Egypt. In another instance, IAMCO ordered standard nuts from the local market rather than from foreign sources, but the product was not available for four months. Such delays could cause NASCO to find a different supplier.

LACK OF STANDARD DATA SOURCES

Mr. Khella, as well as other industry representatives, expressed concern that there is no standard source of information in Egypt on locally made products, processes and equipment.

This problem could be eased by compiling and publishing the Egyptian equivalent of the "Thomas Register." The ITAP organization could assist by helping to compile such data utilizing, for example, the extensive library of information on Egyptian industry already gathered.

JOINT VENTURE OPPORTUNITY

Mr. Khella is anxious to increase output of products for NASCO, or other automotive manufacturers, and welcomes technical assistance from interested parties. He believes that it is advantageous to establish a Law 43 or Law 59 type company in order to take advantage of more liberal policies on taxation, labor utilization and imports which are available to such entities. Mr. Khella specifically mentioned the prospects of producing selected items such as "coils" for starter motors, etc. under a joint venture with a foreign company. Another proposal is to produce for General Motors the wiring harnesses for truck ignition systems. A follow-up with GM is recommended.

Iron Works Factory for
Metal Manufacturing

Productivity Issues and Recommendations

July 1984

Kearney: Management Consultants

CONTENTS

BACKGROUND, OBJECTIVES AND METHODOLOGY

BACKGROUND

This project was undertaken as part of a wider study of impediments to productivity in the Egyptian automotive feeder industries. It was funded by USAID. The Engineering Industries Corporation and El Nasr Automotive Company participated in the direction of the larger study including the selection of participating feeder companies.

Four other companies besides Iron Works were also studied intensively. They were:

El Nasr Forging Industry

IAMCO

Giza Rubber

General Metals

Similar reports were prepared for each of these companies.

OBJECTIVES OF THE STUDY

The purpose of the larger study was to identify the major obstacles to improving productivity in the Egyptian automotive industry and to recommend policies and programs to overcome these obstacles. To accomplish this task, we looked in depth at the four companies listed above and at Iron Works. We then drew conclusions on the results of these five studies, checked them against a larger group of Egyptian companies, and then summarized

our conclusions and recommendations in another document titled Productivity Improvement in the Egyptian Automotive Feeder Industry.

Within each of the five study companies, we were asked to accomplish five tasks:

Task 1: Estimate the opportunity for improving productivity in the company.

Task 2: Assess management impediments to improve productivity.

Task 3: Identify and assess the influence of human resources on productivity.

Task 4: Identify and assess technological impediments to productivity.

Task 5: Assess any other influences on productivity in the study company.

METHODOLOGY

Because of the relatively brief time we could spend in each company, we based our conclusions on five principal activities:

- Reviewing financial and operating data indicating utilization of capacity.
- Inspecting the physical facilities and observing operations.
- Reviewing selected operating data and procedures (e.g., reject rates) that might indicate productivity problems.
- Interviewing managers in the company.

- Interviewing assembly companies to obtain their perspective on quality, delivery and price performance.

We analyzed the data and then drew the conclusions upon which our recommendations are based.

REPORT ORGANIZATION

The next chapter, Executive Summary, presents what we believe are our most important conclusions and recommendations concerning Iron Works. The following chapters focus on each of the five tasks defined in our scope of work.

EXECUTIVE SUMMARY

The Iron Works Factory for Metal Manufacturing, is a small, successful, privately owned firm. They employ about 40 workers producing an assortment of die cast hardware, pressed steel hardware and drawn wire items. The two principal owners are experienced, hands-on workers. Other family members actively participate in the operation.

Recently the Company signed a contract to supply NASCO with 10,000 dual fuel filters. This will be the firm's first output of automotive parts. NASCO is assisting the Iron Works to purchase dies from Italy.

The Iron Works has significantly increased sales in the past few years and the owners are anxious to develop the contacts and know-how to commence production of new items. Proposals cited include plans to buy equipment to make sheet metal items, flanges for NASCO trucks and vacuum plating of plastic parts. Equipment required includes presses, rolling machines, a large pressure die cast machine and another milling machine.

The main problems perceived in improving production at the Iron Works, and proposed remedial actions, are the following.

