8-4 Modernization of Corporate Management

8-4-1 Decision Making

The corporate environment of IMAG is changing drastically with the transition into a market economy. The management challenge for IMAG is to reform its organization from the conventional business structure that relied heavily on IKARUS to a structure that can adapt to the environment of the free economy. For that purpose, IMAG is reorganizing its structure, and the decision making system of the company is in good order as described in Section 7-3 "Present State and Problems of Corporate Management." By making effective use of this system, the company should be able to make decisions efficiently. However, a process of decision making has not been established within the company. For effective decision making, a company must first evaluate the business environment surrounding it, and work out business strategies to adapt to that environment. The process necessary for decision making in a company can be summarized as follows.

(1) Evaluation of the business environment
   (a) The business environment and market opportunities should be determined.
   (b) The capacities of the company must be understood and the tasks should be clarified by corporate analysis.

(2) Development of business strategies
   (a) A corporate philosophy should be established.
   (b) Business strategies should be worked out.
   (c) The business strategies should be broke down in detail.
   (d) Management plans should be produced.

The process of decision making is as follows:

1) Evaluation of the business environment

(1) Business environment and marketing opportunities

Each company has its own characteristics, and what is most important for decision making is the changes how to cope with in the environment surrounding the company. The same changes in the environment can have different effects on different industries and companies.

A company must consider changes in the environment surrounding it as either threats or marketing opportunities and evaluate these changes from the viewpoints of business strategies and marketing. Also, it is important that the responsible persons in marketing, finance, production,

and other related departments in the company not only evaluate these threats or marketing opportunities, but also take actions to deal with them. Changes in the business environment are evaluated as either threats or marketing opportunities from the following two standpoints.

(a) Evaluation of marketing opportunities
Evaluation of the potential attractiveness of marketing opportunities (amount of profit average companies can make)
The probability that the company can defeat competitors

(b) Evaluation of threats
Evaluation of the potential severity of threats (money losses the company will suffer if the threats come true.)
The probability that the events that constitute a threat, will actually occur.

These evaluations can be expressed as matrices of threats and opportunities. For example, if the following changes occur in the business environment of IMAG, they can be expressed by the matrices shown in Figure 8-4-1.

(a) The government is planning a policy of encouraging the use of domestic products.
(b) Hungary joins EU.
(c) A campaign for the use of domestic products is launched, and government agencies and domestic companies use domestic products preferentially.
(d) A bill for encouraging exports is introduced by the government.
(e) A South American bus manufacturer begins to promote exports and IMAG's export share decreases.
(f) A European seat maker has developed a low priced seat-surface material with good workability, which auto makers are beginning to adopt.
(g) Foreign seat makers are planning to advance into Hungary.
(h) An economic forecast is announced that predicts exacerbated domestic inflation, soaring wages, and slow economic growth.

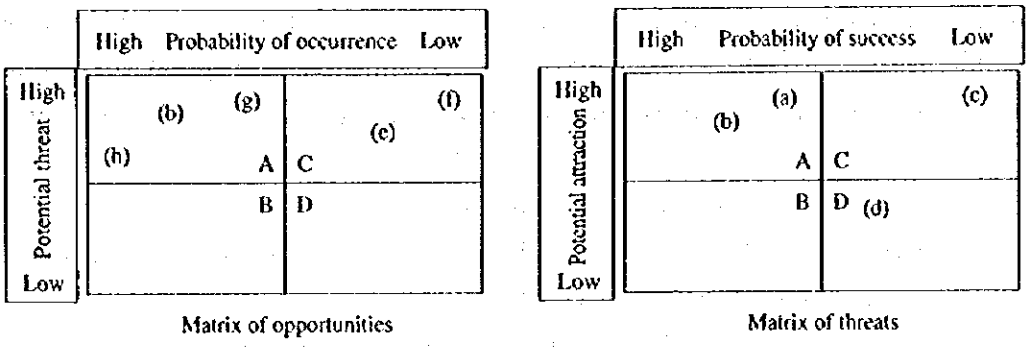


Figure 8-4-1 Matrices of Opportunities and Threats

Items (a) through (d) can be classified as marketing opportunities, and items (e) through (h) as threats. As illustrated by the fact that item (b) is classified as both a threat and an opportunity, matrices can be created differently depending on the decisions of the responsible persons in different departments of the company. The management must see to it that the company take actions selectively based on overall considerations, such as addressing items with a high threat or attractiveness or items with a high probability of occurrence or success (items that belong to categories A or B) rather than addressing all the items.

(2) Self-analysis of the company

In addition to evaluating external factors such as marketing opportunities and threats, companies must analyze themselves in order to cope with the following factors.

(a) Products and technical level
(b) Market position
(c) Sales strength
(d) Human resources
(e) Fund raising capability

These items have been analyzed throughout this report. The key items necessary for maintaining growth in the future can be reduced to the following three.

(a) Product development
(b) Market cultivation
(c) Leadership of top management

IMAG can be evaluated as follows against these criteria:

(a) Product development

The Product Development group is composed of only four persons. Normally, the development staff constitutes about 10% of the employees in manufacturing companies, and is engaged in designing, testing, and prototyping of products. Judging from the present financial situation of the company, it is very difficult to create the capacity for product development. However, without a capacity for product development, market cultivation and marketing activities are drastically limited. The key point in corporate efforts to achieve growth is none other than development capacity.

What is most important in development capability is accumulated know-how. Accumulating know-how requires experience of development and investment in development. However, accumulation of know-how and improvement of development capability cannot be achieved in a short period: they must be achieved through long-term planning.

(b) Market cultivation

The top management, including the president and the head of the Marketing Department, are deeply committed to cultivation of markets. Although they work efficiently, there is a limit to what they can achieve because of the small number of persons. With the view of training the younger generation and raising the efficiency of the company as a whole, at least one person to be exclusively in charge of market cultivation should be appointed. The company should begin by finding out and recording the structure and situation of the markets.

(c) Creation of a lively company

As an aid to business management, informal meetings of the management have been held to improve mutual understanding since this year. This arrangement is expected to contribute greatly to the activation of the top management. And it is very important to continue this arrangement. Although ingenious arrangements are made for such meetings in many companies, they tend to go out of existence in the course of time for the following reasons.

(a) The president is busy and tends to be absent.
(b) The meetings become superficial.
(c) The content becomes stereotyped.
(d) The meeting becomes a salon (gatherings for chatter).

However, it is desirable to continue this practice by all means since it is utilized effectively by some participants and also provides good opportunities for mutual understanding. A proverb says "continuity is strength." What is important is the executive ability of the president to continue this practice and the activities of the executive office that sponsors the meeting. The president

should make time to participate in the meeting by delegating some of his powers.

The topics for discussion are predetermined based on the issues IMAG is dealing with, and the meeting is conducted efficiently. This is a good method for making sure the meeting continues to exist. In addition, the company should draw up medium to long-term management plans (described later) in this meeting to show the course the company is taking and to provide the employees with a vision with the aim of motivating and reassuring them as well as increasing the efficiency of management.

Daily efforts and the wisdom of the president and executives will contribute greatly to the creation of a lively company with employees full of vitality.

2) Development of business strategies

Methods for developing business strategies and for marketing vary greatly from company to company. However, many companies today use two important processes in decision making. The first is the process of planning a business strategy for deciding on what business the company will place emphasis in the future. The second is the marketing process, which is the means for clarifying the marketing opportunities for the company and converting them into a profitable business. The following paragraphs describe the procedure for developing business strategies and the marketing process for decision making.

(1) Establishment of a corporate philosophy

As the business environment changes and various decisions are made in the process of running a company, the objectives and mission of the company become unclear and the activities of the organization become sluggish. An effective method of revitalizing the company is to establish a new objective and mission. For that, the company should start by asking "What is our business? Who are our customers? What do our customers gain from us? What will our future business? What should our business be?" It is very difficult for a company to answer these seemingly simple questions. However, in the process of seeking the answers, the company can direct the behavior of the people who belong to the organization and establish a common philosophy about meaning and achievement. In other words, establishing a corporate philosophy assumes the role of clarifying the objectives and mission of the company, and directs the thinking and behavior of separate individuals in one direction so that they will work together as a single company. The purpose of the business creed described in Section 7-1 is to express the corporate philosophy rather than to put up a concrete goal.

The objectives and mission of the company are the embodiment of the corporate philosophy. To be effective for them in decision making, they must be decided with the following points in

mind.

(a) Market orientation

In order to decide the objectives and mission of a company, the sphere of business must be defined first of all. Generally, spheres of business have been defined based on products or technologies: for example, "manufacture of wire harnesses for automobiles" or "machining." However, in these days of radical environmental changes and technological innovation, it is better to define a business according to the market needs. This is based on the view that market needs are basically permanent while products and technologies eventually become obsolete. IMAG should also define its business in terms of satisfying market needs, which could be, for example, "safety and comfort of the interior space of cars."

(b) Validity

If the business is defined by market needs, the objectives of the company will become wider and more abstract. Thus, the manager should set an appropriate range when defining the business of the company. An effective approach is to begin with the current products, gradually extend the range of abstraction, and extract the range that meets the most realistic market needs imaginable. Extending the range of abstraction will provide new business opportunities. At the same time, it also risks the danger of leading to unrealistic business expansion beyond the company's capacity. Thus, the manager should make sure that the definition of the company's business is neither too narrow nor too wide.

(2) Development of business strategies

The most important goal in the business strategies of a company is the growth of the company, for which companies work out strategies by setting target growth rates for sales, profits, etc. The growth of a company is generally achieved by the growth of its existing products. However, if their growth is slow, the company must try to make up the gap between its target growth and actual profits by adding new products. Figure 8-4-2 shows the profit of IMAG in the case of products A, B, and C, which are related to the sales of automobiles.

After going through the phases of growth, maturity, and decline, the total profit of the three products fails to reach the profit goal. This is the profit gap. This gap must be filled by making improvements such as reducing the cost of existing products or by developing of new products. An important goal in business strategies is to fill this gap.

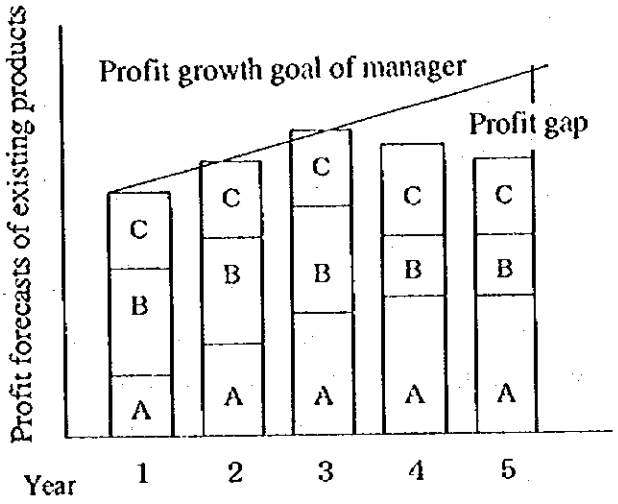


Figure 8-4-2 Profit Forecasts of Existing Products

Business strategies can be worked out based on the analysis of the three stages shown in Table 8-4-1. However, since these approaches do not apply to all companies, it is necessary to select the approach that is suited to the characteristics of the company.

Table 8-4-1 Classification of Growth Stages

First stage: Intensive growth	Second stage: Integration	Third stage: Diversification
(1) Market penetration	(1) Backward integration	(1) Concentric diversification
(2) Market cultivation	(2) Forward integration	(2) Horizontal diversification
(3) Product development	(3) Horizontal integration	(3) Conglomerate diversification

(a) Intensive growth

The first stage is the analysis of opportunities in the existing sphere of business. This is a strategy to be used if the company has not cultivated its existing products and markets sufficiently.

a) Market penetration

This is a marketing strategy for increasing the sales of a product within an existing market. Although the markets for automotive parts such as seats are limited unlike those of general consumer goods, the familiarity of the products (i.e., how well the products are known) is equally important for marketing activities in both cases.

b) Market cultivation

Market cultivation is an attempt to expand sales by putting current products onto a new market. The repair market for bus seats is an example of market penetration of existing seats as well as the cultivation of a new market.

c) Product development

This is the marketing activity of putting a new product or an improved version of a current product onto an existing market. IMAG is developing a line of standard bus seats, driver's seats, and seats for railroad vehicles. In developing these seats, the company should take a marketing (described later) point of view.

(b) Integration

The second stage is the integration strategy. This strategy is effective if the industry to which the company belongs is characterized by high growth and if its profitability and efficiency can be improved through the integration of the industry. However, to put this strategy into action, the company must have adequate ability. Commonly used methods of integration include, backward integration, forward integration, and horizontal integration within an industry.

a) Backward integration

Backward integration is an approach employed to expand profits by owning or, gaining greater control over, supply systems of raw materials or parts.

b) Forward integration

Forward integration is expansion by acquiring, or gaining greater control over, a distribution channel of a product.

c) Horizontal integration

Horizontal integration is expansion by acquiring, or gaining greater control over, a competitor.

(c) Diversification

Diversification is a strategy employed when the market of a current product is mature and there is little chance of gaining profit. A company must expand into the area where it can take advantage of its technical or managerial superiority.

a) Concentric diversification

Concentric diversification is a strategy for reinforcing a product line by adding a new product that will produce a synergistic effect with current products from a technical and marketing points of view.

b) Horizontal diversification

Horizontal diversification is the addition of new products that are unrelated to the present line of products.

c) Conglomerate diversification

Conglomerate diversification is the expansion into new businesses that are unrelated to the present technologies, products, or markets.

In developing business strategies, it is necessary to analyze the marketing opportunities of the existing products (described above), then seek new marketing opportunities in the marketing system of the existing products, and finally, seek opportunities outside the marketing system of the existing products.

(3) Further break down of the business strategies.

After discussing and analyzing growth opportunities described above, the company must make decisions concerning the present line of products. The management should evaluate the current businesses and decide whether to maintain, expand, or abandon each of them. In this way, the company must keep its business portfolio up to date by pulling out of stagnant businesses, and advancing into or investing in growing businesses.

The management must first of all determine the priority of the company's businesses. The matrix for portfolio analysis as shown in Fig 8-4-3 is useful for making such a priority analysis.

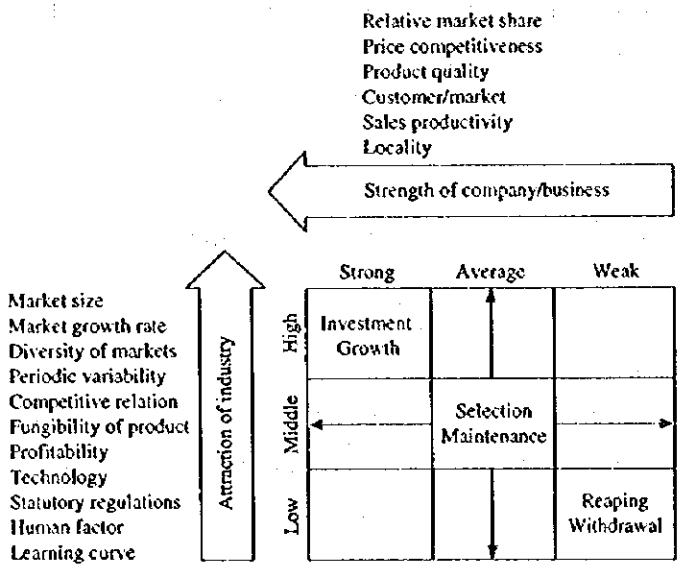


Figure 8-4-3 Portfolio Analysis

Based on this matrix, a portfolio plan is drawn up by choosing businesses for the company of the future and classifying their roles. The purpose of the portfolio plan is to establish priorities for the effective allocation of resources.

(a) Expansion: A business whose market share should be expanded even at the expense of suppressing short-term profits.

(b) Maintain: A business whose current market share should be maintained.

(c) Harvesting: A business that should aim at short-term profits.

(d) Withdrawal: A business from which resources should be diverted to other businesses.

(4) Management plans

To operate in a market, a company must work out a management plan, based on the business strategies described above. At present , IMAG draws up management plans annually. However, in the next stage, the company should prepare a medium-term plan concerning approximately three years, in which the annual plan forms part of medium to long-term plan. It is necessary for continuous management of the company to draw up an annual plan as the detailed first-year plan of this medium-term plan. Since business environments in Hungary change rapidly, the company should annually review the medium and long-term plans as well as the items that constitute the preconditions for these plans.

Through accumulation of such reviews, strategic elements are generally incorporated into the plans. Also, it is important to standardize the form of plans so that comparisons can be made between different years as well as between different divisions.

The items necessary for management planning are shown below.

(a) Basic management planning

Creation of the basic frameworks of the revenue structure and financial structure

a) Forecasting of the sales ratio and growth rates of new and current products
b) Price setting and manufacturing cost forecasting of products
c) Personnel planning and labour cost forecasting
d) Fund raising methods and planning the use of company funds
e) Fund raising costs
f) Capital investment planning and depreciation burden
g) Policies for productivity improvement and surplus manpower

(b) New business planning

a) New businesses and profitability (See "Financial Analysis")
b) Assessment of risks and profits
c) Analysis of own resources
d) Analysis of technologies necessary for operation of new businesses

(c) Profit goal setting

a) Ratio of profits to total liabilities and net worth
b) Ratio of profits to paid-in capital
c) Profits and added value per employee

(d) Profit appropriation planning

a) Social distribution (Corporation taxes, education taxes, taxes on business activities)

b) Distribution to parent body of the company (internal reserves)

c) Distribution to shareholders (dividends)

d) Distribution to management, distribution to employees (bonus to officers, bonus to employees)

(e) Orders and sales planning

a) New product and product mix strategies

b) Orders and sales forecasting, and comparison of profits

(f) Production planning

a) Co-ordination between orders and sales planning and production planning

b) Output and plant operation planning

c) Policy for internal production and subcontracting

d) Planning for automation and labour saving

e) Planning for work-in-process and raw materials

f) Specification and design changes, and production engineering planning

8-4-2 Marketing Method

Marketing activities are based on concepts fundamentally different concepts from sales activities. The latter are activities for promoting sales in order to derive profits from the products produced by the company. That is, they start from the needs of the producer and seller. On the other hand, marketing activities begin with satisfying the needs of the market and are based on the view that profit results from the provision of customer satisfaction.

Marketing strategies are techniques for drawing up management plans (described above), and are means for implementing the such plans. The core techniques for working out marketing strategies are marketing opportunity analysis, the selection of a target market, and the marketing mix strategy. Figure 8-4-4 shows the processes of drawing up management plans and marketing strategies.

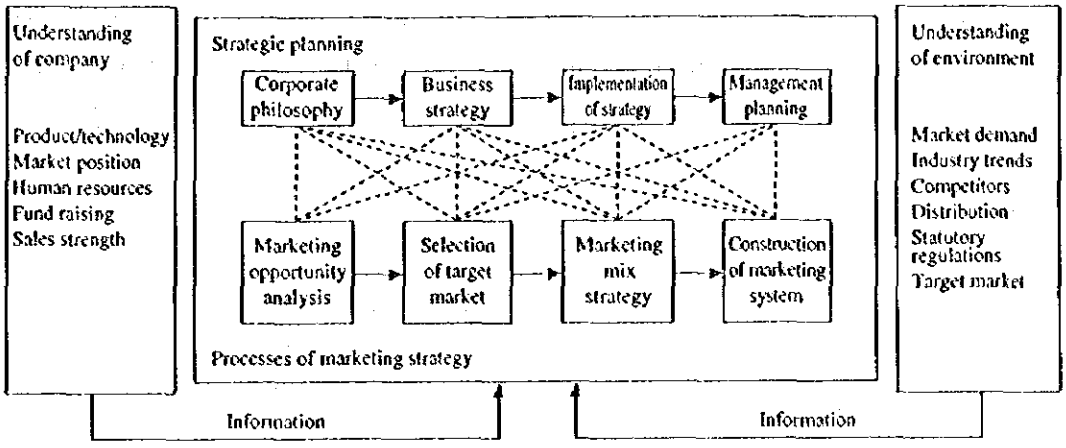


Figure 8-4-4 Strategic Planning and Marketing Strategies

1) *Processes of marketing strategy*

(1) Marketing opportunity analysis

Marketing strategies begin with seeking marketing opportunities that are attractive for the company. Therefore, the marketing staff must not only gather external information, but also make efforts to gather and evaluate various kind of information and ideas within the company and utilize them as opportunities for marketing. IMAG's corporate structure is suitable for brainstorming which is a technique for gathering ideas. Thus, the future challenge for marketing activities is to sum up such information and utilize it as to make opportunities for marketing.

What is important in exploiting marketing opportunities is to select those that will allow the company to exhibit its strength. Such attractive marketing opportunities are analyzed by the marketing, financial, and production staffs. Based on this analysis, the marketing staff ranks the marketing opportunities and makes proposals about the opportunities that merit further development.

(2) Selection of a target market

The next stage of the marketing process is the selection of a target market. It should be noted that the market to be selected is not only a route for selling a product, but also it should contain an area in which the company can participate. Selection of a target market will allow the concept of a product to be established, but the wrong selection will hinder corporate activities. In selecting a target market, the technique of market segmentation can be used. This technique divides a market into several parts according to their characteristics and conditions, allowing the company to consider which is the best segment to enter.

The market segmentation technique generally employs a matrix with products and market segments arranged as rows and columns. It is important to use a matrix that is suited to the actual situation such as the market-customer matrix of replacement bus seats shown in Figure 8-4-5.

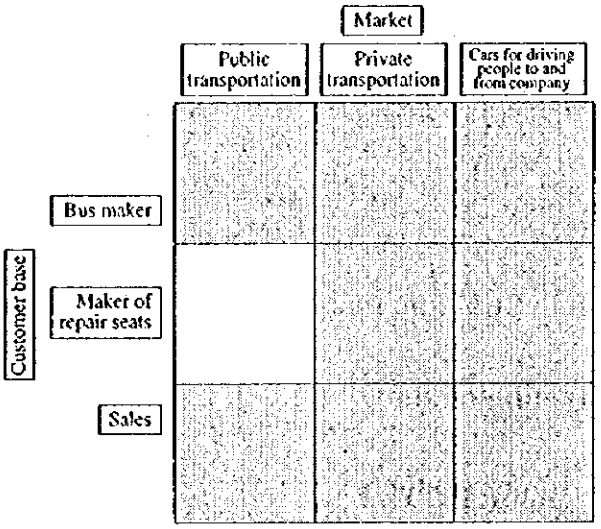


Figure 8-4-5 Market-Customer Matrix for Replacement Bus Seats

Based on this matrix, the subdivided market is analyzed to select a target market.

(3) Marketing mix strategy

The next stage of the marketing strategy is to plan an effective marketing mix strategy based on the selected target market. A marketing mix is a combination of elements known as the four Ps (product, price, place, promotion) described below.

(a) Products : Quality, character, bland name, size, guarantee etc.
(b) Price : Standard price, Discount, Payment condition etc.
(c) Place : Distribution channel, inventory, delivery
(d) Promotion : Sales promotion, advertisement, publicity

Although the items to which the greatest importance should be attached vary with the type of business, the following four points should be kept in mind when considering a marketing mix.

(a) Selection of a type of product and market
A type of product should be selected which has features in common with the current products, technologies, and markets from the viewpoint of a corporate growth strategy.

(b) Orientation for growth

The direction to take should be clearly defined by selecting from among market penetration, market cultivation, product development, and diversification as described in the section about business strategies.

(c) Competitive advantage

When advancing into a new area, consider what the company's advantages are in that area.

(d) Synergistic effect

Consider whether a synergistic effect with current products or technologies can be expected from the advance into the new area.

2) Strategic information system

As described above, what is important in business management is how to make use of information which can be considered as the fourth resource (after human, materials and financial resources). An information system which is incorporated into the planning of business strategies and used efficiently is known as a strategic information system (SIS). Conventional information control systems centered around computers place emphasis on labour saving, rationalization, and cost reduction. In contrast, SIS uses information and a system for strategic business management. At present, the Information Controlling Department of IMAG is building information processing systems as part of the transition to SIS. The company should quickly arrange for the Information Controlling and Marketing Departments to be provided with a single common source of information from the viewpoint of marketing strategies.

3) Improvement of marketing activities

The following points should be kept in mind when planning and systematically implementing strategies that can respond flexibly to changes in the environment.

(1) Sales promotion of capital goods

The sale of automotive parts such as seats, which are capital goods, depends heavily on technical factors such as quality, performance, functionality, and prices. Unlike general consumer goods, it is important to prepare and use catalogues and technical data to promote the sale of capital goods. On the customer's side, many persons from various departments participate before a decision is made to buy a product. The factors that affect the decision vary from department to department, and each department examines relevant factors from its own point of view. Therefore, in sales activities, it is important to correctly understand who are the influential figures in the departments concerned with the purchase and what factors affect their purchasing decisions.

(2) Leadership of management

Compared to bottom-up approaches, top-down approaches allow rapid decision making, but it takes longer for the decisions to become known to the entire organization. Therefore, the executives should use information systems to make strategic decisions quickly and to put the decisions into action, exercising strong leadership.

(3) Flexible organizational structure

When planning and implementing strategies, the human resources must change as well as the company organization in order to achieve the new goal. For that, it is necessary for the organization to be flexible, talented people should be promoted and authority should be delegated to enable each person to play an active part.

(4) Man machine interface

As information systems become complicated and sophisticated, one possible problem is that the information cannot be digested properly. Also, negative aspects of information systems will surface due to lack of communication among departments. In using an information system, as well needing the knowledge and skill to use the system, people must be flexible in their ways of thinking and working. The role of man as the interface between machines and software will be important.

(5) Customer management

Unlike general consumer goods, in the sale of capital goods, it is important to try to increase sales by providing solutions to problems the customers have. This makes it necessary to a system of sales activities based on problem-solving. The market for IMAG today means being customers oriented. The Marketing Department that interfaces with customers, should make the entire company aware that customer satisfaction leads to company profits.

Particular efforts are necessary to maintain trusting relations with customers with whom mutual understanding is difficult due to differences in culture and company attitude. Control within the company is also very important. The Marketing Department should take charge of this controlling function from the marketing point of view, by serving as a bridge between the company and its customers. For that, the department should also participate in the meetings with customers.

(6) Market cultivation

IMAG's goal is to "become one of the largest parts makers in Europe." For that, IMAG should wholeheartedly commit itself to the following points.

(a) Make high quality products.
(b) Observe delivery dates in spite of small variations.
(c) Cultivate development capabilities, and develop new products in co-operation with the clients.

(d) The management should be competent and the entire company should function in a lively fashion.

(e) The company should be trustworthy in all respects including financial matters.

(7) Systematic marketing activities

Public buses are mandated to undergo major repairs every seven years. Many of them were originally equipped with IMAG's seats. IMAG does not carry out marketing activities in the replacement seats market, and low quality seats manufactured by small businesses are used as replacements in such repairs. This is a big market for IMAG today. Also, the installation of inferior seats on IKARUS buses may damage the corporate image of IMAG.

In view of the above points, IMAG should consider entering market after conducting systematic market research on sales prices and marketing channels in the replacement seats market.

(8) Further improvement of quality

As described earlier, the starting point for marketing activities is customer satisfaction, i.e., meeting the market needs. For that, it is necessary above all to maintain and improve product quality. IMAG has acquired the ISO 9001 certification aimed at quality control, but this in itself does not assure quality. Companies often expend energy on the acquisition of the ISO 9001 certification and forget the spirit of quality control. As a result, quality control may become superficial.

8-4-3 Promising Markets

1) Situation Concerning the Supply and Demand for Cars

(1) Transport situation

Transportation in Hungary includes railroad, road, water, and air transportation. The transport of both passengers and goods has decreased greatly since the second half of the 1980s, reflecting the sluggish domestic economy. 1994 saw slight signs of recovery. Table 8-4-2 summarizes the main trends of transportation in Hungary.

Table 8-4-2 Changes in the Volume Transported

	1989	1990	1991	1992	1993	1994
Transport of Goods (million tons)	312.9	230.1	171.6	130.4	107.5	112.3
Passenger Transport						
Long distance (millions)	815.8	765.5	707.0	672.1	650.9	647.5
Local (millions)	3,410.9	3,143.8	2908.1	2,686.8	2,635.6	2,695.0

Source: Statistical Yearbook of Hungary 1995

(a) Transport of goods

As shown in Figure 8-4-6, goods are transported mainly by rail and by road. Rail transportation accounts for 53% of the total by weight, while road transportation accounts for 45%.

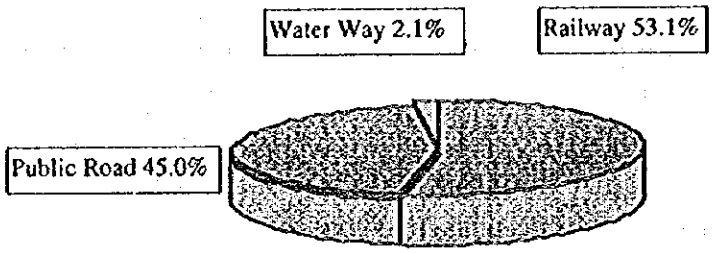


Figure 8-4-6 Means of Transporting Goods (1994)

Domestic goods are transported by road, while imported and exported goods are transported by rail. Table 8-4-3 shows the breakdown transported goods.

Table 8-4-3 Composition of Transported Goods

(Unit: Thousand tons)

	1980		1990		1993		1994	
	Rail	Road	Rail	Road	Rail	Road	Rail	Road
Inland Trafic	79,498	227,291	47,397	115,361	19,971	38,155	21,531	39,425
Import Trafic	20,312	344	16,712	965	13,247	498	14,273	512
Export Trafic	10,223	514	11,509	1,661	7,103	625	8,315	634
Transit Trafic	19,794	3,609	12,104	777	3,252	474	4,119	345
Total	129,827	231,758	87,722	118,764	43,573	39,752	48,238	40,916

Source: Statistical Yearbook of Hungary 1995

(b) Transport of passengers

Both long-distance and municipal passenger transport is mainly by bus, reflecting the area of the country. As shown in Figure 8-4-7, bus transportation accounts for 75% of long-distance travel and 87% of municipal travel. In addition, trolley buses, suburban railways, and subways are also used as means of transporting municipal passengers.

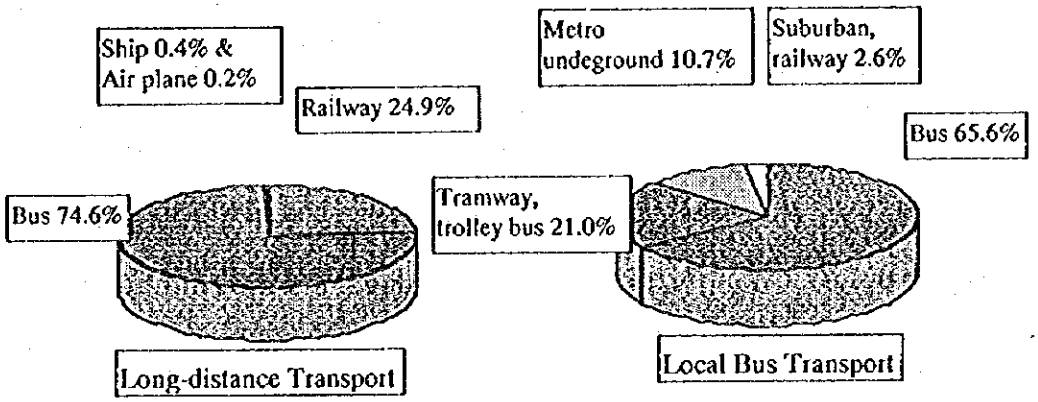


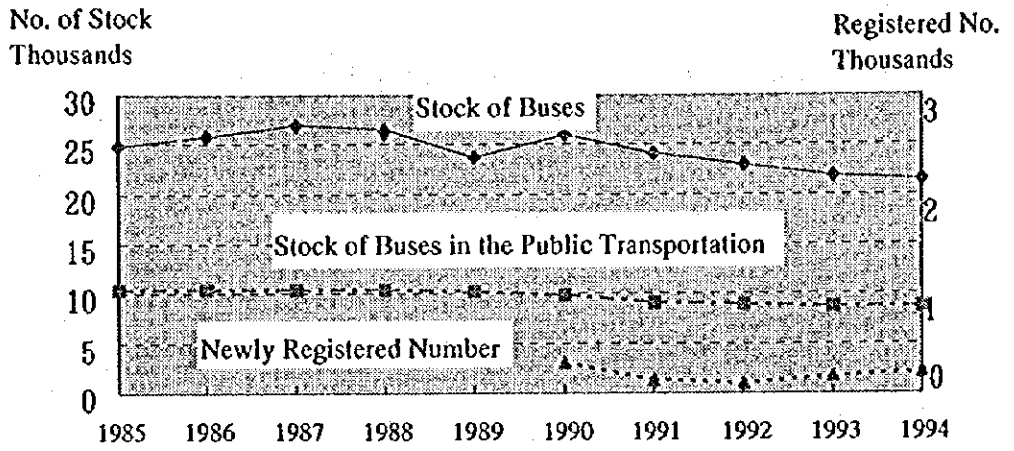
Figure 8-4-7 Means of Transporting Passenger

Public transport by bus that accounts for the majority of passenger travel is typified by the joint enterprise BKV that operates around capital Budapest, and Volan set up among 22 municipal bus companies. It runs approximately 8,700 buses (1994).

(2) Number of vehicles owned

(a) Buses

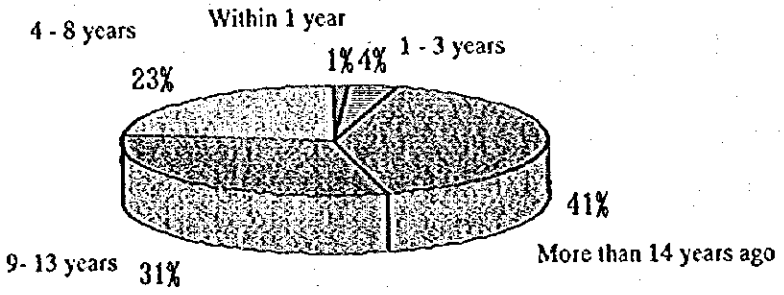
There were 21,500 buses as of 1994, of which 14,000 or 65% were made by IKARUS. Of large buses which have over 26 passenger seats, 98 percent are IKARUS-made. As can be seen from the changes in the number of buses shown in Figure 8-4-8, the stock has been gradually decreasing since 1990. In 1994, the number was 80% of the peak. The number of buses used for public transportation also dropped to 83% of the peak.



Source: Statistical Yearbook of Hungary 1995

Figure 8-4-8 Changes in the Stock of Buses and the Number of New Registrations

As shown in Figure 8-4-9, buses 10 years old and over account for 70% of the stock. Only 200 new vehicles were registered in 1994: buses are aging rapidly. If the trend continues, the number of buses in actual service will decrease further because of maintenance or repairs, dealing a blow to public transport. The average service life of buses in Japan varies from 12 to 16 years for a total mileage of 400,000 to 700,000 km, depending on the conditions of use. Supposing that the useful life of a bus is 20 years, 700 new buses must be supplied annually, according to a rough calculation, to maintain the current requirement of 14,000. In the case that the demand for public transport increases as the recovery of economy, the demand for new buses will increase.



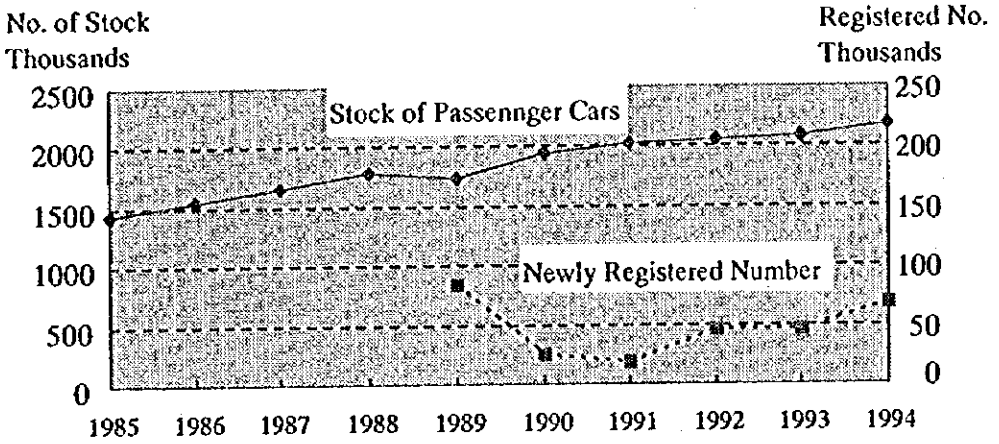
Source: Statistical Yearbook of Hungary 1995

Figure 8-4-9 Stock of Buses by Age

(b) Passenger cars

Figure 8-4-10 shows the stock of passenger cars and the number of new registrations. In spite of the sluggish economy, the registered number of passenger cars is increasing

steadily. In 1995, the number of passenger cars reached 2,180,000. The number of newly registered cars was small in 1990 and 1991, but turned upwards after that, and amounted to 68,000 in 1994.



Source: Statistical Yearbook of Hungary 1995

Figure 8-4-10 Stock of Passenger Cars and Number of New Registrations

The characteristics of the passenger car market in Hungary include:

(a) So far, a large proportion has been used cars imported mainly from EU countries. The private import of used cars six years old or older was prohibited by the government's emission control regulations in October 1993. This is expected to lead to an increase in the sales of new cars.

(b) The size of the domestic market, judging from its economic scale, the population and other factors, is not large.

(c) The number of people per car is 4.7 persons, which is the second lowest (after Czechoslovakia) of the East European countries. However, this figure is much higher than in the EC countries, where the figures are in the order of 2 persons (Table 8-4-4).

(d) Even an inexpensive car costs the equivalent of 30 months' wages of average wage earners: the buyer class is still immature.

Considering the above, the potential demand in new future for passenger cars in Hungary is estimated to be somewhere between 50,000 and 100,000.

Table 8-4-4 Number of Passenger Cars and Number of People Per Car in Major European Countries

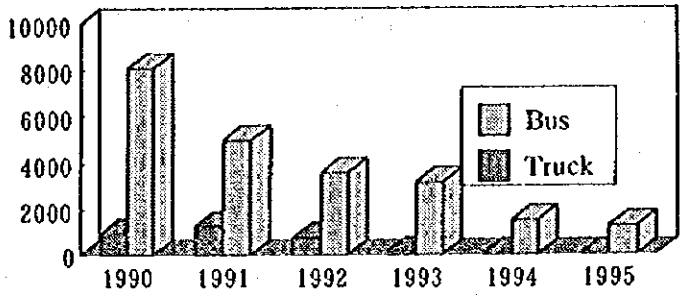
	No. of Passenger Car	Population per Car
Belgium	4,174,811	2.4
Demmark	1,674,939	3.2
France	24,210,000	2.4
Germany	39,917,577	2.1
Italy	29,850,000	2.0
Holand	5,884,000	2.6
United Kingdom	24,470,962	2.4
Spain	13,440,694	2.9
Austria	3,367,626	2.4
Switzerland	3,116,623	2.2
Sweden	3,594,199	2.4
Czechoslovakia	2,693,905	3.8
Rumania	1,793,000	12.7
Poland	6,770,557	5.7
Hungary	2,178,891	4.7

(3) Production and Sales of Vehicles in Hungary

As described in Chapter 2, which deals with the Hungarian automobile industry, the automobile industry of Hungary depended on bus production by IKARUS. With the introduction of foreign capital by companies such as Magyar Suzuki and Opel, passenger cars started to be produced in 1992. An overview of domestic car production is shown below.

(a) Commercial vehicles

As shown in Figure 8-4-11, most of the commercial vehicles produced in Hungary are buses, although trucks are also produced. The volume produced is decreasing rapidly. The reason for this, as described above, is the political and economical confusion in the former communist block which was a major market for Hungary.



Source: The same as Table 2-1-2

Figure 8-4-11 Changes in Output of Commercial Vehicles, 1990-1995

(a) Production of trucks

RABA produced 2,000 heavy trucks annually until the middle of the 1970s. However, later it placed more emphasis on the production of diesel engines and axles. As a result, the production of trucks is currently limited to order production basis. Since diesel engines and axles are selling well, it is not likely that the company will increase its production of trucks.

Manufacturers of medium sized trucks which include Chepel, however, hardly engage in any production at present.

(b) Production of buses

The production of buses was almost monopolized by IKARUS. However, as described above, the bus production of IKARUS decreased rapidly, and only 1,136 buses were produced in 1995, 73% of which were exported. As shown in Table 8-4-5, IKARUS exports its products to all parts of the world, and at the height of prosperity it exported more than 90% of its products.

Table 8-4-5 Actual Export Record of IKARUS Buses

(Unit:Number)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Bulgaria	153	306	114	25	36	12	5	-	-	-
(Czechoslovakia)	263	250	303	581	204	69	13	(2)	(3)	-
Poland	1,901	437	251	431	311	211	91	130	123	168
Rumania	-	-	-	-	-	158	2	-	-	-
Bulgaria	-	-	-	-	-	-	5	-	-	1
(East Germany)	1,025	1,063	1,214	1,064	679	-	-	-	-	-
(Soviet Union)	8,053	7,904	7,721	6,504	5,241	1,717	947	1,830	746	568
East Europ	10,275	9,960	9,603	8,601	6,471	2,167	1,058	1,963	874	736
West Germany	1	1	17	4	-	(2)	(3)	(7)	(1)	(23)
England	9	20	40	-	1	17	41	21	20	24
Greece	-	21	7	-	-	-	-	-	-	-
Others	12	18	14	25	11	4	9	4	5	1
West Europ	22	60	78	29	12	23	53	32	29	48
China	600	1	430	1	170	-	-	-	-	-
Taiwan	-	-	-	-	-	27	560	-	-	-
Turkey	21	-	-	-	105	375	1,111	575	48	20
Kuait	31	-	-	80	40	166	71	22	30	20
Yemen	-	-	28	28	-	-	6	-	3	1
Iran	-	-	-	-	-	1,000	304	-	3	-
Others	312	10	13	142	-	-	5	25	55	-
Asia	964	11	471	251	315	1,568	2,057	622	139	21
Canada	12	128	82	-	-	-	-	-	-	-
U.S.A	-	-	-	58	147	147	37	60	9	-
Cuba	609	650	530	570	100	-	-	-	-	-
Ecuador	-	-	40	-	-	100	2	-	-	-
America	621	778	652	628	247	247	39	60	9	-
Egypt	50	355	352	250	466	401	1	-	-	18
Libya	-	300	150	-	125	401	-	-	-	-
Angoia	100	-	99	-	-	-	1	-	-	-
Tunisia	-	-	30	122	55	12	40	55	-	1
Others	23	-	50	17	2	60	2	-	-	
Africa	173	655	681	379	648	473	44	55	-	19
Export Total	12,055	11,464	11,485	9,888	7,693	4,478	3,251	2,732	1,051	824

Source : IKARUS

Although East European countries centered around the former Soviet Union, were the major markets for IKARUS until 1990, the company also sold worldwide. Even Mercedes-Benz, which has the highest output in West Europe, produced only 4,300 buses in 1994. IKARUS in the communist days was the largest bus manufacturer in the world. The IKARUS bus still enjoys a high reputation among developing countries because IKARUS has been developing buses to suit the infrastructure (such as roads) of the former Soviet Union and East European countries for a long time.