INVESTMENT PRIORITIES

The Iron Works appears to have the technical talent and initiative to be successful in implementing new production programs. The owners are most comfortable in implementing projects that they sense are technically feasible and professionally rewarding. They also need also to consider longer term market demands and the financial requirements of their proposals. The MDP organization can assist the Iron Works to assess its array of ideas and set priorities for carefully phased implementation.

FINANCING

The owners say that financing is their most important problem. Money is available to them from banks at 17% interest but they feel the rate is too high. They pursuaded NASCO to finance the dies for the fuel filter through an advance on sales. Longer term, they would like to obtain more equity money but do not know how to find it. A financial plan should be developed as part of the long term planning suggested in the paragraph above.

MANAGEMENT CONTROL SYSTEMS

In anticipation of further expansion and modernization the Iron Works must begin to establish simple production and inventory control methods. Also, in anticipation of the need to seek loans to finance the proposed purchases of equipment, the owners should begin to establish simple concepts of accountability for major

costs and incomes. Prospective investors are likely to insist on having such programs in place.

MATERIAL HANDLING AND PRODUCTION LAYOUT

At Iron Works, materials handling equipment is virtually nonexistent. Even with the current levels of production the movement of materials is slow and interferes with productivity. When production levels increase and new equipment is installed, as is likely, the factory could face serious problems from cramped work quarters and materials movement bottlenecks. To remedy these problems the managers must begin to plan for the rearrangement of equipment. They should also begin now to design and fabricate themselves simple materials handling containers. Wheeled carts, pushed by hand, are likely to be one element of the solution. The ITAP group could assist in implementing these programs.

SUMMARY

This company demonstrates the advantages of private sector enterprise in Egypt. The owners have aggressively identified unmet needs in the market and have largely used Egyptian materials and equipment to meet them. They are creative and pushing hard to grow.

On the other hand, they face real difficulties identifying potential markets and obtaining resources. The company still depends upon the creativity and energy of owners. The methods and

systems that will enable them to grow into a substantial company are not yet present.

COMPANY PERSPECTIVE

BACKGROUND

The Iron Works Factory for Metal Manufacturing, better known as the "Iron Works," is a small, privately owned firm located in an industrial zone in the Basatin area, about 5 km northeast of Maadi. The plant employs approximately 40 workers most of the year producing an assortment of hardware items, principally locks and door handles plus metal furniture parts which are die cast, stamped or drawn.

The owners of the factory are two brothers, Mr. Ahmed Abdul Aty and Mr. Hussni Abdul Rahmen Hassan. The firm has operated for twenty-five years while the factory has operated for the past thirteen years at the present site.

OUTPUT

Sales during the past few years have been as follows:

Year	Sales (L.E.)
1980	150,000
1981	200,000
1982	170,000
1983	336,000

Production of all metallic items last year is estimated at

50,000 pieces, sold to approximately 50 different buyers.

Principal products are:

- Door handles, nonferrous.
- Locks and hinges.
- Spoons, nickel plated.
- Chair legs, die cast.
- Drawn wire products.
- Clamps for windows.
- 30 other items, some of which are electroplated.

EQUIPMENT

Principal production equipment is as follows:

- Hand fed die casting machine, TRIULZI Castamatic No. 50 from Italy, plus gas fired furnace, with a output of 3 molds per minute.
- Siphon fed die casting machine, Buhler No. 40, from Switzerland, plus gas fired furnace, with an output of 6 molds per minute. (This machine was down for repairs with a cracked piston for several weeks.)
- Several grinders and deburring machines.
- Five locally made punch presses (made by Iron Works).
- Half dozen cutting and bending presses (made by Iron Works).
- Three vibrator, polishing machines.

- Galvanizing and electroplating equipment, some of which was imported from Italy and some made by the Iron Works employees.
- Wire drawing (roll forming) machines, made locally.
- Tool room equipment including a modern milling machine and modern medium size lathe. The tool room staff is also the repair and maintenance crew. They make some of the casting dies as well as jigs and fixtures.

The production equipment is an assortment of modern, imported machinery plus homemade but serviceable equipment made by the Iron Works employees under the guidance of the owners and managers. The equipment appears to be adequately maintained.