The sales of buses are mostly based on bidding; public autonomous bodies in various countries often contract for large quantities of buses. Based on its previous experience, IKARUS targets its marketing activities mainly in developing and semideveloped countries. However, with the entry of newly emerging companies, such as South Korean companies, into the market, IKARUS is losing its advantage in price competition with these companies.

In view of the situation described above, IKARUS plans to produce 1,500 buses in 1996 in anticipation of an increased demand generated by the economic recovery.

(b) Passenger cars

In Hungary, passenger cars are produced by two companies: Magyar Suzuki and GM Hungary. Table 8-4-6 shows the quantities produced by the two companies.

Table 8-4-6 Output of Passenger Cars

	Magyar Suzuki			GM Hungary	Ground Total
	Domestic	*Export*	*Sub Total*	*Domestic*	
1992	916	0	916	9,936	10,852
1993	12,476	79	12,555	13,344	25,899
1994	16,081	3,290	19,371	13,282	32,653
1995	12,178	23,873	36,051	N.A.	-
1996 (Plan)	13,500	36,500	50,000	N.A.	-

Sources: Company data for Magyar Suzuki; Japan Automobile Manufacturers' Association

Hungary aims at joining the EU in 2000. Magyar Suzuki, which serves as Suzuki's production foothold in Europe, produces Caltus (local name: Swift), Suzuki's typical car model. In future, it will specialize in car models that are not produced in Japan, and export them to West Europe from Hungary. Its production capacity is 60,000 cars a year, and its production goal for 1996 is 50,000 cars, of which it plans to sell 15,000 cars in Hungary and export 35,000 cars, mainly to Europe.

Also, Magyar Suzuki is supplying four-wheeled drive vehicles to Fuji Heavy Industries Ltd. on an OEM basis. These have been put on sale in West European countries, and further growth in sales can be expected.

GM Hungary produced 13,000 cars in the assembly plant for the Opel Astra in 1994. All of the products were intended for the Hungarian domestic market. The company imports most of the parts including seats; the proportion of domestic parts is said to be 14%.

As described above the market for passenger cars in Hungary is estimated at somewhere between 50,000 and 100,000. The future trend of the automobile industry depends heavily on the injection of foreign capital into the country. However, geographically Hungary is adjacent to the EU which is one of the largest automobile production area comparable to that of Japan and North America, and so there is a slim possibility that the production of passenger cars will be increased for domestic demand.

2) Outlook for Markets

The markets that automotive parts manufacturer IMAG should target are those in which it can take advantage of its superior expertise. Also, as it is the largest automotive parts manufacturer in the country and as its business centers on the production of automotive seats, the markets which the company should target must be larger than a certain size. The outlook for promising markets is discussed below, from these points of view.

(1) Domestic Markets for Automotive Seats

The seats for IKARUS and Magyar Suzuki are produced by IMAG. As matters stand now, the domestic automotive seat market is almost monopolized by IMAG. The domestic automobile market is rather small for IMAG which in the past had produced seats for more than 100,000 buses. In view of these present state of the market, it is realistic to expect that the only increase in the seat production of seats will come from the current two clients. Discussion of the present state of the domestic markets follows.

(a) Seats for commercial vehicles

Almost 100% of IKARUS bus seats are supplied by IMAG. Seats made in West Germany or Czech are used for some driver's seats at the user's request. In the development of IKARUS buses, IMAG cooperates with IKARUS to develop the seats: the two companies maintain a close cooperative relationship.

At present, the annual output is 1,200 sets (seats for 1,200 vehicles). The production goal is 1,500 sets a year, assuming that demand will increase due to the need to improve public

transportation, provided that there is an economic recovery in Russia and East European countries which are the major markets.

RABA acquired 52% of IMAG's shares in 1996 and the cooperative relationship between the two companies appears promising. RABA produces trucks but the quantity of trucks is small and it is difficult to make the production of seats for them a profitable business.

(b) Passenger car seats

Magyar Suzuki plans to produce 50,000 cars in 1996. This is an increase of 40% from the 36,000 cars made in 1995.

In Japan, a passenger car maker is generally supplied by two seat makers as a precaution in case one maker experiences problems. However, it is generally considered that a car maker reads a minimum output of 100,000 cars a year in order to have two seat suppliers. If IMAG can maintain the corporative system in the field of price and quality, IMAG's monopoly is therefore likely to last for in future.

All the seats used by GM Hungary are imported. Since their structure requires complicated techniques and production ability, it is difficult for IMAG to manufacture them.

Since there are many internal and external factors affecting the automobile industry of Hungary, it is difficult to estimate the future domestic demand for automotive seats. However, the findings obtained by interviewing various companies at the time of the field survey can be summarized as follows:

	Fiscal 1995	Fiscal 1996	Maximum goal
Bus seats	824 sets	1,200-1,500 sets	1,500 sets
Passenger car seats	36,051 sets	50,000 sets	60,000 sets

(2) Export markets for Automative Seats

IMAG annually exports 7 to 10 sets of bus seats - that is 280 to 400 passengers seats assuming that the buses are 40-seaters - to Poland and Czechoslovakia. Automotive seats are not suitable for a distant marketplace since they are bulky when packaged so causing high transportation costs. Consequently, many Japanese seat makers build their plants near the automobile plants of their clients. Thus, the export of complete seats is considered to be difficult except under special conditions.

(a) Characteristics of West European seat makers

There are many bus manufacturers in West Europe, but many of them make their own seats. Also, carmakers are strongly affiliated with their seat makers. Consequently, the markets were difficult to access for a new maker. Recently, however, the sluggish demand for automobiles and increased price competition have triggered a reorganization of automakers, providing opportunities for entry.

Many of the West European seats are luxury products, meaning that if IMAG tries to enter the market, it is required to expand its present development capabilities.

(b) Characteristics of East European seat makers

Among East European seat makers is the Czech Company, Crarossr. The products of East European seat makers are inferior in quality to those of IMAG, but cost only 80% of IMAG's products. Also, as described above, direct investment in the automobile-related industries is increasing in Poland and some other countries, activating the automotive parts industries of these countries. This situation makes it difficult for IMAG to expect future growth in the export of automotive seats.

(3) Competitors for Automotive Seats

The domestic automotive seat market is almost monopolized by IMAG. However, as a result of the economic liberalization, the rival companies shown below have been established. Since their corporate activities are likely to intensify, even harder efforts are required in order to maintain IMAG's leading position.

(a) Rekaro

Rekaro, a German seat vendor, is well known as a manufacturer of high-quality seats for sports cars. The company is engaged only in cutting and sewing cloth for seats on a scale of 200 to 250 employees near Mor where IMAG is located. All the products are sent back to Germany. We learned that the company would start the assembly of passenger car seats in future. It is likely that the company will become a strong competitor of IMAG.

(b) IVC

IVC produces seats in a joint venture operation with Vogel of Germany. IVC is engaged mainly in the assembly of seats and sews a small quantity of cloth. It produces all the seats used by Egyedi - a subsidiary of IKARUS - which produces 150 to 180 buses a year. IVC began its operations aggressively: for example it set low prices at the time of market entry.

(4) Seats for Railway Vehicles

Now the Hungarian National Railways owns about thirty-five hundred railway vehicles. Seats are replaced in 50 to 100 of these vehicles annually. Regarding the quantities of seats, a first-class car contains 66 seats and a second-class car contains 78 seats. IMAG commands a *100% share of the market for these replacement seats: the market is extremely stable.*

The Hungarian National Railways has a plan to purchase 50 vehicles in two years for its international trains. IMAG is developing seats with the aim of winning the order for them. High quality is required of these seats, and it is likely that IMAG will have to compete with Spanish and German seat makers.

(5) Markets for Replacement Seats and Other Seats

(a) Replacement seat

It is mandatory for public buses to undergo major repairs every seven years. Seats and cushions must be replaced during the repair. There are 21,500 public buses in Hungary, of which 65% (or 14,000 buses) are IKARUS buses, that is, they are equipped with IMAG's seats. By a rough calculation, the size of this repair market is 2,000 buses a year. At present, seats are supplied to this market by small businesses specializing in repairs.

The quality of the seats repaired by these small businesses is not very high, which may adversely affect the reputation of IMAG. Thus, this market is important for IMAG. To enter this market, IMAG should concentrate on the marketing activities shown below, rather than investing funds in the development of new products.

(a) Sell existing products developed as standard products.
(b) Produce seats for after market consuming surplus materials, such as surface materials, due to the model change of cars effectively.
(c) Investigate the actual conditions of the industry and organize an appropriate sales network.
(d) Carry out marketing activities aimed at the public bus companies BKV and Volan.

(b) Other bus seats

In Hungary, customs duties on mini buses are exempted, if they are imported without interior fittings, which includes seats. Most of the seats used for these buses are supplied by small businesses.

Depending on the type of bus, IMAG's seats may not be suitable, without modification, because the shapes are usually different. This market is not attractive enough for IMAG to pursue actively because of the small demand and the low profit that can be expected. However, IMAG has prospects of receiving orders through its sales network mentioned above.

(6) Automotive Parts

In Central and Eastern Europe, where foreign capital is being actively introduced into automobile-related industries, it is likely that regional specialization will occur based on the corporate strategies of western automakers. To adapt itself to such specialization, IMAG should try to diversify its products based on the production technologies it owns. Currently, IMAG produces the following products in addition to the automotive seats.

(a) Parts for seats
IMAG produces seat frames and exports them to a German company. Although completed seats are bulky, creating the problem of expensive transportation, semi-finished products such as parts for seats have a chance of being marketed.

(b) Other automotive parts
The automotive parts produced by IMAG include wire harnesses, doors and roof trim for German and Japanese companies, as well as trunk boxes for IKARUS buses.

Except for the trunk boxes for buses, IMAG receives technical assistance for their products from foreign companies. The commercial introduction of an automotive part depends entirely on receiving orders from automakers: the mere possession of manufacturing techniques is not enough. Therefore, when attempting to obtain orders, it is necessary to produce product samples as well as to develop the products. If a company enters the market without possessing development capabilities, it will have no choice but to become a secondary subcontractor for parts makers. Therefore, when entering a new market, IMAG must select the fields in which it can take advantage of its superiority including the existing facilities, manufacturing techniques, and development technologies shown below. In addition, since appropriate size of markets do not exist domestically, IMAG must target mainly foreign companies.

(a) Metal working techniques
(b) Techniques for cutting and sewing cloth
(c) Urethane foaming techniques
(d) Injection molding techniques
(e) Products resulting from a combination of the above techniques

There are two ways to take advantage of the above techniques. The first is to become a supplier of processed parts. The second is to become a full-line manufacturer based on the company's own development technologies. Examples of full-line manufacturers include a total automotive interior manufacturer. Automotive parts can be roughly classified into more than 4,000 types. It is not wise to spread corporate efforts on all of them. It is necessary to adopt a business policy of, for example, specializing in interior parts and concentrating on its development.

Classifications that include multiproduct capabilities are listed below. As described so far, the implementation of this kind of policy involves various business and technical conditions.

(a) Interior parts
Instrument panels
Console boxes
Roof and door trim, luggage boot linings
Carpets
Steering wheels
Sunvisors
Assist grips

(b) Metal working (pipe bending techniques)
Rings used for suspensions
Trailer hitch fittings for passenger cars
Hand rails and supports for buses
Canopy ribs to be used for load carrying platform of trucks
Underfloor guard pipes for trucks

(c) Sewing techniques
Processing of seat surface materials

(d) Urethane foaming
Arm rests
Shock absorbing parts such as hand rails

(7) Other Markets

Besides automotive parts, IMAG plans to develop desks and chairs for use in schools. This is an application of pipe working techniques. However, as mentioned above, it seems to be wise for IMAG, which has been in the automobile sector of passenger cars for only four years and whose operations have not yet stabilized, to focus on automotive parts and upholstery rather than to deal with a wide range of products. This does not mean that potential markets other than

the automotive parts market should be excluded, but emphasis should be given to the above mentioned automotive parts markets.

8-4-4 Human Resources Development and Labor Management

The purpose of human resources development and labor management in a company is to secure and develop the human resources necessary for implementing the corporate philosophy and management policy of the company. For a company to respond properly to drastically changing internal and external circumstances and carry out competitive business activities, its human resources are very important. IMAG is also trying to build a new system for developing its human resources and managing labor in order to adapt to the radically changing business environment. The labor management of IMAG has the following tasks.

(1) Adaptation to changing business environment
The human resources that the company requires change with the needs of the times. The company must develop its human resources so that they can respond flexibly to changes in the business environment and can contribute fully in achieving its business objectives.

(2) Development of diverse administrative abilities
As the environment surrounding the company becomes more complex and sophisticated when its business circumstances change, the company must make its managerial techniques more sophisticated. Also, as its operations diversify and when new business are cultivated, it will become necessary to modify or increase the number of divisions. In this way, as the management system expands and becomes more sophisticated, the company must increase its range of administrative abilities.

(3) Personnel management based on ability
To vitalize the company and survive the increasingly intensive competition between companies, in managing its personnel, the company should emphasize the development of their personal abilities.

(4) Providing employees with reasons for working and living
In order for the employees to find meaning in their work as members of the organization, it is important to develop and improve their ability to do their jobs. Then the company should make effective use of these abilities and treat the employees according to the jobs they do and how well they do them.

1) Personnel management system

These are tasks that not only IMAG, but also many other companies are faced with. To solve these personnel management tasks, many companies are beginning to adopt professional ability grading. To reinforce its business structure, IMAG should consider introducing comprehensive human resources development and labor management (a total personnel system) by incorporating professional ability grading into the qualification system currently employed. A total personnel management system consists of:

(a) Professional ability grading
(b) Merit rating
(c) Wages based on job evaluation
(d) Development of abilities

As shown in Figure 8-4-12, by repeating the function of this system in an organized way, it is possible to build and reinforce a business structure for achieving the goal of the management plans.

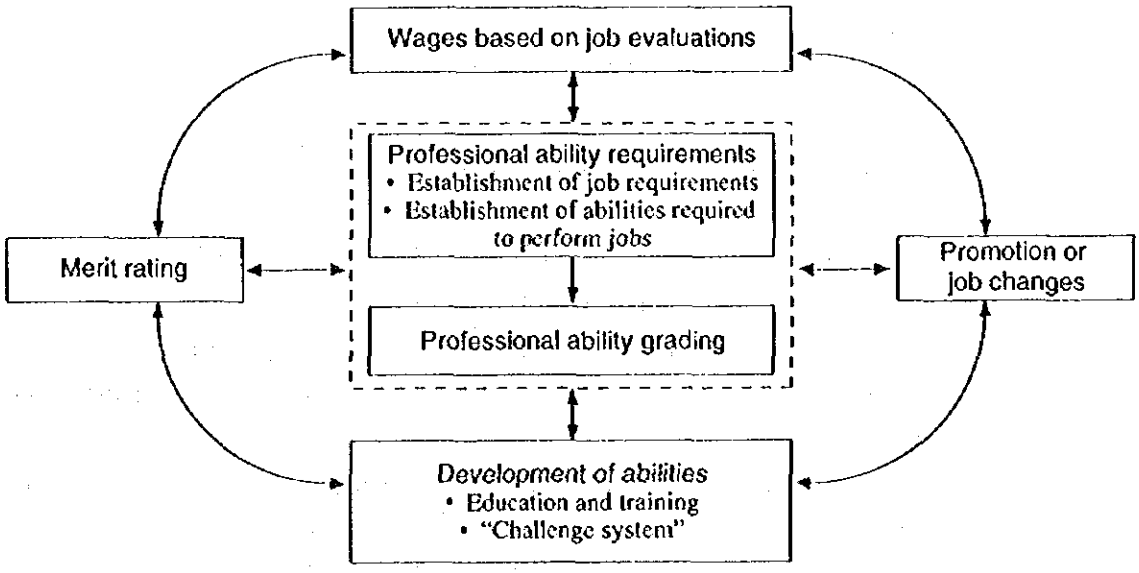


Figure 8-4-12 Schematic of the Total Personnel System

(1) Professional ability grading

As described in Chapter 7 "Present State and Problems of Business Management," IMAG currently employs a system in which functions are classified into five groups, which are subdivided into several ranks. IMAG has been studying labor management and has modified systems, which the company should fully utilize. Therefore, when introducing a professional ability grading

system, it is realistic to begin by defining each function and the corresponding job requirements based on the existing classification of functions. Establishment of a professional ability grading system involves the entire organization and requires many tasks. The following paragraphs describe only some important items.

(a) Job and function analysis

It is advisable to use job and function analysis to define functions and expected job requirements and to establish the professional ability requirements based on this analysis. Job and function analysis defines the duties and functions of each position objectively and concretely by discussing and analyzing the information obtained by investigating the actual job conditions, and taking the company's business policies into consideration. The following items should be considered in job and function analysis.

a) Analysis of basic tasks
To define the basic role and tasks of each position within the organization.

b) Analysis of tasks to be performed
To define the details of the basic tasks to be performed.

c) Analysis of time allocation
To define the time required for each task.

d) Analysis of priority of tasks
To define the priority of tasks for each position

e) Analysis of authority
To define the degree of authority required to perform each task.

f) Analysis of abilities required to perform jobs
To clarify the abilities needed to perform tasks for each position.
Knowledge and skill: basic knowledge, professional knowledge, qualifications, and licenses
Abilities and attitudes: judgment, inventiveness, executive ability, comprehension, planning ability
Interpersonal abilities: negotiating ability, leadership, cooperativeness

To define professional ability grades, based on the above analysis.

(b) Definition of professional ability grades

There are 30 ranks in IMAG's system. Professional ability grades must be matched to these ranks. It is important to define an optimum number of professional ability grades that is suitable for the actual conditions of the organization. Although professional

ability grades and posts should be separated in principle, it is difficult to separate them in actuality. Thus, it is necessary to clarify their relationship when introducing a professional ability grading system.

(c) Establishment of professional ability criteria

Professional ability criteria should be established based on the professional ability grades. Such criteria should be established for the administrative and production departments or for the five functional categories currently used in IMAG. Also, the results of job and function analysis (described above), business policies, and problems relevant to the whole organization should be taken into account. As an example, professional ability criteria for part of an organization are shown below.

First grade

(Corresponding position: Deputy Business Director, Code 11)

a) *Professional ability criteria*

Capable of putting the corporate policy and philosophy into practice and aware of this necessity. Has the advanced knowledge, skill, experience, judgment, negotiating ability, and inventiveness necessary for realizing corporate and departmental objectives. Quite capable of assisting the president and has the dignity commensurate with such a position.

b) Professional ability requirements

(Abilities in interpersonal relations)

Capable of addressing any customer appropriately.

Capable of motivating human resources under his authority.

(Basic knowledge and skill)

Has learned how to run a business and capable of directing the employees.

Has knowledge about the manufacturing of automotive parts and adequate knowledge about the customers and suppliers.

Knows how to analyze financial statements.

Rest is omitted.

c) *Ability to perform job*

Rest is omitted.

Second grade

(Corresponding position: Head of Division, Code 11A, Head of Department, Code 12)

a) Professional ability criteria

Rest is omitted.

(2) Merit rating system

The merit rating system must play an important role in proper and fair personnel management. For that, the merit rating system should work as part of a total personnel system that works in close coordination with jobs and functions. The merit rating system is used for the following purposes.

(a) Proper personnel assignment
(b) Development of abilities and education & training of employees
(c) Fair distribution of the pay-roll
(d) Proper promotion

Traditionally, merit rating placed emphasis on evaluation and assessment for wage management. Recently, merit rating places emphasis on ability development and proper personnel assignment to meet with corporate objectives.

Generally, evaluations can be roughly divided into "ability evaluation," "performance evaluation," and "work evaluation." For actual personnel management purposes such as promotion or job transfers, a "fair evaluation" is made. Items to be evaluated are classified as follows:

(a) Ability evaluation
  a) Knowledge requirements
     Job Knowledge (professional knowledge, practical knowledge, basic knowledge)
  b) Ability requirements
     Judgment, inventiveness, executive ability, negotiating ability, leadership, comprehension, planning ability, handling ability, ability to cope with situations
  c) Attitudinal requirements
     Diligence, cooperativeness
  d) Job responsibility

(b) Performance evaluation
  a) Degree of achievement of corporate policies and plans
  b) Track record of improvements in business
  c) Track record of product development
  d) Track record of business reports
  e) Degree of achievement in developing own abilities
  f) Quantity and quality of work
  g) Track record of sales support
  h) Track record of cost reduction

(i) Work evaluation

Generally, superiors make qualitative evaluations through interviews with employees.

It is desirable to introduce a merit rating system that works in coordination with the professional ability grading system. For the time being, however, the existing evaluation systems should be reviewed, and the evaluation method should be disclosed to raise the employees' awareness and help them set their goals.

(3) Wages based on job evaluation

In IMAG's wage system, maximum and minimum wages have been defined for each functional rank. When a new merit rating system is introduced, it will become necessary to review the wage system so that it will work in conjunction with the new merit rating system.

(4) Development of abilities

Business management heavily depends on the human resources the company has. Therefore, the human resources development undertaken by a company plays an important role in the corporate activities of the company. The human resources development tasks that IMAG should deal with include:

(a) A basic policy of human resources development should be established and its orientation clarified, based on the business policies and medium and long-term management plans.

(b) In developing human resources, it is advisable to try to maintain a balance between improvement of the company's productivity and to respect for the employees' human needs.

(c) Training should be systematically conducted through the coordinated use of OJT, OFF-JT, and self-development.

(d) Training must contribute to improving performance and achieving goals in the production department.

(e) The educational courses and curriculum currently provided should be reorganized in order to develop exactly the abilities required in each job grade.

Introduction of a system to develop abilities that works in conjunction with a professional ability grading system will be effective in dealing with the above mentioned tasks. The business environment surrounding IMAG is vastly different from the conventional one. In this environment, situations may arise that cannot be dealt with based solely on past experience and records. In such an environment each employee must voluntarily and with a challenging spirit, develop his/her ability to perform his/her job.

For that, the employees should set challenging goals for themselves, draw up a concrete program for their attainment, and implement it. This method is known as a challenge system. It will produce better results when used in conjunction with the self-development and OJT that are important parts of the education and training provided by companies.

IMAG provides education and training under the lead of the Human Resources Department. An enhanced effect can be expected if a challenge system is introduced. The following paragraphs provide an overview of a challenge system.

(a) Setting of goals

The following three goals should be set. These goals must systematically coordinate the business policies and goals of the company with the goals necessary for the pursuit of individuals' careers.

a) Performance goal

Performance goals must be coordinated with the target values and main goals of the individual departments. This will allow each employee to concentrate his/her efforts on the attainment of the goals of the entire organization. Performance goals are set through interviews with superiors, based on higher goals - the goals of the entire company. Performance goals include a labor productivity goal, cost reduction goal, loss reduction goal, sales goal, margin goal, operating profit goal, and the like. Each employee selects and sets himself one or two of these goals.

b) Ability development goal

Ability development is the development of professional abilities - abilities necessary for performing the jobs individual employees are assigned. When setting ability development goals, the most necessary items should be selected from the ability requirements established for the professional ability grading system.

c) Self-development goal

Items to be selected as self-development goals include acquisition of a qualification or license, participation in the training courses necessary for the present job or future tasks.

(b) Preparation of a program

A program for achieving the goals systematically and voluntarily should be prepared. The program should be arranged on a goal management sheet such as the one shown in Figure 8-4-13 and the progress should be supervised.

(c) Preparation of an OJT plan

In order for each employee to achieve his/her goal, active support from his/her superiors is necessary. Since self-development goals are those necessary for the job, they should be supported by providing OJT. The superiors should draw up a concrete program, considering the goals submitted by subordinates and selecting, through interviews with the subordinates, the items that need guidance. An example of an OJT program is shown in Figure 8-4-14.

(d) Implementation management

In order to achieve a goal, meticulous guidance by superiors is necessary in addition to the personal effort of the person who sets the goal. To facilitate the achievement of goals, the following measures should be taken:.

a) Each employee should make a systematic effort voluntarily using his own initiative to achieve the goal given in the goal management sheet.
b) Superiors should provide OJT systematically according to the OJT program.
c) OJT leaders should evaluate the degree of achievement of goals once a month and give specific advice.

(5) Procedure for introducing labor management systems

It is impossible to introduce the above mentioned labor management systems in a short period: a long planning and implementation period is necessary. It is also necessary to consider when to introduce the systems. It is important that the employees understand the systems. Therefore, the following procedure is necessary for introducing the systems.

(1) An executive board should be set up (the president and Information Control Department).
(2) A committee should be established for screening workers (a letter of appointment should be issued to the committee members).
(3) Job evaluations should be performed
(4) Professional ability grades should be defined.
(5) Criteria for promotion should be established
(6) The wage system should be reviewed.
(7) Merit rating items and a merit rating sheet should be created.
(8) Training in merit rating should be conducted (for executives).
(9) The ability development system should be put in order.
(10) The operation of the systems should be explained to all the employees.

Management Table	Established Y. M. D.	Achievement Y. M. D.	Section	Position	Name
Target	Action plan			Rating	Self checking for achievement
〈Business performance〉					
〈Career development〉					

Figure 8-4-13 Goal Management Sheet

Section		Supervision		OJT Plan	Period	

System	Importance	Contents and method of instruction	Name of trainee	Time schedule							Rating	Comments
				M	M	M	M	M	M	M		

Figure 8-4-14 OJT Program

2) Improvements in labor management

(1) Motivation of employees

In order to build up the employees' morale and sense of participation in the company, it is necessary to motivate them properly. The following items will help to enhance the motivation of employees.

(a) Good working conditions (wages, welfare, working hours, etc.)
(b) Worthwhile job
(c) Fair evaluation of individuals' achievements
(d) Excellent management and superiors trusted by subordinates
(e) Sharing of corporate objectives and visions
(f) Balance between collective goals (established by a department or section) and personal goals.
(g) Sense of security about the future based on the continuing growth of company
(h) Bright career path

Items (b), (c), (d), and (f) depend largely on the employees' superiors, and Items (d), (f), (g), and (h) on the attitude and ability of the management.

(2) Improvement of discipline in workplace

(a) Education of executives

The theme of employee education in 1996 is "promotion of employees' will to work." However, in order to motivate the employees, top priority should be given to the education of executives and workshop leaders. It is recommended that the following education should be given mainly to executives and workshop leaders.

Actions executives should take (leadership)
How to build up morale in workshops

It should be understood that the high percentage attendance at Magyar Suzuki is attributable to the constant efforts of the company not only to provide an incentive, but also to create a pleasant working environment.

(b) Suggestion system

Before improving the discipline in the workplace, it is necessary to change the attitudes of executives and workshop leaders. It is necessary to encourage workshop leaders to

report instances of lax discipline observed occasionally in the workshops. Then the company should correct the lack of discipline and bring it to everyone's attention. Since this method is liable to arouse the antipathy of the employees, suggestions should be invited from the employees. Also, it is desirable to make improvements in cooperation with the labor unions and considering the situation in the company: for example, a model workshop could be set up. However, what is most important is the resolute attitude of the management.

(3) Labor hours management

There are workers who do things other than their jobs while on duty. Also, employees are already waiting for the bus home around the main gate of the factory at the finishing time of 2:00 p.m. Judging from these observations it is suspected that working efficiency is low. This may be partly attributable to the irregular work periods pointed out in the section dealing with the present state and problems of the production processes. To correct the work periods, the company should divide the working hours into four groups and have the workers take a break all at once, as described in Section 8-2-2. In addition, the following actions should be taken from the viewpoint of labor management.

Everybody should start work together a siren or bell sounds. Also warm-up exercises to relax muscles should be done for approximately five minutes before work. Also, before starting work, the workshop leaders should convey messages (including safety instructions) from the company. At finishing time, all the production lines should stop together when a siren or bell sounds. Then the workers should clean their workshops and prepare to go home.

The problem is not one concerning the nature of workers, but concerns the management of workers including the discipline in the workplace. Strict control during working hours is not contrary to the respect for human nature advocated by labor management, but should be considered as something that improves employees' morale and promotes safety.

(4) Improvement of attendance

The percentage attendance at IMAG is very low: that of the direct workers is 80.6% and that of the indirect workers is 82.3% (results for 1995). Under these circumstances, it would be difficult to employ shift working to maintain the production lines, which would affect the management of the company greatly. It is said that at Magyar Suzuki, the percentage attendance of the direct workers is 93% and that of the indirect workers is 96%.

As a practical measure to improve the attendance, IMAG should review the working time system and related company rules in consultation with the labor unions.

IMAG is reviewing the wage system with the aim of improving attendance. It should introduce a wage system designed to improve efficiency. Practical actions include giving bonuses to both individuals and groups that have achieved their goals. The bonus system intended for groups in particular is aimed at promoting the cooperativeness of all the employees.

a) Bonus system for perfect attendance (to individuals)
b) Bonus system for achievement of planned production (to divisions or responsible persons)

When introducing these systems, it is important to talk over the matter with the labor unions representing the employees and reach an understanding with them.

3) Safety management

IMAG has safety rules in place and is managing safety according to these rules. However, both the management and employees lack a positive attitude towards reducing unsafe practices. The following basic items are important for protecting the safety of the employees.

(1) The attitude of executives towards safety
(2) Constant reminds from the management about safety
(3) Broader safety education
(4) Creation of an environment which encourages safety
(5) Observation of safety rules by employees

Except for the creation of an environment, the above items need to be augmented by personal behavior. An accident or injury will affect not only the victim, but also his/her family and many other people in the company including his/her colleagues and direct superior. At present, the annual number of on-the-job injuries at IMAG is smaller than the national average. However, the company should make improvements from the top down aiming at zero injuries. If it strives at becoming the safest workplace in Hungary, its corporate image will be improved greatly. It is recommended that IMAG should take the concrete safety management measures shown below.

(a) A safety day should be provided once a month on which a meeting is held where the company conveys its messages about safety in the workshops and invites suggestions or reports from the employees.
(b) The departments should submit specific programs. Good programs should be implemented immediately.
(c) If an accident occurs, its details, causes, and counter measures (how could it have

been avoided) should be sent to all the workshops as well as the workshop directly involved to bring it to their attention.

(d) Safety education should be provided, such as precautions to be taken when handling heavy items, examples of unsafe operations, and precautions to be taken during sports and recreations.

(e) Events concerning safety should be held under the leadership of the Human Resources Development Office. Employees should be invited to submit safety mottoes and ideas about safety. Workshops free of accidents for a year should be commended, and the workshops should be encouraged to compete for a record of accident-free days.
The adopted motto should be displayed in the company, adopted ideas should be introduced at a safety meeting, and the record of accident-free days should be displayed in the company. The actions should be taken on a company wide basis.

(f) A person in charge of safety should be appointed in each workshop and made to play a role in promoting safety in the workshop. This person should take charge of the events associated with safety such as a monthly safety meeting. Assigning this role to a candidate for promotion to become the next leader will produce good results.

(g) The Human Resources Development Office should analyze the accidents that occurred due to carelessness in the past, and study and report on problem areas and preventive measures.

Although these measures place emphasis on workshops, they are also applicable to safety in offices. There was a case in which an accident occurred in an office in spite of enhanced safety consciousness in the field. Safety consciousness will not last long unless it is continuously stimulated throughout the company and gets the attention of top management. It is also necessary to make people be concerned about safety in their homes as well as in the workplace.

8-4-5 Financial Management

Financial analyses that put together and analyze income statements, balance sheets, and other financial data can be divided into the external analyses performed by outsiders and the internal analyses performed by the management. External analyses includes the credit analysis used by banks before extending loans for assessing whether the company is solvent, and investment analysis used by investors for assessing the profitability and growth capacity of a company before deciding on investment in the company. External analysis is also used for analyzing the business conditions of customers or competitors.

Internal analyses have two purposes. The first is to collect and analyze financial information and provide management information to interested parties. The second purpose is to carry out a business analysis, based on the financial information, for use in decision making concerned with

administrative actions such as investment planning or corporate-strategy planning. For financial management, the actual business situation of the company must be accurately presented in the financial statements. It is important to accumulate analysis data continuously based on the financial statements and improve the management of finances.

It can be seen from IMAG's financial statements that the company's sales volume has increased rapidly since 1992 when the production of passenger car parts such as seats and wire harnesses began and consequently the company's expenses and profits have changed drastically. This indicates that the company's affairs have not settled into a normal trend. It is difficult to analyze IMAG's financial condition from these financial data. Thus, in discussing financial analysis in this report, emphasis will be placed on the description of specific analysis methods.

1) Statement analysis on financial ratios

This section analyzes the financial condition of IMAG using statement analysis, a typical technique for analyzing financial statements. Generally, financial ratios are analyzed by comparing the data shown below. However, since it is difficult in Hungary to get indices or figures for the industry and other companies in the same business, the accuracy of the statement analysis must be improved by accumulating the past analysis results of the company.

(1) Past figures of the company
(2) Average index numbers of the industry to which the company belongs
(3) Figures of other companies in the same industry

Statement analysis consists of profitability analysis, productivity analysis, and liquidity analysis, which are described below. Various types of formulas and indices are available for the analyses. This report employs the formulas for calculating indices devised by the Small and Medium Enterprises Agency of Japan for diagnosing and guiding companies and rationalizing their management as shown in Table 8-4-7. Tables 8-4-8 through 8-4-10 show the financial indices of IMAG calculated after making allowance for the differences from Japanese financial statements as described in Section 7-4, together the average indices of the 26 automotive parts manufacturing companies with more than 100 employees listed in "The Management Indices of Small and Medium Enterprises" published by the Small and Medium Enterprises Agency of Japan. Since there are large differences in the economic environment and kinds of enterprises in Japan and Hungary, "The Management Indices of Small and Medium Enterprises" will serve merely as a rough guide.

Tables 8-4-7 Formulas for Financial Indices (1/2)

(1) Operating Profit to Total Assets $= \frac{\text{Operating Profit}}{\text{Total Assets}} \times 100$

(2) Net Sales to Total Assets $= \frac{\text{Net Sales}}{\text{Total Assets}}$

(3) Operating Profit to Net Sales $= \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100$

(4) Ordinary Profit to Share holder's Equity $= \frac{\text{Ordinary Profit}}{\text{Share Holder's Equity}} \times 100$

(5) Ordinary Profit to Total Assets $= \frac{\text{Ordinary Profit}}{\text{Total Assets}} \times 100$

(6) Gross Profit to Net Sales $= \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100$

(7) Ordinary Profit to Net Sales $= \frac{\text{Ordinary Profit}}{\text{Net Sales}} \times 100$

(8) Selling & Administrative Expenses Ratio

$$= \frac{\text{Selling \& General Administrative Expenses}}{\text{Net Sales}} \times 100$$

(9) Selling Expenses to Net Sales $= \frac{\text{Selling Expenses}}{\text{Net Sales}} \times 100$

(10) Advertising Expenses to Net Sales $= \frac{\text{Advertising Expenses}}{\text{Net Sales}} \times 100$

(11) Personnel Expenses per Employee

$$= \frac{\text{Administrator's \& Sales men's costs + Direct labor costs + Indirect labour costs + walsfare}}{\text{Number of Employee} \times 12}$$

(12) Welfare Expenses to Labour Costs $= \frac{\text{Walfare Expenses}}{\text{Labour Costs}} \times 100$

(13) Amount of Production Equipment per Employee $= \frac{\text{Assets of Production equipment}}{\text{Number of Employee}}$

(14) Annual Processing Amount per Employee $= \frac{\text{Production Amount}}{\text{Number of Employee}}$

(15) Processing Amount to Production Amount $= \frac{\text{Processing Amount}}{\text{Production Amount}} \times 100$

Tables 8-4-7 Formulas for Financial Indices (2/2)

(16) Labour Costs to Processing Amount $= \frac{\text{Labour Costs}}{\text{Processing Amount}} \times 100$

(17) Processing Amount to Equipment Assets $= \frac{\text{Processing Amount}}{\text{Equipment Assets}} \times 100$

(18) Net Sales to Raw Material Inventories $= \frac{\text{Net Sales}}{\text{Raw Material Inventories}}$

(19) Net Sales to Semi-products Inventories $= \frac{\text{Net Sales}}{\text{Semi-products Inventories}}$

(20) Net Sales to Finished Products Inventories $= \frac{\text{Net Sales}}{\text{Finished Products Inventories}}$

(21) Fixed Assets Shareholder's Equity $= \frac{\text{Fixed Assets}}{\text{Shareholder's Equity}} \times 100$

(22) Fixed Assets to Equity & Long Term Loan $= \frac{\text{Fixed Assets}}{\text{Equity + Longterm Loan}} \times 100$

(23) Current Ratio $= \frac{\text{Current Assets}}{\text{Current Liabilities}} \times 100$

(24) Liquid Assets to Current Liabilities $= \frac{\text{Liquid Assets}}{\text{Current Liabilities}} \times 100$

(25) Shareholder's Equity to Total Assets $= \frac{\text{Shareholder's Equity}}{\text{Total Assets}} \times 100$

(26) Interest Payments to Net Sales $= \frac{\text{Interest Payment - Received Interest}}{\text{Net Sales}} \times 100$

(27) Fixed Assets Turnover Ratio $= \frac{\text{Net Sales}}{\text{Fixed Assets}}$

(28) Turnover Ratio of Account Receivable $= \frac{\text{Net Sales}}{\text{Account Receivable = Note Receivable}}$

(29) Turnover Ratio of Account Payable $= \frac{\text{Net Sales}}{\text{Account Payable + Note Payable}}$

(30) Turnover Ratio of Inventories $= \frac{\text{Net Sales}}{\text{Inventories}}$

(1) Profitability analysis

Profitability analysis determines the profitability of a company by quantifying and comparing the profits of the company. If adequate profitability is not achieved, the company can clarify the source of the problem and devise counter measures by using the analysis results. The results of IMAG's profitability analysis shown in Table 8-4-8 is discussed below.

Table 8-4-8 Results of Profitability Analysis

Description	IMAG				[1]Ref.
	1992	1993	1994	1995	Indices
1. General Indicators					
(1) Operating Profit to Total Assets (%)	-	4.6	-	34.1	4.0
(2) Net Sales to Total Assets	1.0	1.5	1.4	3.1	1.7
(3) Operating Profit to Net Sales (%)	-	3.0	-	10.8	2.5
(4) Ordinary Profit to Share holder's Equity (%)	-	6.1	-	66.6	24.7
(5) Ordinary Profit to Total Assets (%)	-	2.6	-	28.3	5.1
2. Sales Ratio					
(6) Gross Profit to Net Sales (%)	37.7	38.2	30.0	33.9	13.4
(7) Ordinary Profit to Net Sales (%)	-	1.7	-	9.0	3.4
(8) Selling & Administrative Expenses Ratio	37.4	30.0	27.9	20.6	10.9
(%)	-	-	-	-	2.9
(9) Selling Expenses to Net Sales (%)	-	-	-	-	0.1
(10) Advertising Expenses to Net Sales (%)					
3. Labour Efficiency	23.9	28.7	33.7	42.7	
(11) Personnel Expenses per Employee (Thousand HFT/Month)	-	-	-	-	
(12) Welfare Expenses to Labour Costs (%)	149	139	185	189	
(13) Amount of Production Equipment per Employee (Thousand HFT)					

1) "The Management Indices of Small and Medium Enterprises" of Japan.

(a) Ratio of ordinary profit to total assets

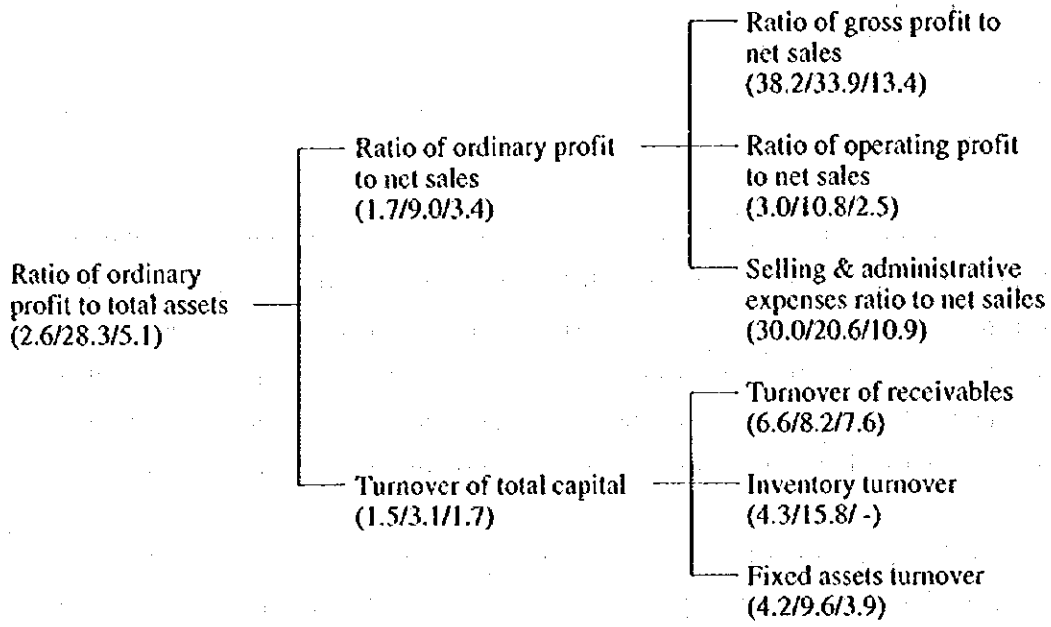
The ratio of the ordinary profit to total assets can be used as a general index for judging profitability. It shows the ratio of the annual ordinary profit to the total capital employed by the company, enabling one to understand the overall profitability of the company. Generally, to maintain sound corporate activities on a continuous basis, a company must secure the following items out of its ordinary profit.

(1) Dividends
(2) Risk provisions
(3) Inner reserves
(4) Taxes

The ratio of ordinary profit from which these items are subtracted to total assets is an indication of the reasonable profitability of the company. So far, IMAG has not paid any dividends. The business environment is changing drastically: for example, 100% management control of IMAG used to be held by IKARUS but, 52% was transferred to RABA as described earlier. Although it is difficult, under such circumstances, to determine reasonable profitability, financial data should be accumulated to allow reasonable profitability to be calculated in future.