NEW PRODUCT

Currently the Iron Works is establishing a production system to make approximately 10,000 die cast fuel filters for trucks for NASCO. NASCO took the initiative to seek quotations from the Iron Works to produce these filters.

The dies required for production of the filters are being made in Italy, at a cost of about $12,000. NASCO is assisting the Iron Works in the purchase of the dies.

The sales price of the filters will be about LE 15.00. Production costs of the casting are estimated at LE 7.00 plus

other components, overhead and profit. By comparison, one of the military factories quoted to NASCO a price of LE 21.00 per unit for each filter while the landed cost of an imported filter is about LE 30.00.

The gross sales revenue from this order is expected to be about LE 150,000 which is about half of the company's gross sales reported for 1983.

INVENTORY

The principal raw material, aluminum ingots and scrap, comes from local sources, principally the Egyptian Aluminum Company. The Iron Factory also melts down old piston heads for raw materials.

Zinc is now purchased locally but the owners say that they wish to import it because the price will be lower. Steel is procured locally.

Storage organization is poor, partly because the factory has been expanding output and adding equipment within the existing floor space. Material handing is typically simple. Workers drop production items to the floor and then periodically others pick them up and move them to the next operation.

TASK 1: ESTIMATE PRODUCTIVITY IMPROVEMENTS

The owners/managers of the Iron Works are operating their small factory with remarkable energy, creativity and success. They have not yet produced any parts for the automotive feeder industry but they have in hand a contract to manufacture 10,000 die cast aluminum fuel filter. Production should commence in the spring of 1984. With this order, the Iron Works is entering a new phase of business which will require greater attention to quality and accountability.

Currently, the principal problems are as follows:

- Difficulty in obtaining information in Egypt on products, machines, costs and technology.
- Maintaining quality of output for new products (such as the fuel filters for NASCO) which will require greater attention to the quality of raw material, mixtures and pouring temperatures.
- Arranging financing for the major new investment planned; these include the proposed acquisition of more modern:
  - Presses for metal sheet products.
  - Rolling machines.

- Pressure die cast machine, with a capacity of 400-500 tons.
- Milling machine.

Production skills at the Iron Works are adequate in most cases for the items currently being manufactured. The factory appears to be operating its major pieces of equipment at about 50 to 70 percent of capacity for one shift. It was not possible to estimate factors of cost, profit, machine efficiency, system downtime, or financial ratios for the Iron Works.

The following recommendations are made by members of the study team to improve the general operational productivity of the plant and to anticipate the requirements that will be imposed when the plant expands production and initiates the manufacture of more sophisticated items.

- Establish simple systems of production and inventory control which will enable the owners to cope with the requirements of management control and accountability which are likely to be imposed when the factory expands sales by 50 to 100% in the coming year, as is expected.
- In anticipation of the need to finance the purchase of new production machines, establish a simple, modern cost accounting system and improve the

general accountability for all income and expenditures. Prospective lenders will need to understand the firm's financial position before they offer loans and the Iron Works will have to respond to inquiries with reliable data if they are to be successful. Finally governmental authorities, including the tax office, will expect a rapidly modernizing factory to maintain adequate records of operation and accountability.

- Link support for investment needs of the Company to progress on improving the firm's management control system.

TASK 2: ASSESS MANAGEMENT IMPEDIMENTS

The two owners of the Iron Works are responsible for most of the major functions of marketing, production, management, R&D, purchasing and financial transactions. Three sons and other family members and close friends assist in these operations. The management structure is direct, simple and comparable to other traditional, family owned small businesses.

PLANNING

The Iron Works owners have mentioned on several occasions their wish to purchase a number of expensive production machines in order to expand output of existing items and to begin production of sheet metal products. The demand for products made by the factory reportedly is sufficient to justify an expansion of output. The firm also is particulary interested in expanding its output of automotive parts, including production of flanges for NASCO. Finally, the owners are interested in purchasing equipment for vacuum plating of plastic parts. Before embarking on such a significant investment program, the firm should develop a long term (2 to 4 year) plan of production opportunities, investment requirements and estimated rates of return.

The MDP and ITAP organization should be in a position to offer assistance to the Company in preparing such a plan and possibly guiding the firm in its quest for investment capital. The Iron Works also should be introduced to GM officials in charge of local parts procurement.