For IMAG, the ratio of ordinary profit to total assets became positive in 1993 when the company's sales increased rapidly, then dropped to a negative figure in 1994, and improved greatly to 28.3% in 1995. To analyze the profitability using these data, the ratio of ordinary profit to total assets is broken down into the ratio of ordinary profit to net sales and turnover of total capital as shown in Figure 8-4-15. The figures used for this analysis were taken from the financial data of 1993 and 1995 when IMAG's profit figures were in the black.

To put it simply, the ratio of ordinary profit to net sales means the "markup" on net sales, and the turnover ratio of total capital means the ratio of net sales to total capital (in other wards the number of times the capital is "turnedover" by the annual net sales). As can be seen from Figure 8-4-15, the low ratio of ordinary profit to total assets can be attributed to the low ratio of ordinary profit to net sales.



Note: The figures indicate the following:
(1993 result)/(1995 result)/(Management Index of Small and Medium Enterprises)
For the operating capital of IMAG, the amount of its total assets was used.

Figure 8-4-15 Breakdown of Ratio of Ordinary Profit to Total Assets

(b) Ratio of ordinary profit to net sales

The ratio of ordinary profit to net sales can be broken down into the ratio of gross profit to net sales and the ratio of operating profit to net sales. Although for IMAG, the ratio of gross profit to net sales is very high, the ratio of operating profit to net sales and the ratio of ordinary profit to net sales are getting smaller.

Generally, a high ratio of gross profit to net sales means enhanced competitiveness of the products. IMAG's main customers are the auto makers IKARUS and Magyar Suzuki that are regular customers. This suggests that the selling prices are set properly.

The low ratio of ordinary profit to net sales is caused by a high selling & administrative expenses ratio to net sales. IMAG's selling & administrative expenses ratio in 1995 was 21%, which is nearly twice the average of Japanese companies. IMAG employs a system in which the divisions are independent and daily management jobs are performed by the administration departments of the divisions, which means that the actual values of selling & administrative expenses are higher. Since the items of selling & administrative expenses differ between Japan and Hungary, it is impossible to judge if the ratios are reasonable based on the Japanese standards. However, it is necessary to examine the administrative expenses in detail and devise measures

to reduce them as required.

In addition, at the time of closing the 1994 accounts, inventories of imported goods were rapidly growing. As a result, the interest payment burden was making the ratio of ordinary profit smaller. IMAG's inventory assets in 1994 amounted to 700 million forints, 88% of which were accounted for by raw materials inventories. The interest payments in the same year amounted to 60 million forints, affecting the company's business greatly. The improvement of the profitability in 1995 owed a lot to the fact that the costs of parts imported from Japan and surface materials were shouldered by Magyar Suzuki.

(c) Turnover of total capital

The turnover of total capital is an indication of how much the invested capital, i.e., the capital employed by the company, contributes to the sales. The existing production facilities of IMAG are old and considerably depreciated, resulting in a low appraisal of fixed assets, while the Japanese manufacturing industry is investing actively in plant and equipment. This makes it difficult to compare IMAG's turnover of total capital with that of Japanese companies. What requires care in interpreting IMAG's turnover of total capital shown in Table 8-4-9 is the inventory turnover.

Since inventory assets are assessed in terms of acquisition value and manufacturing cost, comparison with net sales which include profits will not produce an accurate value of turnover. However, the use of a common measure, ratio to net sales, allows the trend of inventory assets to be understood. Too small an inventory volume will impede manufacturing, while too large an inventory volume will cause heavy burdens such as interest payments. Interest payments affect business greatly, especially in Hungary, where interest rates are as high 20% to 30% per year. Since the amount of inventory which is reasonable varies with the type and form of business, each company must find out what quantity of inventory is reasonable for its own situation.

IMAG's inventory turnover is 4.5 times per year with the inventories turning over every 2.7 months. For reference purposes, the turnover rates of inventory assets listed in "The Management Indices of Small and Medium Enterprises" are shown below.

Turnover of raw materials	: 83.7
Turnover of semi-finished products	: 72.8
Turnover of products	: 72.6

(2) Productivity analysis (value added analysis)

Productivity analysis compares factors associated with production and the resulting output. Production factors include labor, production facilities, and raw materials. For calculation of added value, various formulas are available: no single formula is generally accepted. Therefore, productivity analysis concentrates on making a series of analyses over a period of time and accumulating data using the same method.

Table 8-4-9 Results of Productivity Analysis

Description	IMAG				[1]Ref.
	1992	1993	1994	1995	Indices
4. Production Efficiency					
(14) Annual Processing Amount per Employee (HFT)	1,256	1,781	2,249	4,527	-
(15) Processing Amount to Production Amount (%)	62.8	55.7	45.1	42.5	42.1
(16) Labour Costs to Processing Amount (%)	36.3	34.7	39.8	26.6	46.3
(17) Processing Amount to Equipment Assets (%)	5.3	7.1	5.5	10.2	3.6
(18) Net Sales to Raw Material Inventories	5.6	4.9	4.4	23.9	83.7
(19) Net Sales to Semi-products Inventories	21.4	53.9	50.9	65.9	72.8
(20) Net Sales to Finished Products Inventories	269.8	108.9	98.0	181.5	72.6

1) The Management Indices of Small and Medium Enterprises of Japan.

(3) Liquidity analysis (soundness analysis)

Liquidity analysis analyzes the financial condition of a company using the values from its balance sheet to evaluate the soundness of the company such as the stability of management and capability. It also allows the financial structure of the company to be examined from a short-term and long-term standpoint. This section describes typical indices of liquidity analysis: the net worth ratio, current ratio, quick ratio, and fixed ratio. When making comparisons with the reference indices (Table 8-4-10) from "The Management Indices of Small and Medium Enterprises" while making a liquidity analysis, the characteristics of the financial structure of Japanese companies should be kept in mind. These characteristics include the difficulty of increasing net worth for tax policy reasons; high ratios of long-term borrowing; high ratios of trade receivables and payables such as current assets and liabilities due to the inter-business credits which have been developed.

The structure of IMAG's balance sheet is shown in Figure 8-4-16.

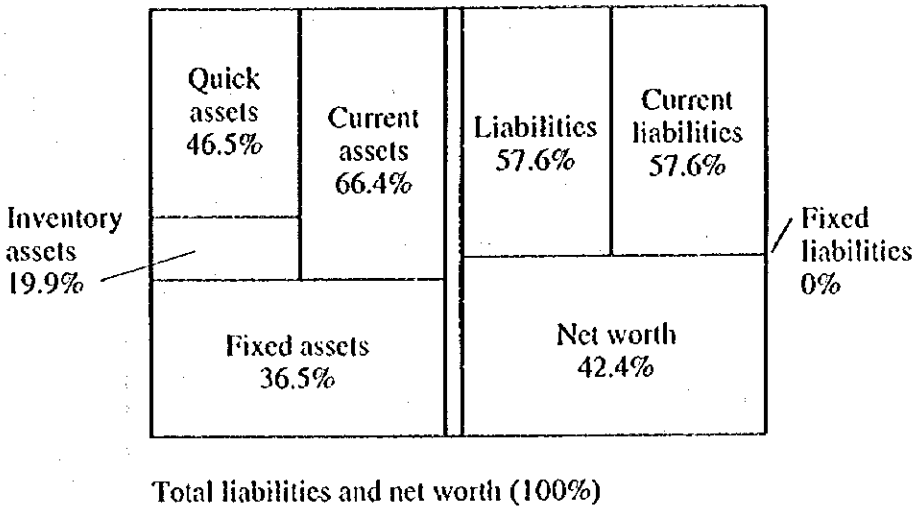


Figure 8-4-16 Structure of the balance sheet

(a) Shareholder's equity ratio to total assets

This ratio, which is the ratio of net worth (inner reserve) to the total capital (total liabilities and net worth) of a company, is a way of meaning the soundness and safety of the company. A high net worth ratio means a good profitability and a high resistance to business fluctuations. On the other hand, a company with a limited fund raising (borrowing) capacity also has a high net worth ratio.

In spite of rapidly growing sales, IMAG's net worth ratio dropped rapidly from 55.5% (1992) to 43.2% (1993) to 30.8% (1994). This indicates that the expansion of its operations is not profitable. Possible reasons include the increase in inventory assets, especially raw materials, described above. The parts purchased for passenger car seats were not suitable for the models being produced, resulting in an overstock. In 1995, as a result of a reduction in the burden of inventory costs, the net worth ratio rose to 42.4% as shown in Figure 8-4-16.

Table 8-4-10 Results of Liquidity Analysis

Description	IMAG				[1]Ref.
	1992	1993	1994	1995	Indices
(21) Fixed Assets Shareholder's Equity (%)	85.1	83.1	98.6	77.0	213.6
(22) Fixed Assets to Equity & Long Term Loan (%)	72.3	70.5	98.8	77.0	97.8
(23) Current Ratio (%)	151.9	129.4	100.0	117.1	119.0
(24) Liquid Assets to Current Liabilities (%)	84.7	57.7	46.8	80.7	89.8
(25) Stockholder's Equity to Total Assets (%)	85.1	83.1	98.6	77.0	25.2
(26) Interest Payments to Net Sales (%)	-	1.3	2.2	1.9	2.0
(27) Fixed Assets Turnover Ratio	2.1	4.2	4.7	9.6	3.9
(28) Turnover Ratio of Receivable	4.9	6.6	7.0	8.2	7.6
(29) Turnover Ratio of Payable	-	-	-	-	5.1
(30) Turnover Ratio of Inventories	4.3	4.3	3.9	15.8	-

1) The Management Indices of Small and Medium Enterprises of Japan.

(b) Current ratio

The current ratio is the ratio between current assets and current liabilities, and is used to judge the short-term solvency and the stability of a company's fund raising ability. Generally, a higher current ratio, indicates a more solvent company with a more stable fund raising ability.

IMAG's current ratio dropped from 151.9% in 1992 to 100.0% in 1994. It is difficult to get long-term loans in Hungary now because of the continuing high inflation and because there is little difference in interest rates between long-term and short-term borrowing. Therefore, IMAG uses short-term borrowing, resulting in low current ratios. Although the current ratio improved in 1995, the value of 100% means inadequate short-term solvency.

(c) Quick ratio (Liquid assets to current liabilities)

A quick ratio is an index of the ability to discharge liabilities with rapidly available assets such as cash deposits, notes receivable, accounts receivable, temporarily-held negotiable securities that can be cashed quickly. It is used to judge the solvency of a company.

The quick ratio of the company also went down every year until it reached 47% in 1994. However, it recovered to 80% of the current ratio in 1995 as shown in Table 8-4-10. Due to the increased use of short term loans, fund raising presents important business problems. It is important to reduce the proportion of inventory assets in the current assets and increase the quick assets.

(d) Fixed ratio (Fixed assets to Shareholder's Equity)

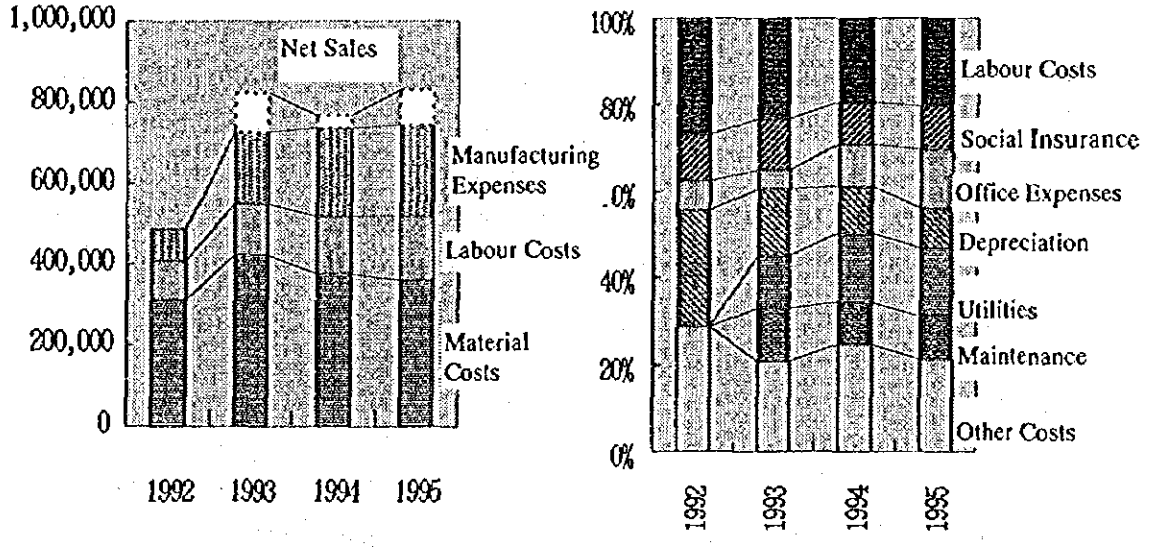
The fixed ratio is the index that indicates whether the fixed assets are covered by the net worth or how much of the net worth are invested in fixed assets. It is desirable that the fixed assets used for corporate activities over a long period of time should be covered by net worth so that it does not require repayment and can be used stably over a long period.

It is generally considered desirable that the fixed ratio should not be more than 100%. IMAG's fixed ratio was 98.8% in 1994 and 77.0% in 1995.

2) Manufacturing cost analysis

(1) Seats for buses and railway vehicles

Table 8-4-11 and Figure 8-4-17 show the past record of the manufacturing costs and expenses of seats for buses and railway vehicles.



Break down of manufacturing costs Breakdown of manufacturing expenses

Figure 8-4-17 Breakdown of Costs of Seats for Buses and Railway Vehicles

The results of an analysis based on the past record of the manufacturing costs of bus seats are as follows:

(a) The sales increased in 1993 when seats for railway vehicles were put into production. Although they decreased in 1994, they increased again in 1995 because of an increase in the sales for municipal buses. The sales of seat units by type are as follows:

	1994	1995
Deluxe seats	236 sets	226 sets
Seats for municipal buses	542 sets	641 sets
Model 400 seats	449 sets	353 sets
Seats for railway vehicles	294 sets	194 sets
Total	1,521 sets	1,414 sets

(b) The proportion of the material cost in the total manufacturing cost decreased year by year from 64% in 1992. The values are fairly high compared to those for passenger car seats even in view of the fact that the value added ratio is increasing. On the other hand, the contribution of material costs as a fraction of the total also became lower in the case of that management costs are high.

(c) The office expenses have been rising steeply since 1994.

(d) The proportion of labor costs in the total manufacturing cost remains almost constant. Generally, those production costs that will not be affected by the quantity produced are defined as fixed costs. However, in Hungary where wages are rising every year due to high inflation every year, labor costs are regarded as variable costs. The price indices in Hungary and the average wage index of IMAG are shown below.

	1992	1993	1994	1995
Producer price index	100	110.8	123.3	–
Domestic consumer price index	100	110.5	121.8	–
IMAG's average wage index	100	120.1	143.5	173.6

(Source) Price indices: Statistical Yearbook of Hungary 1995

(e) The depreciation expenses are decreasing every year, which means that no new capital investment is being made.

(f) The utility costs (such as cost of fuel) and maintenance costs have stayed almost constant. Note that these costs were not calculated before 1993.

Table 8-4-11 Breakdown of Costs of Seats for Buses and Railway Vehicles

(Unit: Thousand HFT)

	1992		1993		1994		1995	
Sales Amount (Thousand HFT)			821,330		764,376		834,311	
Sales Volume (Unit)			764		1,521		1,324	
<SEAT DIVISION>								
Direct Costs and Expenses								
Material Costs	311,508	(64.0%)	423,862	(58.5%)	374,422	(50.9%)	363,750	(48.7%)
Direct Labor Wages	69,202	(14.2%)	78,508	(10.8%)	82,638	(11.2%)	84,201	(11.3%)
Social Insurance Expenses	21,138	(4.3%)	34,544	(4.7%)	36,219	(4.9%)	37,049	(5.0%)
Sub Total	401,848	(82.5%)	536,914	(74.0%)	493,279	(67.0%)	485,000	(65.0%)
Indirect Costs and Expenses								
Indirect Material Costs	11,404	(2.3%)	20,138	(2.8%)	32,730	(4.5%)	24,500	(3.3%)
Indirect Labor Costs	22,816	(4.7%)	43,515	(6.0%)	47,218	(6.4%)	52,900	(7.1%)
Other personal Costs	8,051	(1.7%)	9,942	(1.4%)	15,504	(2.1%)	18,341	(2.4%)
Social Insurance	9,011	(1.9%)	22,573	(3.1%)	23,699	(3.2%)	26,813	(3.6%)
Office Expenses	5,673	(1.2%)	7,789	(1.1%)	23,463	(3.2%)	34,796	(4.6%)
Other Costs	1,178	(0.2%)	3,147	(0.4%)	5,732	(0.8%)	3,400	(0.5%)
Sub Total	81,147	(12.0%)	136,558	(14.8%)	174,872	(20.2%)	185,000	(21.5%)
<Other Division>								
Depreciation	23,014	(4.7%)	29,454	(4.1%)	26,526	(3.6%)	24,250	(3.2%)
Utility Costs			23,000	(3.2%)	38,000	(5.2%)	40,934	(5.5%)
Maintenance Costs			23,000	(3.2%)	24,200	(3.3%)	27,442	(3.7%)
Other Costs	3,870	(0.8%)	5,491	(0.7%)	5,070	(0.7%)	8,620	(1.1%)
Sub Total	3,870	(5.5%)	51,491	(11.2%)	91,270	(12.8%)	76,996	(13.5%)
Manufacturing Cost Total	486,865	(100.0%)	724,963	(100.0%)	735,421	(100.0%)	746,996	(100.0%)
Financial Operating Costs								
General Management Costs			87,000		50,000		37,000	
Grand Total	486,865		811,963		809,421		783,996	

Note: The general management costs were calculated by dividing them between divisions in proprtion to sales.

From the viewpoint of cost control, in order to increase company profits, it is necessary to raise the value added ratio and reduce the manufacturing expenses. Based on the analysis results described above, the following points should be kept in mind when controlling the manufacturing cost of bus seats.

(a) Value added ratio

The proportion of the material costs in the manufacturing costs is as low as 50%. Generally, in cost analysis, value added ratios are calculated by the following formula.

$$\text{Value added ratio} = \frac{\text{sales volume - variable costs}}{\text{sales volume}} \times 100\ (\%)$$

$$\text{Variable costs} = \text{material costs + utility costs}$$

The value added ratio for bus seats is as high as 51.5%. In order to increase company profits, it is necessary to maintain this high value added ratio. Since the material costs are expected to continue on upward trend because of inflation, it is important to find inexpensive stable suppliers.

(b) Manufacturing expenses

One of the reasons for the high value added ratio is the fact that bus seats are manufactured almost exclusively by IMAG. To respond flexibly to changes in the domestic economic environment such as intensified competition among companies in future, it is necessary to reduce manufacturing expenses.

First, office expenses are growing. The office expenses in 1995 were 1.5 times those of the previous year. This makes it necessary to review the costs in detail.

Second, the maintenance costs should be examined. Approximately 25 million forints are spent on maintenance costs annually. Many of the equipment items are old models requiring a lot of maintenance: consideration should be given to reducing the maintenance costs to finance new plant and equipment investment as well as to reduce the manufacturing expenses.

(2) Seats for passenger cars

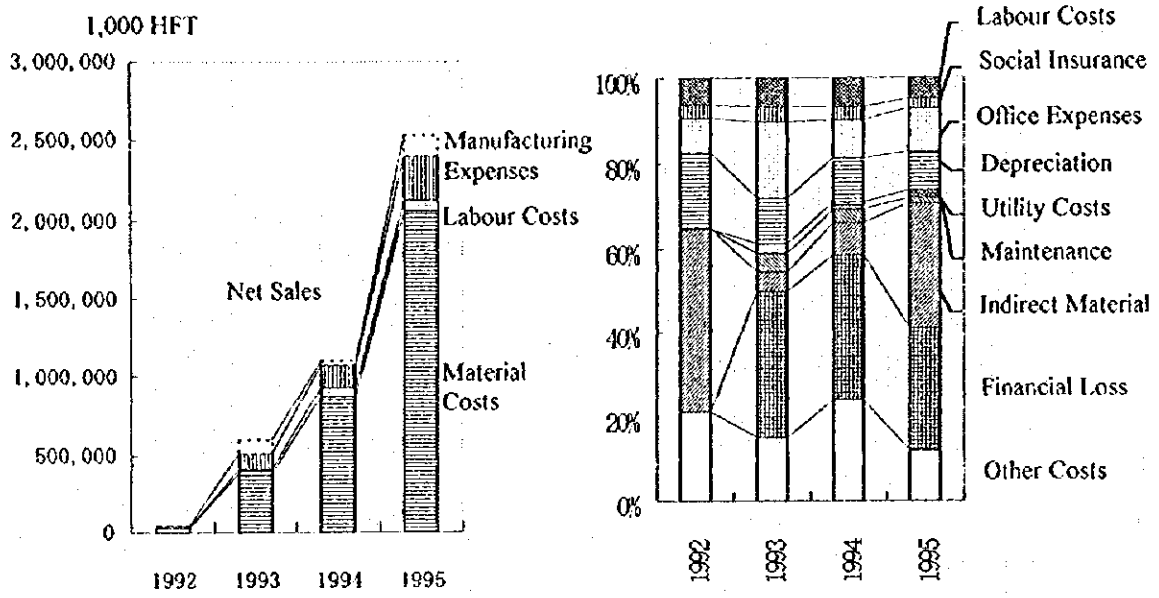
Table 8-4-12 and Figure 8-4-18 show the past record of the manufacturing costs and expenses of passenger car seats.

Table 8-4-12 Breakdown of Costs for Passenger Car Seats

(Unit: Thousand HFT)

	1992		1993		1994		1995	
Sales Amount (Thousand HFT)			599,975		1,104,965		2,531,855	
Sales Volume (Unit)	600		1,105		19,489		36,627	
<SEAT DIVISION>								
Direct Costs and Expenses								
Material Costs	24,604	(50.6%)	384,325	(74.9%)	880,990	(81.2%)	2,048,241	(85.0%)
Direct Labor Wages	1,749	(3.6%)	19,208	(3.7%)	30,987	(2.9%)	58,313	(2.4%)
Social Insurance Expenses	769	(1.6%)	8,452	(1.7%)	13,777	(1.3%)	25,658	(1.1%)
Sub Total	27,122	(55.8%)	411,985	(80.3%)	925,754	(85.4%)	2,132,212	(88.5%)
Indirect Costs and Expenses								
Indirect Material Costs	9,360	(19.3%)	4,608	(0.9%)	11,805	(1.1%)	82,000	(3.4%)
Indirect Labor Costs	1,311	(2.7%)	6,676	(1.3%)	10,537	(1.0%)	13,500	(0.6%)
Other personal Costs	1,032	(2.2%)	2,117	(0.4%)	4,675	(0.4%)	6,825	(0.3%)
Social Insurance	662	(1.4%)	3,556	(0.7%)	4,951	(0.5%)	6,820	(0.3%)
Office Expense	1,774	(3.7%)	18,164	(3.5%)	13,991	(1.3%)	27,501	(1.1%)
Other Costs	3,447	(7.1%)	11,869	(2.3%)	21,321	(2.0%)	22,800	(1.0%)
Sub Total	21,378	(36.4%)	58,038	(9.1%)	83,978	(6.3%)	184,446	(6.7%)
<Other Division>								
Depreciation	3,792	(7.8%)	11,048	(2.2%)	16,698	(1.5%)	25,000	(1.0%)
Utility Costs			2,100	(0.4%)	2,800	(0.2%)	5,017	(0.2%)
Maintenance Costs			4,400	(0.9%)	5,000	(0.4%)	3,460	(0.1%)
Other Costs	129	(0.3%)	36,511	(7.1%)	66,977	(6.2%)	84,310	(3.5%)
Sub Total	129	(8.1%)	43,011	(10.6%)	74,777	(8.3%)	92,787	(4.8%)
Manufacturing Cost Total	48,629	(100.0%)	513,034	(100.0%)	1,084,509	(100.0%)	2,409,445	(100.0%)
Financial Operating Costs			10,000		18,721		62,189	
Management Costs			70,000		123,000		128,000	
Grand Total	48,629		593,034		1,226,230		2,599,6345	

Note: The general management costs were calculated by diriding the total between divisions in proportion to sales.



Breakdown of manufacturing costs

Breakdown of manufacturing expense

Figure 8-4-18 Breakdown of Costs of Seats for Passenger Cars

The results of an analysis based on the past record of the manufacturing costs of passenger car seats are as follows:

(a) The sales have been increasing rapidly since 1992 when passenger car seats were put into production.

(b) The ratios of manufacturing costs to sales were 85.5% (1993), 98.1% (1994), and 95.1% (1995). The breakdown of the manufacturing costs is summarized as follows.

Unit: %

	1992	1993	1994	1995
Material costs	50.6	74.9	81.2	85.0
Direct labor wages	3.6	3.7	2.9	2.4
Manufacturing expenses	45.8	21.4	15.9	12.6
Total	100.0	100.0	100.0	100.0

(c) The proportion of material costs in the total manufacturing cost is increasing from year to year: it reached 85% in 1995. The major causes of this increase are the imports from Japan (such as functional parts) that accounts for 80% of the material costs. Since the accounts are settled in yen, the chronic decline of the forint against the yen virtually means that the price is continuously rising.

Although efforts are being made to increase the rate of local procurement, material costs are soaring because of the high inflation in Hungary.

(d) In spite of inflation, the proportion of direct labor wages is falling as production increases.

(e) As can be seen from the breakdown of manufacturing costs shown in Figure 9-5-12, the proportion of exchange losses has increased greatly since 1993. However, whether exchange losses should be included in the manufacturing expenses is open to further discussion.

(f) A large proportion of the manufacturing expenses consists of indirect material costs. Although the details of these costs are not clear, they include the cost of purchasing equipment and materials needed for management jobs. Since the production began in 1992, the management support has been in the process of improvement.

(g) The proportion of fixed costs such as office expenses, depreciation, and repairs cost is decreasing as production increases.

Based on the analysis results described above, the following points should be kept in mind when controlling the manufacturing cost of passenger car seats.

(a) Value added ratio

The proportion of the material costs in the manufacturing costs is much larger than in the case of bus seats. The value added ratio is getting smaller as shown below.

Unit: %

	1992	1993	1994	1995
Value added ratio	—	35.6%	20.2%	18.9%

This is because in addition to the imports from Japan described above, the covering materials (such as cloth) imported from Austria are expensive. Since passenger car seats require materials of higher quality than those for bus seats, the proportion is also high in Japanese companies (approx. 85% in the case of Houwa Kogyo Co.). However, to improve the value added ratio, it is necessary to reduce the unit prices of raw materials. To do this, it is important to find inexpensive stable suppliers which could be done in combination with the procurement of materials for bus seats as well as to try to further increase the rate of domestic procurement.

(b) Manufacturing expenses

The labor costs and other fixed costs are on a downward trend as production increases. However, reduction of manufacturing expenses will present a challenge since the production of passenger cars will reach an upper limit in 1996.

8-5 Modernization of the Production Facilities

IMAG is highly quality-conscious and production has been arranged with priority given to quality. However, the production facilities which affected quality assurance are old and have some defects resulting in loss of man hours and materials, and this indicates the needs to modernize the facilities. In planning the modernization of facilities, the introduction of new technologies and processes should be considered as preparation for cultivating new markets.

The modernization of the production facilities is aimed at improving the quality and reducing the manufacturing costs to strengthen the business structure of the company. At present, the process are wasteful, and inadequate consideration is given to costs. Therefore, immediate improvements should be considered such as reforming production management and labour management before starting to modernize the production facilities.

The following paragraphs describe the equipment that is necessary for modernizing the facilities. It is recommended that the equipment should be introduced in 1997 for the purposes of quality assurance, improvement of productivity, and to enable seats for 50,000 cars to be produced actually. This equipment is in addition to the items listed in the 1996 equipment program worked out by IMAG. In addition, mention will be made of the equipment that should be introduced in the future if IMAG aims to become a world-level seat maker.

8-5-1 Metal Works

When installing production facilities, satisfying of the clients' requirements must be considered first of all. To satisfy the requirements of clients, the company must lower prices and meet delivery dates, aiming at zero customer complaints about quality.

To fulfil this aim, it is necessary to install equipment that can produce highly accurate products with a low percentage of defects and can achieve higher output per hour than at present. The equipment that should be introduced in the metal working processes is described below.

(a) Pipe bending
NC pipe bender
1 unit: To improve productivity and quality (reduction of 2 workers)

(b) Pipe cutting
Circular pipe cutter
2 units: To improve productivity and quality (reduction of 2 workers)

(c) Processing of passenger car rear seats
Wire forming machine
1 unit: To improve productivity and quality (reduction of 2 workers)

1) NC pipe bender

To reduce the machining time and increase the accuracy of mass-produced products, NC pipe benders should be installed and the bending method should be changed to draw bending which does not need a mandrel. The specifications of the bender are shown below. There are two types of benders - the two head type and single head type - that differ in capacity.

Two-head NC pipe bender

(a) Capacity

Maximum pipe diameter x thickness	: 31.8 mm x 1.6 mm
Maximum bend radius:	130 mm
Maximum bending angle	: 100 degrees
Maximum twist angle	: 180 degrees
Feed between centers	: 230 to 2,000 mm

(b) Operating speed

Bending speed	: 1.0 sec./ 90 deg.
Twisting speed	: 2.0 sec./ 180 deg.
Feed rate	: 500 mm/sec.

(c) Accuracy

Repeatability of bending	: +/- 0.1 deg.
Repeatability of feeding	: +/- 0.1 mm

(d) range of settings

Number of bending steps: 8 + 8 = 16 steps	39 types memorized
Number of twisting steps: 8 + 7 = 15 steps	39 types memorized
Number of feeding steps: 8 + 8 = 16 steps	39 types memorized

One-head NC pipe bender

Equipment name: SP Series, Model 30ST

Specifications

(a) Capacity

Maximum pipe diameter x thickness	: 31.8 mm x 2.0 mm
Maximum bend radius	: 200 mm
Maximum bending angle:	0 to 190 deg. (bending arm revolution)
Maximum twist angle	: 0 to +/- 360 deg. (chuck revolution)
Effective length of pipe	: 2,800 mm (mandrel bending)

(b) Operating speed

Bending speed	: 30 to 170 deg./sec.
Twisting speed	: 30 to 210 deg./sec.
Feed rate	: 250 to 800 mm/sec.

(c) Accuracy

Repeatability of bending	: +/- 0.05 deg.
Repeatability of feeding	: +/- 0.05 mm

(d) Range of settings

Number of programmable steps	: 0 to 30 steps

2) Circular pipe cutter

A circular pipe cutter should be installed that will produce fewer burrs so that the current deburring operation can be eliminated. This will increase the productivity of pipe cutting.

Circular pipe cutter

(a) Cutting method	: Cut-off tool
(b) Range of cutting	
Pipe diameter	: 10 to 38 mm
Thickness	: 15 mm
Length	: 2,000 mm (a special modification is required)
Bar stock	: 10 to 30 mm dia.
(c) Spindle speeds	: 600 rpm, 1,000 rpm
(d) Pneumatic pressure used	: 5 kg/ cm2
(e) Cutting time	: Approx. 6 sec.

3) Wire forming machine

In the bending process of wire frames, the bending angle of the wire must be changed together with the changes in the elongation for different production lots. However, with the current method of bending that employs dies, it is difficult to change the bending angle. A wire forming machine will allow the bending angle to be changed freely and to set processing conditions for each bend, making it possible to produce highly accurate products. Also, it has higher operating speeds. Further, it does not cause any loss of material since it can handle coils of wire directly. The installation of a wire forming machine will reduce the number of dimensional defects and poor welds.

Wire forming machine

(a) Range of wire size	: 2 to 5 mm dia.
(b) Working speed	
Bending speed	: 100 deg./sec.
Swing speed	: 100 rpm
Feed rate	: 10 m/min.

(c) Accuracy

Repeatability of bending	: +/- 0.05 deg.
Accuracy of feeding	: +/- 0.05 mm
Accuracy of swinging	: +/- 0.05 deg.

In addition to the above equipment, it is also recommended that the following equipment should be considered for installation in future.

(d) Bus I Division
Improvement of the compressed-air, electric, and industrial-water systems: To improve productivity and quality

(e) Processing of passenger car rear seats
Wire frame welding robot: To improve productivity and quality

(f) Welding process of passenger car seats
Six-axis welding robot: To improve productivity and quality

(g) Press working
Mechanical press: To replace old presses and integrate operations

4) Improvement of compressed-air, electric, and industrial-water systems

It is necessary to establish infrastructures that can accommodate layout changes which way require integration of equipment and introduction of new equipment. Ring mains should be used for piping for both compressed air and industrial water, in particular, so that constant pressure can be obtained everywhere. In Figure 8-5-1, the dotted line indicates the piping for compressed air and alternate long and short dash line indicates the piping for industrial water.

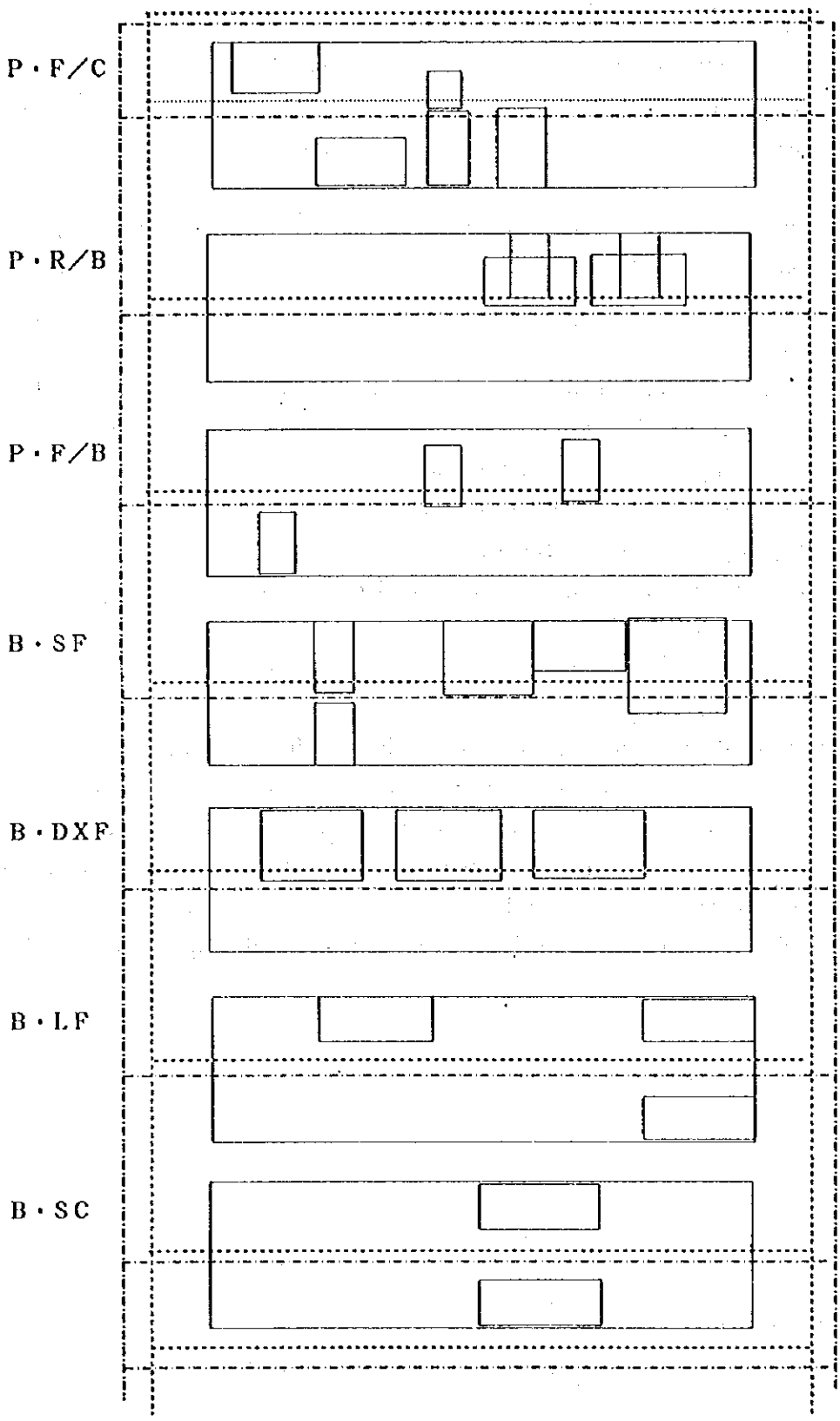


Figure 8-5-1 System Diagram of the Compressed-Air, Electric, and Industrial-Water Systems in Bus I Division

5) Wire frame welding robot

The prerequisite for improving the productivity in the spot welding process of wire frames is the reduction of defects due to forgotten welds or misplaced welds. There are about 60 spot welds on a wire frame, and it is difficult to avoid such defects if the work is done manually. Therefore, the company should consider installing a welding robot to accommodate any production increase in passenger car seats.

Welding robot

(a)	Configuration	: Control panel, main body, and spot gun
(b)	Working area of main body	: 4,006 mm (W) x 1,574 mm (D) x 2,116 mm (H)
(c)	Maximum working area	
	S axis (sweep)	: 300 deg.
	L axis (lower arm)	: 115 deg.
	U axis (upper arm)	: 140 deg.
	R axis (turning of wrist)	: 380 deg.
	B axis (wrist swing)	: 270 deg.
	T axis (rotation of wrist)	: 700 deg.
(d)	Allowable moment	
	R axis (turning of wrist)	: 353 Nm (36 kgf-m)
	B axis (wrist swing)	: 353 Nm (36 kgf-m)
	T axis (rotation of wrist)	: 216 Nm (22 kgf-m)
(e)	Position repeatability	: +/- 0.3 mm
(f)	Type of spot welding gun	: Inverter type gun with a transformer
(g)	Dimensions of gap	: 125 mm x 200 mm (vertical x depth)
(h)	Specification of electrodes	
	Electrode force	: 300 kgf
	Electrode stroke	: 30 mm
	Electrode tip	: 16 mm dia.
	Maximum short-circuit current	: 15,000 A
(i)	Allowable duty cycle	: 6%
(j)	Volume of cooling water	: 12 liters/min.
(k)	Pressure of air used	: 5 kg/ cm2

6) Six-axis welding robot

The planned production of passenger car seats for 1996 is 50,000 sets, and it is desirable to have an arrangement that can fulfil this plan. IMAG's welding processes are undertaken by highly experienced welding operators and there is no need for the introduction of robots at present. However, it is necessary to develop the technology of a welding robot line and at a same

time acquire automation techniques in order to provide for a future increase in orders. However, since this is a preparatory investment, it is important to take the particular business situation into consideration.

Six-axis welding robot

(a)	Equipment configuration	: Control panel and main body
(b)	Working area of main body (H)	: 2,679 mm (W) x 2,679 mm (D) x 2,653 mm
(c)	Maximum working area	
	S axis (sweep)	: +/- 170 deg.
	L axis (lower arm)	: +150 deg., -90 deg.
	U axis (upper arm)	: +150 deg., -125 deg.
	R axis (turning of wrist)	: +/- 180 deg.
	B axis (wrist swing)	: +/- 135 deg.
	T axis (rotation of wrist)	: +/- 350 deg.
(d)	Allowable moment	
	R axis (turning of wrist)	: 31.4 Nm (3.2 kgf-m)
	B axis (wrist swing)	: 31.4 Nm (3.2 kgf-m)
	T axis (rotation of wrist)	: 15.7 Nm (1.6 kgf-m)
(e)	Allowable moment of inertia	
	R axis (turning of wrist)	: 0.7 kg-m^2
	B axis (wrist swing)	: 0.7 kg-m^2
	T axis (rotation of wrist)	: 0.2 kg-m^2
(f)	Position repeatability	: +/- 0.1 mm

7) Mechanical presses

The six mechanical presses, which are of the pin clutch type, are about 20 years old and have some safety problems. They should be replaced gradually. Since 63-ton and 40-ton presses are not commercially available in Japan, a 60-ton and 44-ton press are described below.

60-ton mechanical press

(a)	Press capacity	: 60 ton
(b)	Limiting thickness	: 5.6 mm
(c)	Stroke	
	Stroke of slide	: 160 mm
	Strokes per minute	: 55 s/m
	Allowable intermittent strokes per minute	: 40 s/m

(d)	Frame gap	: 285 mm
(e)	Die height	: 335 mm
(f)	Slide adjustment	: 70 mm

45-ton mechanical press

(a)	Press capacity	: 45 ton
(b)	Limting thickness	: 8.3 mm
(c)	Stroke	
	Stroke of slide	: 140 mm
	Strokes per minute	: 60 s/m
	Allowable intermittent strokes per minute	: 43 s/m
(d)	Frame gap	: 240 mm
(e)	Die height	: 290 mm
(f)	Slide adjustment	: 60 mm

8) 150-ton mechanical press (with a coil feeder)

Once the mechanical presses have been replaced with new ones, a 150-ton press with a coil feeder should be installed that will allow automatic operation combined with the use of multiple press dies if the company intends to strengthen the press working process.

150-ton mechanical press (with a coil feeder)

(a)	Press capacity	: 150 ton
(b)	Limiting thickness	: 6.0 mm
(c)	Stroke	
	Stroke of slide	: 225 mm
	Fixed strokes per minute	: 40 s/m
	Variable strokes per minute	: 20 to 45 s/m
(d)	Frame gap	: 390 mm
(e)	Die height	: 430 mm
(f)	Slide adjustment	: 100 mm

Coil feeder

(a)	Capacity	
	Thickness of plate	: 0.3 to 3.2 mm
	Width of plate	: 50 to 500 mm
(b)	Coil dimensions	
	Weight	: 2,000 (1,500 kg)

Outside diameter : 1,200 mm

(c) Feed per stroke : up to 400 mm

8-5-2 Sewing Process

The sewing process involves the highest material costs of the process for producing seats. The equipment items to be introduced and their purposes are described below. They are necessary in order to reduce the total cost by increasing yields, and are based on the improvements recommended in Section 8-2 "Modernization of Production Processes."

(1) Cutting process

Duplicating machine for pattern layout : To improve yields and productivity

Air cushion sheeting table : To improve productivity

Automatic spreading machine : To improve yields and productivity

Transfer elevator for rolled sheets : To improve productivity

(2) Sewing process

Bobbin-Remaining lower thread counter : To improve quality and productivity

Automated line of sewing machines in standing position : To improve quality and productivity

(3) All the processes

Production amount indicator : To improve productivity

1) Duplicating machine for pattern layout

This machine aims at eliminating the pattern layout operation and improving the yield by cutting spread sheets together with a full-size copy of a pattern layout drawing. When selecting a Duplicating machine, consideration should be given also to the type of copying paper, copying speed, ease of use, and running cost. The points to be kept in mind when introducing the machine and its main specifications are as follows:

Important points to be considered

(a) Make sure the machine can made sufficiently large copies.