TASK 3: IDENTIFY AND ASSESS INFLUENCE OF HUMAN RESOURCES

The current work force at the Iron Works is as follows:

Category		Number of Workers
Skilled		12
Assistants (Semiskilled)		8
Handlers (Unskilled)		10
Supervisors		3
Security		1
Maintenance		1
Other: Secretary, Storekeeper, Driver		3
Total		38
Management Staff	about	5

Turnover of workers presents some problems but is not a serious issue. In the period 1978 to 1982 about 22 "regular" workers left employment or an average of 5 per year. Principal reasons for their departure were to join the military service or accept employment elsewhere, including overseas. All of the workers who left were classified as skilled or assistants-to-skilled workers.

Take home wages, according to the Company range from LE 3.0 per day for regular full-time laborers to LE 18.0 per day for skilled production when output is high. Measures of productivity of workers is not available. The owner stated that workers are generally available although some skills are in short supply.

Worker skills appear to be adequate for the work performed which, with the exception of tool room personnel, do not require close tolerances or precision operations.

Training for workers is performed on-the-job. No formal training is offered to workers. The owners were not aware of potential sources of assistance such as MDP, ITAP, or VTP and expressed no interest in these programs for training needs or technical guidance.

TASK 4: IDENTIFY AND ASSESS TECHNOLOGICAL IMPEDIMENTS

Quality control measures are minimal but probably acceptable for the items produced, to date. When, however, production commences of fuel filters, NASCO will no doubt insist that specific criteria be established and followed in inspecting units, both at the Iron Works and at NASCO's quality control center.

MDP and ITAP can assist in building a quality control capacity at the Iron Works although for the immediate future such guidance can most readily be given by NASCO's personnel.

The tool room equipment used to make and repair dies are in excellent condition and no outside attention is warranted. The production equipment is in generally good condition (although the automatic, siphon fed die casting machine was out of service for weeks because of a repair problem).

Materials handling equipment is virtually nonexistent. Material and semifinished goods are piled on the floor in most available space. The few containers available, generally old barrels or boxes, are not appropriate for the purpose. The owners and their employees have all the talent and equipment necessary to design and fabricate their materials handling equipment. Wheeled carts pushed by hand are likely to be one element of the solution although the floor would have to be improved.

When the factory begins to ship fuel filters to NASCO, the products should be stored in containers that will guard them against damage and facilitate quality checks and ease of counting. The Iron Works and NASCO should collaborate in building such containers for mutual advantage.

WORK METHODS

No formal methods of work control are utilized. To date the production output has been small enough so that the owners/managers can retain in their memory the data essential to maintain adequate control. This arrangement cannot continue if the firm expands production as proposed. Soon, simple systems of production and accounting control must be initiated.

The quality of the output, which is not subject to precision work or close tolerances, is fair to good. When production of the fuel filters for NASCO begins, greater attention will have to be paid to the quality of the molten inputs to the die cast machines and to head and pressure limitations.

TASK 5: ASSESS OTHER INFLUENCES ON PRODUCTIVITY

INDUSTRY DATA

Company officials expressed concern, like others, that there are no standard sources of information in Egypt on locally made products, processes and equipment. The ITAP organization could assist by helping to compile such data using, for example, the extensive library of information on Egyptian industry already gathered. The informacion, which should be published for wide-spread use would be comparable to the "Thomas Register" which is so widely used in the USA.

IMPORT LICENSES

The managers of the Iron Works visited Italy during the course of the study in order to place orders for dies and perform other business functions. They mentioned their experiences with the bewildering array of requirements in obtaining import permits and foreign exchange. This is a general problem faced by small businessmen.

One means of alleviating the anxiety and hastening the compliance with regulations is to circulate more widely and regularly the instructions on how to:

- Obtain import licenses.

- Obtain foreign exchange.
- Export products.

INVENTORY

Like many other companies in Egypt, the Iron Works keeps a stock of material greater than would be required by a comparable U.S. or European firm.

A means of easing this problem is to expand the capacity and dependability of wholesalers of industrial goods. The Egyptian Federation of Industry, supported by the MDP and ITAP organizations, could contribute to this effort. These entities could, for example, help identify the problems encountered in operating industrial supply houses and recommend the means of improving their capacity to supply industrial firms for mutual profit.

INVESTMENT PLANS

The Iron Works plans to install new anodizing equipment to support the output of new product lines. The owners also wish to obtain investment capital to purchase equipment for vacuum plating of plastic parts. This would be a totally new product line for the Company. The basic equipment, if purchased from abroad, is estimated to cost about $300,000 with installation and ancillary equipment extra.

In addition, the owners wish to consider the advisability of making sheet metal products, possibly for the automotive industry. Finally, they cite the need to add new equipment to enable them to expand the output of existing products. Machinery requirements cited includes presses, rolling machines, a new milling machine and a new pressure die cast machine with a capacity of about 400-500 tons.

The Iron Works staff has an excellent record of successful operations in the past few years. Their relationship with NASCO is a testament to their credibility and capacity. Nonetheless, before the firm embarks further on any major element of its array of proposed investments, the managers should solicit the counsel of the MDP and ITAP organizations in order to calculate better the long term outlook for their products. After that is accomplished, they can set priorities for investments and market penetration.

Giza Rubber Company

Productivity Issues and Recommendations

July 1984

Kearney: Management Consultants

CONTENTS

BACKGROUND, OBJECTIVES AND METHODOLOGY

BACKGROUND

This project was undertaken as part of a wider study of impediments to productivity in the Egyptian automotive feeder industries. It was funded by USAID. The Engineering Industries Corporation and El Nasr Automotive Company participated in the direction of the larger study including the selection of participating feeder companies.

Four other companies besides Giza Rubber were also studied intensively. They were:

El Nasr Forging Industry

IAMCO

General Metals

Iron Works Company for Metal Manufacture.

Similar reports were prepared for each of these companies.

OBJECTIVES OF THE STUDY

The purpose of the larger study was to identify the major obstacles to improving productivity in the Egyptian automotive industry and to recommend policies and programs to overcome these obstacles. To accomplish this task, we looked in depth at the four companies listed above and at Giza Rubber. We then drew conclusions on the results of these five studies, checked them against a larger group of Egyptian companies, and then summarized

our conclusions and recommendations in another document titled Productivity Improvement in the Egyptian Automotive Feeder Industry.

Within each of the five study companies, we were asked to accomplish five tasks:

Task 1: Estimate the opportunity for improving productivity in the company.

Task 2: Assess management impediments to improve productivity.

Task 3: Identify and assess the influence of human resources on productivity.

Task 4: Identify and assess technological impediments to productivity.

Task 5: Assess any other influences on productivity in the study company.

METHODOLOGY

Because of the relatively brief time we could spend in each company, we based our conclusions on five principal activities:

- Reviewing financial operating data indicating utilization of capacity.
- Inspecting the physical facilities and observing operations.
- Reviewing selected operating data and procedures (e.g., reject rates) that might indicate productivity problems.
- Interviewing managers in the company.

- Interviewing assembly companies to obtain their perspective on quality, delivery and price performance.

We analyzed the data and then drew the conclusions upon which our recommendations are based.

REPORT ORGANIZATION

The next chapter, Executive Summary, presents what we believe are our most important conclusions and recommendations concerning Giza Rubber. The following chapters focus on each of the five tasks defined in our scope of work.

EXECUTIVE SUMMARY

The Giza Rubber Company is a very small, successful, privately owned firm, employing approximately a dozen unskilled workers to manufacture about 30 kg. per day of selected pressed rubber products.

The two principal owners and operators have many years of experience in the rubber industry. Their operation competes against much larger rubber companies by emphasizing the production of small quantities of specialty products which often require special attention to quality.

Output of items for the automotive market includes rubber mounts for exhaust systems, rubber roof dividers, tail light gaskets and spark plug covers. Recently the factory produced a few samples of rubber motor mounts, at the request of NASCO. If the tests of these parts proves their durability, the Giza Company will begin soon to produce these items. The firm would like to expand its operation and make other products such as automotive water hoses and rubber lined products.

Production of nonautomotive parts includes "buta" gas stoppers, discs for polishing machines, suction drain cleaners, caps for test tubes, surgical pads and about 50 other items.

The principal impediments to increased production and suggested remedial actions include the following.