(b) The machine should have a closed circuit ventilation system to avoid the need for an exhaust duct.

(c) The machine should be easy to operate.

Equipment name: Large Duplicating machine

Specifications

Copying method	: Ammonia process diazo copying
Maximum copy size	: 1,800 mm
Copying speed	: 1 to 6 m/min. (with variable speed gearing)
Copying paper	: Blue sensitized paper, white master drawing paper
Paper width	: 196 to 1,800 mm

2) Air cushion sheeting table

This transfers spread sheets to make effective use of the limited member of work benches and equipment. This will allow the spreading and cutting operations to be separated.

Important points to be considered

(a) *A specification should be selected that is compatible with the proposed automatic* spreading machine.

(b) The width and length of the table should be determined taking into consideration of the location of the installation and the quantities and types of orders.

Equipment name: Air nozzle, knock-down cutting table (air cushion table)

Specifications

Dimensions	: 1,960 mm (W) x 6,000 mm (L)
Table legs	: Adjustable height

Table should be removable and distortion-free.

Blower	: 1 unit for every 3,600 mm of table length

3) Automatic spreading machine

With manual spreading, the working efficiency is reduced when the operators become fatigued. To overcome the problem, an automatic spreading machine should be introduced. This machine employs a microcomputer for automatically controlling the length and number of sheets to be spread. Also, an automatic selvage justifying machine and motor-driven straight cutting machine will allow the sheets to spread and piled accurately for higher yields. The specifications and main features of the equipment are shown below.

Equipment name: Automatic spreading machine

Specifications

(a) Attachments	: Unrolling unit
	Attachments: Unrolling unit
	Automatic selvage justifying unit

Automatic lifting unit
Cloth feeding unit (with forward, reverse, and pause capabilities)
Reset counter (with automatic stop)
Motor-driven cutting unit (with dial-in cloth width setting device)

(b) Table:

Width	: 1,430 to 2,630 mm;
Loaded height	: approx. 400 mm
Stack height of spread sheets:	180 mm

Features

(a) The length and number of sheets to be spread can be set with push buttons (microcomputer-controlled) and displayed digitally.
(b) The right and left stop positions are adjustable, and the use of proximity sensors eliminates the need for right and left stoppers.
(c) Both high and low travel speeds are possible even during manual operation.

4) Transfer elevator for rolled sheets

This loads rolled sheets on to the spreading machine automatically. This device should be installed because the mounting position of the rolled sheets on the current spreading machine is high and dangerous and also for the purpose of reducing the time taken to mount a rolled sheet. The work procedure and specifications are shown below. However, the company should consider building the equipment on its own, taking advantage of its expertise.

Work procedure

(a) The rolled sheets are placed on the rolled sheet stand according to the working plan.
(b) The Transfer elevator loads the rolled sheets one by one and waits at the position where they will be unloaded on to the spreading machine.
(c) When the operator presses the start button, a rolled sheet is lowered on to the spreading machine.
(d) The above procedure is repeated and the rolled sheets lowered in the sequence in which they were loaded.

Equipment name: Transfer elevator for rolled cloth sheets

Specifications

(a) Cloth width	: The same as for the spreading machine
(b) Rolled sheet stand	: With an unrolling shaft

(c) Effective cloth width : 1,700 mm
(d) Maximum weight of rolled sheet : 60 kg
(e) Diameter of rolled sheet : 600 mm
(f) Diameter of paper core : 50 to 10 mm

5) Bobbin remaining lower thread counter

The bobbins must be replaced every 15 minutes. If the thread runs out halfway through a sewing operation, the workpiece must be sewn again, and in some cases, the material itself is spoiled. To prevent such a situation, install a bobbin remaining lower thread counter should be installed. This device indicates the quantity of thread remaining on the bobbin using an electronic counter, and sounds a buzzer if the thread is running out. The device has been developed by a Japanese company Houwa Kogyo independently, and it is not commercially available. Its main specifications are as follows:

Equipment name: Bobbin remaining lower thread counter
Specifications
(a) Reads the number of rotations of the sewing machine pulley with a sensor and displays it on an electronic counter.
(b) Sounds a buzzer when the reading of the counter reaches a set value.

Necessary parts: Sensor, amplifier, head, counter, buzzer

6) Automated line of sewing machines in standing position

It is considered impossible to automate the sewing operation of seats in spite of the technological innovations in production facilities. However, an automated line of sewing machines in standing position has been developed to accommodate the just-in-time approach. This line automatically sews the workpieces that have been placed in jigs that are interlocked with the sewing machines. All that the workers have to do is to fix the workpieces in the jigs and press the start button. Therefore, the company can use inexperienced workers. However, before introducing such a system, a long-term program of technical training is necessary as described earlier. It is recommended that the company buy a few automatic machines to become familiar with the technical developments as well as to learn about the automation of sewing machines. The automatic machine described below will save two persons per machine. Its specifications are as follows:

Specifications of an automatic machine for attaching back bag to front seat
(a) Single-needle lock stitch integrated feeding sewing machine
- Electronic motor

- Automatic reversing mechanism
- Automatic thread cutter
- Table dimensions: 1200 mm x 900 mm

(b) A set of pneumatic cylinder type straight stitch jigs
- Sewing area: 450 mm
- Material table

(c) A set of jigs (expanded shape)
- Table for slit parts

(d) A set of electrical components
- A small sequencer (with a control box)
- Missing-part alarm on slitter (sensor and buzzer)
- Bobbin running-out of thread alarm (buzzer triggered by a pre-set number of stitches)
- Control breaker
- A set of other small components

7) Production amount indicator

This device displays the planned quantity and completed quantity for the day so that the progress of the work can be monitored regularly. The company can use this device to achieve plans and increase productivity. This device indicates:

Today's plan (planned production quantity for the day)
Target (planned production quantity up to the present time)
Actual results (quantity produced so far)
Progress (difference between target and actual results)

Specifications

(a)	Input method and number of inputs	: Isolated contact unit: Number of input :7
(b)	Output method and number of outputs	: Photo-coupler open collector; number of outputs: 4
(c)	Number of keystrokes	: 20
(d)	Displayed characters	: 7-segment dot presentation; red LED display
(e)	Numbers of rows and digits	: 4 rows each with 3 digits

In addition to the above equipment, it is also recommended that the following equipment should be considered for future installation.

CAD/CAM for cutting operations : To improve yields and productivity

Pick-up table for cutting operations: To improve productivity
Slitting machine : To increase rate of in-house production
Automated line of sewing

8) CAD for cutting process

The installation of CAD will computerize operations from pattern design to pattern layout - the basis of the cutting process - to improve the quality, yield, and productivity. CAD will carry out the main operations such as pattern design, grading, marking, the cutting of paper patterns, and the generation of marker sheets in a single integrated process.

Installation of CAM will enhance the effect of CAD in the cutting process. An integrated CAD/CAM system should be considered.

Equipment name: CAD for cutting process
Basic system configuration

(a) Central processing unit (high-speed 32-bit CPU)
(b) Magnetic disk unit
(c) Color graphics display
(d) Streaming tape drive
(e) Mouse
(f) Keyboard
(g) Digitizer
(h) Plotter
(i) Floppy disk drive unit

9) CAM for cutting process

A CAM system integrated with CAD should be installed to fully automate the cutting process, eliminating manual cutting and press cutting with a guillotine. This will improve the quality, yield, and productivity. The yield in particular can be increased by 3% or more. The running costs after installation including maintenance costs and expenses for consumable should be taken into consideration.

Equipment name: CAM
Basic system configuration

(a) Main control unit (3-phase, 8 kVA, 200-240V, 50/60 Hz)
CRT display
5-in. disk drive unit
20-MB disk drive unit
(b) Cutting carriage (including input display)

(c) Cutting head unit (including knife control unit)
(d) Cable unit
(e) Drilling unit
(f) Operator control console
(g) Built-in vacuum pump (40 HP, 3-phase, 50 kVA)
(h) Cutting table (2.4m (W) x 5.8m (L), conveyor type)
(i) Cutting table traversing device
(j) Floor rails
(k) Spare cutting head unit

Features

(a) Maximum cutting speed: 8.5 m/min.
(b) Automatic knife sharpener
(c) Variable knife speed
(d) Vacuum clamping of cloth on a Bristol table

10) Belt conveyor pick-up table for cut parts

This is a conveyor unit for collecting cut parts and putting them in order. This unit can be integrated into the CAD/CAM system to improve the operating rate of the equipment.

Equipment name : Pick-up table

Specifications

(a) Speed : Synchronized with the cutter
(b) Traverse : Manual on floor rails

11) Slitting machine (including a high-speed direct winder)

When cutting rolled sheets into strips for use as bindings, it is more efficient to cut the rolled material into slices than to cut it after spreading. At present, the quantity used is small, and the materials are cut manually or slit parts are imported from Japan. However, mechanization will be required when production increases. A high-speed direct winder must also be installed together with a slitting machine because the rolled sheets must be rewound more tightly before slitting. The specifications of a high-speed direct winder and slitting machine are shown below.

Equipment name: Slitting machine

Specifications

(a) Cloth width : 1,600 mm
(b) Maximum diameter of rolled sheet : 300 mm

(c)	Grinder	: Automatic grinder (with the distance automatically controlled to compensate for cutting edge wear caused by grinding)
(d)	Cutting speed	: Variable cutting speed corresponding to the width of the cut
(e)	Cutting speed:	Three speeds
(f)	Spindle, revolving round tooth	: Inverted-controlled
(g)	Cut count display	: Number of cuts is automatically displayed when the width of the cut is entered

Equipment name : High-speed direct winder

Specifications

(a)	Cloth width	: 1,600 mm
(b)	Diameter of rolled sheet	: 300 mm
(c)	Winding speed	: 53 m/min.
(d)	Tightness of winding	: Adjustable
(e)	Application	: leather, vinyl, cloth, unworn fabric

8-5-3 Cushion Process

The stationary-Mould production system used in the cushion process is optimized for *multi-product small-lot production and gives a problems with productivity. Since the existing* production facilities have been systematized, it is difficult to make even limited improvements. Therefore, it is recommended that one of the two lines should be for bus seats and the other line should be converted into a turn table line (or circle line) if the production of passenger car seats increases.

As a preliminary step, a metering unit (injector) should be added to the line which is to be modified to increase the injection capacity and productivity with a view to converting the line into a turn table line in the future.

1) High-pressure injector (metering unit and other items)

Since the injection processes of four blocks are covered by one injection system, time is lost in watching if more than one injection operation is required at a time. Desirably, each block should be provided with one injection system. However, such a measure would be expensive. As a solution, another injection system should be added to reduce waiting time. Also, if two injection systems are available, two types of raw materials can be used and the weight of the back cushion can be reduced.

Specifications

(a) High-pressure injection system

Metering unit: A2Vk28/12 (for liquids A and B)

V motor, feedback control

Control panel (dual control)

(b) Raw material tank

Capacity : 10 liters x 2 tanks

Heat exchanger : 2 M x 2 units

The following equipment would have a marked effect on improving productivity and quality. However, its installation is not urgently needed for the modernization plan. It should be considered in a future plan.

Degassing (crushing) process	Vacuum degassing apparatus:	To improve productivity and quality
Injection - Mould removal	Turn-table type high-pressure injection line:	To improve productivity and reduce weight

2) Vacuum degassing apparatus

The degassing (crushing) process - the final process of the cushion process - for the purpose of rationalization should be mechanized for rationalization.

At the time of our first field investigation, we recommended that IMAG use a vacuum degassing apparatus for cushions with inserts because roller crushing will deform them. The company built its own equipment which, however, has insufficient vacuum capacity. Now IMAG is modifying the equipment. In anticipation of a future production increase, the equipment should be modified so that it has the capacity to degas two rear seats simultaneously.

3) Turn-table type high-pressure injection line

The turn table line described in the modernization of "Cushion Process" (Section 9-2-3) aims at improving productivity with 12 workers producing seats for 300 cars per day. In addition, the raw materials should be changed from the diphenylmethane diisocyanate single type to a mixture of MDI and TDI to reduce the weight and cost of the cushions. Shown below are specifications that are intended to make use of the existing equipment such as Mould carrying systems and injection systems as much as possible.

(a) Two-component high pressure injector : 2 sets

Two-component metering unit

Two-component high pressure mixing head

	Variable speed motor, automatic flow controller	
	Control panel for injectors, hydraulic unit	
(b)	Raw materials tank unit	: 2 sets
	Capacity	: 200 liters
	Heat exchanger	: 2 M x 2 units
(c)	Temperature regulator for raw materials	
(d)	Automatic material feeder	: 4 sets
(e)	Injection robot	: 1 set
	Main body, head cleaner	
(f)	Automatic Mould release applicator	: 1 set
	Robot body	
	Air spray, gun, booth	
(g)	Raw materials, hydraulic piping	: 1 set
(h)	Conveyor system	: 1 set
	Turn table	
	Mould carrier	: 12 units
	Mould opening/closing device	
	Mould temperature regulator, hot-water main pool	
	Exhaust unit	
(i)	Automatic central control panel and wiring	: 1 set
(j)	Mould carrier connect/disconnect device	: 1 set

8-5-4 Assembly Process

The specifications of seats are different for every type of car, and all the operations in the assembly process are performed manually. This means that mechanization and automation require special-purpose machines for each specification. Therefore, equipment can be fully depreciated in the case of products which are produced in large quantities and have a long life cycle, and this limits the number of processes that can be modernized. The following paragraphs describe three special-purpose machines that are expected to be effective, judging from the actual results of their use in Japan. However, they are not fully-automatic, but labour-saving machines that will reduce labour. The purpose of their introduction is to increase overall productivity by reducing fatigue and by operations to proceed at a continuous, stable rate.

(a)	Assembly of seats back	
	Back covering machine	: To improve productivity
	S-spring caulking machine	: To improve quality and productivity
(b)	Assembly process	
	Unit assembly conveyor	: To improve quality and productivity

(c) Front seats
Belt conveyor : To improve productivity
(d) Rear seats
Belt conveyor : To improve productivity

1) Covering machine

The covering of the front seats back requires more physical strength and skill than any other operation in the assembly process. A covering machine will eliminate the need for physical labour since the sewn surface is mounted by the machine after it has been temporarily tacked to the back cushion. This will allow operations to proceed at a continuous steady speed.

Specifications
(a) Power supply : 100 VAC
Air supply : 20 liters/min
Air pressure : 4 kg/cm^2
(b) Overload detector
(c) Outside Dimensions : 1300 mm (W) x 1050 mm (L) x 2550 mm (H)
(d) Clamp fixtures, upright flip-over unit, steam jet unit

2) S-spring fixing speeder machine

The process for fastening the S-springs to the front back frame proceeds as follows: the S-springs are hung in the hooks on the frame and the hooks are bent down with a hammer to secure the S-springs. The reclining device is bolted to the frame in the next process. An S-spring fixing speeder machine will automate these operations: it automatically bends down the hooks while the workers carry out other operations as well as mounting the reclining device. Also, an error preventer is provided that verifies the tightening torque of the bolts in the reclining device and the number of S-springs, which allows the quality and productivity to be improved.

Specifications
(1) Seats handled : Types with a separate front seat back; standard integral types
(2) Power supply : 100 VAC
Air pressure 6 kg/cm^2
(3) Working cycle
(a) Operator: Sets frame hung with S-springs in clamping fixture. Turns switch to on.

(b) Machine: Clamping fixture automatically moves into position and folds down the S-spring hooks. Then the clamping fixture returns to its original position.

(c) Operator: Bolts the reclining device to the frame and verifies the torque (torque wrench).

(d) Machine: Verifies torques and opens clamp.

(e) Error preventer: Checks for missing S-springs with a sensor and checks the tightening torque of bolts in the reclining device.

3) Unit assembly conveyor

In the unit assembly process which is the final process in the assembly of a seat, two workers do the work using a single jig, which has a limit of 240 units/day. To increase production, a unit assembly conveyor should be installed, in which the jigs carrying the products are fixed to a caterpillar conveyor. The conveyor should be equipped with an error preventer to prevent defective units from leaving the line. Also, the jigs will move according to the tact time, eliminating the need for the workers to walk around and is increasing productivity.

This conveyor can be switched over to different models of seats by simply replacing the jigs attached to the conveyor.

Specifications

(1) Seats handled

This conveyor can handle seats of any specification, provided that the slide rail pitch of the front seat is equal to a certain value.

(2) Power supply: 100 VAC

Air pressure 6 kg/cm2

(3) Working cycle

(a) Operator: Places front seat cushion in conveyor jig and bolts on the front seat back. Turns switch on.

(b) Machine: Conveyor jigs move to second station.

(c) Operator: Verifies tightening torque of bolts.

(d) Machine: Verifies all torques and transfers workpieces to inspection table of the next process.

(4) Error preventer

(a) Fixed side: Tightening of truss screws: 1 place

(b) Reclining side: Tightening of bolts: 2 places

(c) Reclining side: Tightening of nuts: 1 place

(5) Outside Dimensions: 3.5 m (W) x 1 m (L) x 0.8 m (H)

4) Belt conveyor

The advantage of using a belt conveyor is that by running it in synchronization with the standard tact time during flow production, the process allocation can be reviewed to improve and stabilize the efficiency of production. The specifications are shown below.

(a)	Outside Dimensions	: 4 m, 7 m, 10 m (L) x 0.8 m (W) x 0.8 m (H)
(b)	Motor	: 0.75 kW
(c)	Speed control	: Inverter control
(d)	Position control	: Conveyor stops when a sensor detects a work piece.

8-5-5 Test and Inspection Equipment

Although IMAG possesses the laboratory equipment necessary for bus seats, it has not yet added the laboratory equipment necessary for passenger car seats. Also, it has to modify the equipment it possesses in order to carry out tests on products to be exported, for example, to EU. The following paragraphs describe the items to be modified and the equipment that a passenger car seat manufacturer must possess.

(1)	Three-coordinate measuring machine	: Special-purpose jigs should be built.
(2)	Durability test machine for cushions	: A twist and slide mechanism should be added.
(3)	Fatigue testing machine for seat frames	: A 45-degree testing device should be added.

Since test machines are expensive, when considering introducing new machines, IMAG should take its business strategies and clients' requests into account.

1) Three-coordinate measuring machine

Although the company owns a three-coordinate measuring machine the reliability of the measured values is low because no fixed methods of clamping the seats during measurements have been decided. Since the mountings and layout of passenger car seats vary with the type of car, a special-purpose jig for clamping the seat is necessary for each type of car.

The jigs should be built using the assembly drawings of the seats. Car bodies or drawings of the car bodies should be used if available from the automaker.

2) Durability test machine for cushions

For testing the durability of seats, IMAG has a durability test machine employing dummy hips that repeat an up-and-down motion. This machine roughly simulates the conditions of an actual car. In real life, however, the passenger changes his/her sitting position due to fatigue by

shifting his/her hips. To simulate these movements, the company should add a mechanism capable of horizontal twisting motion and back-and-forth sliding motion.

Main specifications

(1) Horizontal twisting motion

Reduction gear box rotates an eccentric crank arm to produce a horizontal twisting motion. The angle of twist is adjusted by changing the offset of the eccentric crank arm.

(a) Frequency: 14.8 times/min.

(b) Angle: +/- 10 to 30 deg. (total angle: 20 to 60 deg.)

(2) Back-and-forth sliding motion of a seat

An eccentric crank arm is rotated by a reduction gear box and a worm reducer to move a sliding piece with a weight on it backwards and forwards over the seat.

(a) Back-and-forth stroke: 50 ~ 80 mm (normally 55 to 60 mm)

(b) Frequency: 15.8 times/min.

3) Fatigue testing machine for seat frames

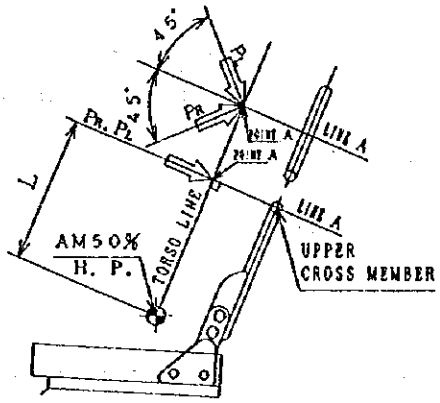
Fatigue testing of seat frames is generally done to check their ability to continuously withstand loads in the longitudinal direction caused by rapid acceleration of the car or the sudden application of the brakes. IMAG has a machine for this kind of testing. However, to simulate the large load applied to an actual car during cornering, a device is necessary that can apply a load at an angle of 45 degrees. The necessary equipment and its specifications are shown below.

(1) Jigs

In Figure 8-5-2, the intersection of the torso line and a vertical line on the back frame is the point of load application. A jig (Figure 8-5-3) is necessary for applying a load to the back frame at this point.

(2) Load application unit for the test machine

It is necessary to add a device for applying a load at an angle of 45 degrees from the test machine to the jig mounted on the back frame.



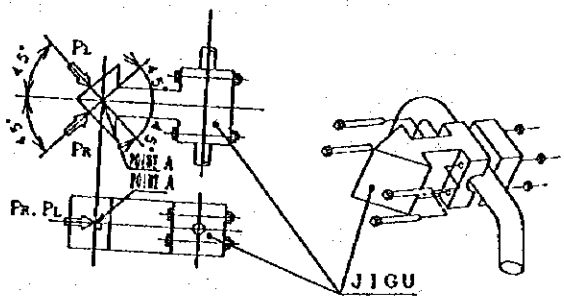


Figure 8-5-2 Point of Load Application **Figure 8-5-3 Loading Jig**

In addition to the above equipment, it is also recommended that the installation of the following equipment should be considered in future.