COMPETITION AND MARKET SEGMENT

The Giza Rubber Company faces considerable competition from larger rubber products manufacturers, including a new Egyptian French joint venture, SEFCA, which soon will commence production of extruded rubber profiles and other items at a factory in Tanta. The principal output from the latter plant will not compete directly with the pressed rubber products made by the Giza Company. Nonetheless, the array of potential competition is formidable and the managers need to understand better the strengths and shortcomings of the competition, and the long term demands for rubber products in Egypt. Certainly this type of assessment must be undertaken before the firm invests in new types of production equipment. The MDP organization can assist in this effort.

TECHNICAL IMPEDIMENTS

Currently there is a substantial safety hazard at the mixing mill and a tool should be designed to aid the operator in performing the mixing process. Also the final compound, which is fairly heavy, should be transported to the preparation area by a small cart, not by hand.

The current layout of the factory allocates the least space to the most intensive labor operations. If additional equipment is to be installed, a long range layout plan should be prepared by the owners themselves.

Opportunities were noted to utilize special hand tools, jigs and fixtures which would assist the laborers work more efficiently. Possibly the Iron Works manager could assist in identifying these opportunities and then could fabricate the items agreed upon.

COMPANY PERSPECTIVE

BACKGROUND

The Giza Rubber Company is a very small firm employing about a dozen workers who produce about 30 kilograms a day of assorted pressed rubber parts for household uses and industry.

The owners, Engineer Sami Mansour and Mr. Hanafy Wahaba, started the business in 1976 when they were authorized to import essential production equipment, primarily from Japan.

Eng. Sami Mansour is a graduate chemical engineer who worked at a major public sector rubber factory for several years. Mr. Hanafy also worked in the same public sector firm for 25 years before retiring. The owners waited about three years for governmental authorities to approve their application to import equipment. The rationale given was that public sector firms had unutilized capacity.

OUTPUT

Output of items for the automotive market are principally:

- Exhaust system mounts (about 20,000 pieces annually).
- Rubber roof dividers, for buses.
- Rubber gaskets for tail lights and side lights.

- Nonskid panels.
- Spark plug covers.

Currently, the Giza Rubber Company is awaiting the results of tests by NASCO of motor mounts for trucks. If the trial production is acceptable, the Company expects to receive an order to make about 4,000 units initially at a cost of about LE 1.75 each, including the bolts which are made locally. Also, the firm has given bellow type rubber products, including gear shift handle covers, to NASCO for testing and is awaiting the results of these tests.

Output of nonautomotive products are:

- Suction drain cleaners (plumber's helper).
- "Buta" gas stoppers.
- Discs for polishing machines.
- Stopper caps for test tubes, and related items.
- Surgical pads.
- Plus about 50-60 other items as required.

EQUIPMENT

Principal equipment, imported from Japan in the period 1976-1977, includes:

- One open roller mixer of rubber, either natural or synthetic, with 30 cm diameter and 70 cm length, from NIKROLL Company.

- One hydraulic press, for die moulds, of 60 ton capacity, with 4 plate capacity (45 cm by 45 cm size).
- One extruder (not in use because of lack of sales potential) with a capacity of 1.75 cm diameter output, designed to make mouldings or channels; the machine is from the OSAKAIROLL, KONPON Company.
- About 100 dies and several simple jigs and fixtures.

TASK 1: ESTIMATE PRODUCTIVITY IMPROVEMENTS

The quality of the small output of items from the Giza Rubber Company is excellent. The owners/managers are energetic and experienced in the field.

The firm has relied on initiatives take by NASCO to begin production of automotive parts. NASCO also has provided testing facilities, in order to check quality, as well as drawings and specifications. NASCO engineers have visited the small factory on several occasions.

Production skills at the Giza Rubber Company are adequate-to-good for the items currently being made. The plant appears to be working at roughly half of the capacity output which could be obtained on a one shift basis. No estimates could be made of factors of cost, profit, system downtime or financial ratios for the Company.

Principal productivity constraints include the following:

- The plant has a very limited output, estimated at 30 kg per day, of pressed rubber parts. In order to grow, the firm has to continue its active marketing program and obtain additional orders for pressed rubber items that can be made on the existing equipment. Potential customers include

General Motors and the Arab American Vehicles Co. as well as nonautomotive industrial users.