(a) Sitting 3D human phantom : To be introduced newly
(b) Load test machine for seat frames : To be introduced newly

4) Sitting 3D human phantom

A sitting 3D human phantom is necessary for measuring and setting the hip point and back angle of seats which is an essential part of seat development and design. Although there is no international standard, the company should obtain a model that conforms to the SAE (Society of Automotive Engineers) standards which are widely used.

Specification: SAE-3DM human phantom

5) Load test machine for seat frames

A load test machine that can measure the strength of seat frames and do destructive testing of seat slide devices is necessary for the development of new products. The company should consider its introduction when the company is ready to push ahead with product development.

Specifications

(1)	Base and frame	: 1 unit (common base: 1800 mm x 2450 mm)
(2)	Horizontal load actuators	: 3 units (static, thrust and tension 500 kgf x 600 mm)
(3)	Elevators for horizontal load actuators	: 3 units (stroke: 500 mm)
(4)	Hydraulic actuator	: 1 unit (hydraulic pump: 37 l/min. x 140 kgf/ cm2)
(5)	Instrument panel	: 1 set
	(a) Operation unit	: 1 unit
	(b) Alarm unit	: 1 unit
	(c) Function generator	: 1 unit
	(d) Servo amplifiers	: 3 units
	(e) Endurance counters	: 3 units
	(f) Elevator control units	: 3 units
	(g) Load amplifiers	: 3 units
	(h) Displacement amplifiers	: 3 units
	(i) Angle amplifiers	: 3 units
	(j) Digital monitor meters	: 3 units
	(k) Angle analogue meters	: 3 units
	(l) Fracture detectors	: 3 units

8-6 Implementation Schedule

This modernization plan is to enable the factory to cope with the increased production of seats for passenger cars by improving the productivity and profitability. For introducing the new machinery and equipment, the actual implementation schedule is divided into two stages of the investment to be made in 1996 and that in 1997 for the purpose of having the company's internal organization ready for the production of the passenger car seats for 50,000 cars per year. After analyzing and evaluating the situation of the implementation of the modernization plan, the final investment of the third stage should be undertaken.

(a) The 1st stage investment plan (1996)

The system for producing passenger car seats for 50,000 cars per year should be arranged first. Then it is necessary to improve the standard of the work to suit the machinery and equipment to be introduced in the 2nd stage investment plan, as well as the establishment of the management control system in the factory.

(b) The 2nd stage investment plan (1997)

Investigation and evaluation of the newly introduced machinery and equipment based on the 2nd stage investment plan should be carried out and after being evaluated in this way, the equipment should be purchased. After analyzing the record of rejected parts and products and the work in the applicable unit processes, the improvement of the productivity and the system for reducing costs shall be firmly established.

This will be the time to initiate and organize the QC activities on a total company basis.

(c) The 3rd stage investment plan (up to 2003)

After analyzing the compatibility of operations with the machinery and equipment introduced during the 2nd stage investment plan and analyzing the financial situation of the company, the contents of the 3rd stage plan and its implementation schedule should be evaluated. The year in which the goal of modernizing the factory will be achieved is set for the year 2003.

8-6-1 The First Stage Modernization Plan

The implementation goals for the first stage modernization plan are as follows;

(1) To arrange the organization and the system in the factory for the production increase of passenger car seats for 50,000 cars per year

(2) To prepare and enhance the company organization for implementation of the second stage modification plan

1) Production Process

In addition to the above mentioned implementation of the plan, the following activities are to be carried out.

(1) Metal Work Process

The layout of the machinery and equipment for the production workshop should be examined. By analyzing the unit operation process, the accumulation of data and documents should be attempted for the purpose of the re-adjustment of operation processes.

(2) Inspection Process

Preparation of inspection standards and inspection procedures should be promoted.

(3) Flow of Materials

In order to reduce costs related with the flow of materials, the overall layout should be examined for evaluation.

2) Production Control

In addition to the activity targets set for the first stage modernization plan, the action items shown below should be executed.

(1) Product Development and Design

For the purpose of the design standardization, the collection and analysis of data and documents should be carried out.

(2) Quality Control

Preparation activities for introducing QC activities should be initiated.

(3) Information Processing System

The function of SYMIX software should be enhanced.

3) Corporate Management

The items implemented regarding the corporate management are as follows;

(1) Decision Making

To establish a suitable internal organization for exercising the decision making.

To accumulate the business information necessary for the decision making.

(2) Marketing Activity

To educate and train the staff dedicated for marketing activity.

It is recommended to establish an execution organization which is responsible for the systematic and organic marketing activities.

(3) Labor Management and Human Resources Development

To analyze the job classification based on the current personnel evaluation system.

To review the present qualification system.

8-6-2 The Second Stage Modernization Plan

The target of the second stage modernization plan is to establish a radical corporate concept of the company that can cope with rapidly changing business environments by a flexible manner, preparing the company itself for the privatization, probably being taken place in IMAG in the near future.

1) Production process

The target activities for the production process during the second stage modernization plan is to improve the productivity and profitability of the company with a good and effective use of the newly introduced machinery and equipment.

(1) Receiving of raw materials

Strengthening of actual material control

Strengthening of the control for incoming and outgoing materials in the warehouse

(2) Metal working process

Improvement of operation efficiency

Analysis and review for the introduction of automated machinery and equipment

Newly introduced machinery and equipment:

- One head NC pipe bender
- Circular pipe cutter
- Wire frame forming machine

(3) Cutting and sewing process

Reduction of loss of raw materials

Improvement of productivity

Newly introduced machine

- Pattern reproducing copy machine
- Air cushion sheet working table
- Automatic spreading machine
- Rolled sheet material transfer elevator
- Bobbin remaining underneath thread counting machine
- Automatic sewing machine operated in standing position
- Production performance accounting indicator (for all processes)

(4) Cushion process

Improvement of productivity

Development of raw material and introduction of low density materials to reduce the production costs

Newly introduced machine

- High pressure injection machine

(5) Assembly process

Improvement of productivity

Analysis and improvement of line balance

Improvement of line balance

Newly introduced machine

- Back covering machine
- S shape spring caulking machine
- Unit assembly conveyor
- Belt conveyor

(6) Inspection process

Analysis and countermeasures for rejection records of each production process

(7) Flow of materials

Improvement of factory layout in order to reduce costs related with the flow of materials

2) Production Control

The goals of the production control in the second stage modernization plan are to establish a control method based on operation analyses and standard operations, as well as the introduction of QC activities

(1) Design and product development

Introduction of design review method

Promotion of design standardization

Newly introduced machine

- 3 coordinates dimension measuring machine
- Durability test machine for cushion
- Fatigue testing machine for seat frames

(2) Inventory control

Strengthening of control by introducing procurement controlling method

Strengthening of warehouse control by adopting address for each stored item and execution of "first-in-and first-out" method

(3) Process control

Preparation of production schedule based on daily plan and improvement of accuracy of production schedule

Thorough obedience of working indication using devices such as dispatching board

(4) Quality control

Promotion of quality consciousness by the introduction of QC circle activities

Promotion of quality accuracy in production shop by the introduction of QC process schedule table

(5) Information processing system

Integration of systems including SYMIX

Improvement of input method for computers

3) Corporate Management

By formulating the corporate management plan, aiming markets are selected and analyzed. Marketing activities based on this selection should be carried out.

(1) Decision making

Formulation of the corporate policy and corporate strategy

Evaluation of the business environment and the potential markets

Evaluation of the development strategy

(2) Marketing method

Introduction of marketing strategy

Opportunity analysis for marketing

Selection of the target market

(3) Human resources development and Labor management

Analysis for introduction of the professional ability grading system

Analysis for introducing the professional ability grading method

Investigation for introducing the personnel evaluation system based on the professional ability grading qualification method

8-6-3 The Third Stage Modernization Plan

The third stage modernization plan aims to improve the production technique and the quality of the products to the levels which is acceptable on internationally basis, so that IMAG products can be sold not only in the domestic market, but also in the west European market, and the corporate management is also to be update to meet the marketing capability and the production technology.

1) Production Process

By utilization of the applied technology, it is intended to increase the ratio of the local purchase of the raw materials and components in order to achieve the reduction of cost. During the third stage of the modernization plan, it aims to introduce the internationally applicable equipment and machinery for automation operation, CAD/CAM application and flow production operation.

(1) Receiving of raw materials

Increase of ratio of the domestic procurement

Reduction of the cost of raw materials and components

(2) Metal working process

Investigation of the introduction of the automation for welding process

Investigation of the introduction of the welding robots

Increase of the internal manufactured items

Newly introduced machine

- Wire frame welding robot
- Six axis welding robot
- Mechanical press

(3) Cutting and Sewing processes

Investigation of the automation and mechanization

Introduction of line production

Investigation of the introduction of CAD/CAM

Newly introduced machine

- CAD/CAM for cutting operation
- Pick-up table for cutting operation
- Slitting machine
- Automated line of sewing machine in standing position

(4) Cushion process

Introduction of turn table line

Newly introduced machine

- Vacuum degassing apparatus
- Turn table type high pressure injection line

(5) Inspection process

Introduction of the equipment and machinery in accordance with the corporate management policy

(6) Flow of materials

Adoption of synchronized delivery system for the customers

2) Production Control

It aims to establish the production control methods which are compatible to automated unit operations and CAD/CAM system, introduced by the production process. At the same time, the quality control by implementation of TQC activities should be established and the development of new markets should be carried out.

(1) Product development and design

Strengthening of the product development functions

Development of CAD/CAM corresponding with production process

Newly introduced machine

- Sitting 3 dimension human phantom
- Load test machine for seat frames

(2) Inventory control

Promotion of the inventory reduction activities

(3) Process control

Strengthening of the planning function by reviewing the organization

(4) Quality control

Fulfillment of the designated items by ISO 9001

(5) Information processing control

Promotion of CAD/CAM by total company wide basis

Preparation of data base aiming at CIM and the standardization of the equipment and machinery

3) Corporate Management

It is planned to formulate a medium and long term corporate plan based on the accumulated corporate data. Furthermore, the corporation structure of market oriented type should be established and the development of new markets should be carried out.

(1) Decision making

Formulation of the medium and long term corporate plan

Basic plan for the corporate management

New investment plan

Target profit setting

(2) Marketing activities

Strengthening of the corporate structures suitable for the market oriented environment

Development for the new markets

Formulation of the strategy for product development

(3) Human resources development and Labor management

Introduction of the total personnel management system

Based on the above contents, the goals for activities at each modernization stage and the implementation schedule are summarized in Figure 8-6-1

		1996	1997	~2003
Modernization Execution Plan		First Stage Investment Preperation / Execution	Second Stage Investment Preperation / Execution	Third Stage Investment (Preperation/Execution)
Target of Modernization		(First Stage Plan)	(Second Stage Plan)	(Third Stage Plan)
PRODUCTION PROCESS	Receiving of Raw Materials	· Production Increase of Passenger Car Seats (Seats for 50,000 Cars) in 1996	· Strengthening of receiving inspection · Control of incoming and outgoing of Inventory in Storage	· Increase of Ratio of Locally Procured components · Reduction of cost for raw materials and semi-finished components
	Cutting & Sewing Process		· Reduction of material loss · Improvement of work Efficiency	· Mechanization of Process · Introduction of line production system · Introduction of CAD/CAM system
	Cushion Process	· Preparation of Company Inside Organization for Second Stage Modernization Programme	· Improvement of productivity · Improvement of raw material chemicals with cooperation of suppliers	Introduction of Turn Table Line
	Assembly Process		· Analysis and improvement of line balance · Re-arrangement of Line Layout	
	Inspection Work	· Preparation of Standard Documents for Inspection	· Analysis of Records for Rejected Products at each process · Counfer measure for above	Improvement of Equipment and Tools for Inspection and Test in accordance with the company's overall modernization programme
	Distribution Work	Re-arrangement of Layout of Machinery and Equipment	Re-arrangement for Layout in Factory	Adoption of Synchronized and Concurrent Delivery to Customer
	Metal Work	· Re-arrangement of Layout of Machinery and Equipment · Analysis of Unit Operation	· Improvement for Work Efficiency · Promotion of Preparation for Automation	· Introduction of Welding Robots and · Automation of Metal Work Equipment · Increase of Inside Work within Shop
PRODUCTION PROCESS	Product Development Design Control	Preparation of standerdization of Design Work	Implementation of Design Review	· Strengthening of Function of Product Development (Cultivation of Planning Function for New Products) · Promotion of Technical Capability (Plan of Development for Human Resources) · Planning for Future Adoption of CAD/CAM
	Inventory Control	· Preparation for Production Increase of Passenger Car Seats (Seats for 50,000 Cars)	· Establishment of Inventory Control (Strengthening of Procurement Control) · Control of Address of Parts in storage Area and Room	Thorough implementation of Reduction of Inventory
	Schedule Control	· Preparation of Company Inside Organization for Second Stage Modernization Programme	· Review of Work Schedule Preparation of Daily Operation Schedule · Improvement of Control Function Preparation of Control by Dispatch Board	Establishment of Schedule control by Visual Presentation
	Quality Control	Preparation for Producing of QC Programme	· Promotion of Quality Control Activity QC Circle Activity · Introduction of QC Schedule · Introduction of New Inspection Equipment and Preparation of Organization in Company	· Promotion of TQC Activities · Introduction of Goal Achievement Control
	Information Processing Control		Establishment of Production Control System by SYMIX	· Standardization of Computer Work · Arrangement of Data Base · Formulation of Long Term Plan for adoption of CIM System
CORPORATE MANAGEMENT	Decision Making	· Establishment of Proper Inside Organization for Decision Making · Preparation of Information Control System	· Corporate Concept and Management Policy · Formulation of Corporate Strategy · Evaluation of Corporate Environment and Market Potentiality · Strategy for Development	· Formulation of Corporate Plan on Medium and Long term · Corporate Base Plan New Business Plan · Target Profit Plan
	Marketing Methodology	· Education and Training of Marketing personnel · Systematic and Organic Marketing Activities	· Introduction of Marketing Strategy · Analysis of Target Market	· Corporate Management of Market Orientation Type · Development and Excaration for New Market · Formulation of Strategy for Product Development
	Development for Human	· Implementation of Analysis for Job Assignment and Position in	· System for Job Development · System for Evaluation of Individual	Introduction of Total Personnel Evaluation System
	Resources Labor Control Management	Organization Chart · Review of Job Qualification and Rank in Organization	Employee · Wage System to reflect assigned Job	

Figure 8-6-1 Implementation Schedule and Target of Modernization

Chapter 9

Financial Evaluation of Project

Chapter 9 Financial Evaluation of the Project

9-1 Total Capital Requirements

This section calculates the total capital required in order to implement the capital investment plan described in section 8-5 "Modernization of Production Facilities." The breakdown of the total capital requirements is as follows:

(1) Costs of new facilities to be introduced
  Equipment cost
  Transportation cost
  Installation cost
(2) Contingencies
(3) Taxes
(4) Initial working capital
(5) Interest during construction

9-1-1 Conditions for the Calculations

Since the conditions (such as fund raising methods) of calculating the total capital requirements were undecided at the time of field survey, the following conditions are used, considering the situation in Hungary.

1) Exchange rates

The fixed exchange rates shown below are used throughout the period of the project because it is difficult to predict changes in exchange rates.

US$1 = 142 forints (Ft)
US$1 = 106 yen (¥) ¥1.0 = 0.746 Ft.
US$1 = 1.48 Deutsche Marks (DM) DM1.0 = 95.95 Ft.

2) Prices used

The prices as of February 1996 are used as standards.

9-1-2 Costs of New Facilities to Be Introduced

The introduction of the equipment and facilities required for the 1996 capital investment plan worked out by IMAG is classified as the first stage plan, while the introduction of the other equipment and facilities necessary for the modernization of IMAG is classified as the second stage plan and will be implemented in 1997. The equipment and facilities will be procured in Hungary, Germany, and Japan. They were divided into the local and foreign portions, which are calculated separately. Table 9-1-1 summarizes a costs of equipment and facilities.

Table 9-1-1 Costs of equipment and facilities (1/2)

Equipment and Facilities	Amount				Re-mark
	1996	1997			
	Local (HFT1,000)	Local (HFT1,000)	Foreign (DM1,000)	Foreign (¥ 1,000)	Day
<Phase 1>					
Bus II Division					
3-ton diesel forklift	3,000	-	-	-	
Passenger Car Seat Division					
Ciliate cloth sewing-machine	2,000	-	-	-	
Industrial sewing-machine	6,000	-	-	-	
Hand-operated cutting machine	1,000	-	-	-	
Heat indicator	150	-	-	-	
Steam generator	1,000	-	-	-	
Gluing device	150	-	-	-	
Transportation facilities	3,000	-	-	-	
Clipper 'C' clip stitching machine	300	-	-	-	
Stitching machine	300	-	-	-	
Pneumatic screwing machine	450	-	-	-	
Mould separating device	150	-	-	-	
Temperature	400	-	-	-	
Mechanical cutter-blades	1,000	-	-	-	
Vacuum foam treater	1,000	-	-		
Sub-total	19,900	-	-	-	
<Phase 2>					
Bus I Division					
Pipe cutting machine	-	-	-	24,200	
One-head NC pipe bender	-	12,000	-	-	
Bus II Division					
Relocation & piping works	-	5,000	-	-	
High pressure injector (Metering unit)	-	-	-	20,000	
Wire frame wire-crimping machine	-	28,000	-	-	
Sub-total		45,000	-	44,200	

Table 9-1-1 Costs of equipment and facilities (2/2)

Equipment and Facilities	Amount				Re-mark
	1996	1997			
	Local (HFT1,000)	Local (HFT1,000)	Foreign (DM)	Foreign (¥ 1,000)	Day
Passenger Seat Division					
Duplicating machine	-	-	-	3,800	
Automatic spreading machine	-	-	56,000	-	
Cloth transfer elevator	-	1,250	-	-	
Air cushion sheeting table	-	-	14,000	-	
Remaining lower thread counter	-	-	-	1,000	
Sewing machine in standing position	-	-	-	5,000	
Production amount indicator	-	-	-	2,000	
Belt conveyors	-	2,680	-	-	
Back covering machine	-	-	-	3,500	2
Unit assembly conveyor	-	-	-	5,500	2
"S" fixing speeder	-	-	-	5,600	2
Laboratory					
Jigs for 3-dimention measuring equipment	-	-	-	1,500	
Modification for durability testing machine for cushion	-	-	-	6,000	
Modification for fatigue testing machine for seat frame	-	-	-	750	
Sub Total	-	3,930	70,000	34,650	
Total	-	48,930	70,000	78,850	

9-1-3 Other Costs

1) Freight and Insurance

Regarding the equipment to be procured in Japan; marine transportation cost, landed cost (including warehouse expenses), inland transportation cost, and transportation insurance expense are calculated as transportation costs. In the case of the equipment to be procured in Germany and Hungary, the freight is included in the prices of the products.

2) Installation cost

The costs involved in the installation of the equipment are calculated. Since the installation does not involve construction of buildings or foundations, 1% of the equipment costs is used to calculate the installation cost.

3) Import duties and other expenses

The following expenses are used to calculate import duties and other taxes associated with import.

Import duties (average rate):	13%
Value added tax:	25%
Customs clearance fee:	2%
Statistics fee:	3%

4) Training costs

When training is required for the new facilities, this is indicated in the "Remarks" column (Table 10-1-1) which shows the number of days required for training the operators. For IMAG's assembly workers who would receive training in Japan, the airfares and living expenses during that stay in Japan are calculated (excluding salary expenses).

Equipment and days of training	
Covering machine	2 days
Assembly conveyor	2 days
S-spring caulking machine	2 days
Total	6 days

5) Contingencies

These are currently unpredictable expenses. Five percent (5%) of the equipment costs is used to calculate the sum of the material and price contingencies.

6) Pre-operational expenses

The expenses involved in trial runs such as electric power are not calculated because of the small amount required. Also, because the existing plants are in operation, the initial working capital is calculated as part of the working capital of the existing plants.

7) Interest during construction

The interest during construction was calculated based on the conditions described in the "Fund Raising Plan" section.

9-1-4 Fund Raising Plan

1) Conditions for fund raising

Since the lender of the money for the modernization is still undecided, the conditions for the loans are unknown. However, as agreed with the arrangement with IMAG at the time of our on-the-spot investigation, it is assumed that the following methods will be used to raise the total capital requirements.

Debt-Equity Ratio

Own equity: 30% of total capital requirements

Long-term loans: 70% of total capital requirements

Loan terms

Interest rate: 30%

Debt maturity: 5 years

Grace period: 3 years

Repayment method: Payable in fixed semiannual installments of the principal

2) Disbursement schedule

The total capital requirements for each fiscal year are shown in Table 9-1-2.

Table 9-1-2 Disbursement schedule by year

(Unit:Thousands HFT)

	1996	1997	Total
Equipment costs	19,900	164,570	184,470
Freight and Insurance	0	14,934	14,934
Import duties and other expenses	0	47,575	56,132
Construction costs	199	1,646	1,845
Training costs	0	1,232	1,232
Contingencies	0	11,416	12,839
Sub Total	30,079	241,373	271,452
Interest During Construction	3,529	29,376	32,905
Total Capital Requirement	23,569	273,301	296,876
Equity	10,082	81,966	92,048
Long term loan	23,525	188,783	212,309