- Giza Rubber faces competition from the SEFCA Company, a joint venture of Egyptian and French businesses, which will soon begin production of extruded rubber profiles, mouldings and other rubber products. While the principal output of the new firm will be extruded rubber profiles, products which are not made by the Giza Rubber Company, the potential for severe competition exists. The Giza firm will have to stress quality production and the capacity to make small numbers of specialty items on short notice.
- The Company needs additional testing equipment, including a tensile tester for plasticity, in order to carry out essential in-house verification of quality. The items needed are not too expensive, estimated to cost $5,000 to $8,000, and the firm can obtain the necessary capital when it has determined that the investment is justified.

The Giza Rubber Company is also considering the advisability of investing in equipment to make different rubber forms including:

- Hoses for vehicles, whereby rubber is impregnated with reinforcing material.

- Rubber coating for storage tanks.

Some forms of these products are already being made in Egypt, in one case by a public sector firm. It is recommended that ITAP and MDP assist the Giza Rubber Company managers to evaluate the market potential and competition. There may be a suitable niche for the Company in these markets but the investments required are significant for an efficient but very small firm and the owners will need technical and financial advice and counsel.

TASK 2: ASSESS MANAGEMENT IMPEDIMENTS

With a work force of a dozen persons, all young untrained females, led by the two owners who direct all important events, the Giza Rubber Company has a simple, direct management structure. The owners visit the plant every day and instruct the workers on all major aspects of production. They keep all accounts themselves.

PLANNING

As noted above, the owners are contemplating various business opportunities including possible investment in new equipment to produce other kinds of rubber products.

One advantage that the present Company has in producing pressed rubber goods is that the processes are moderately labor intensive, the demand is varied and limited to small runs, and the production of automotive parts requires careful attention to the quality of mixing of ingredients.

If the company shifts production to items not requiring these factors then the strength of competitors may be too strong. The ITAP and MDP organizations should be in a position to help the Company assess its prospects for undertaking new ventures.

TASK 3: IDENTIFY AND ASSESS INFLUENCE OF HUMAN RESOURCES

The labor force consists of a dozen young women who have been trained by the owner to operate to blending machine and curing presses. Worker turnover is not a problem. Working conditions are fair and morale appears to be good.

The factory operates like a cottage industry. No figures were given regarding payments to workers but all the young employees live in the neighborhood and are likely to be working for a very modest wage.

Worker productivity appears to be adequate and no recommendations are made for training or other special support programs.

TASK 4: IDENTIFY AND ASSESS TECHNICAL IMPEDIMENTS

A number of suggestions to improve the efficiency and safety of existing plant and equipment follows.

MIXING MILL

Currently there is a substantial safety hazard at the mixing mill. The operator must have her hands quite close to the rolls while the mill is in motion. A tool should be provided to aid in the mixing process.

The final compound from the mixing mill is hand carried to the areas where final preparation is done. Preferably a small cart or section of gravity conveyor should be used to carry the material.

GENERAL LAYOUT

The current layout is such that the areas which require the most space are allocated the least space. Since the mixing mill requires a substantial foundation, the press and the preparation areas should be rearranged around the mixing mill. With additional equipment anticipated, a "long range" plan should be developed and the plant arranged with the future production in mind.

METHODS AND TOOLS

Opportunities were noted for the use of special hand tools, jigs, fixtures, etc. which would assist the operators and facilitate such activities as removal of the product from the dies and placing the dies into the press. Possibly the Iron Works personnel could assist in identifying these opportunities and manufacturing the items agreed upon.

TASK 5: ASSESS OTHER INFLUENCES ON PRODUCTIVITY

INDUSTRY DATA

As with the other small private sector firms surveyed, Giza Rubber's owners also mentioned the difficulties of obtaining information in Egypt on products, processes and prices. The owners were informed about the general work of the EIDDC but had not heard of the program offered by MDP, ITAP or VTP. These organizations could assist by leading efforts to compile industry data in forms that can be distributed widely.

IMPORTS

The owners also noted the difficulties in understanding and complying with import restrictions. The firm imports its natural and synthetic rubber plus most of the chemicals used in mixing. Although the owners are highly educated themselves and widely traveled, they would welcome efforts to simplify import procedures and reduce the time required to obtain necessary authorizations.