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PROBLEMS OF THE HUNGARIAN RAILROAD CAR INDUSTRY

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[The following article, which represents a lecture delivered at the rolling stock conference of the Gepipari Tudományos Egysület (Scientific Institute for the Machine Building Industry) on 22 November 1952, reviews the current condition of the Hungarian railroad car industry and permits insight into the enormous difficulties existing in this field.

These difficulties include: (1) serious disagreements with foreign purchasers, because of the poor quality of products and deviations from specifications; (2) inferior quality of steel and irregular deliveries by the metallurgical industry; (3) poor organization and low technological level; (4) loss of old specialists and lack of competent technical personnel; and (5) lack of time and facilities to build and test prototypes prior to serial production.

It may also be concluded from the article that a sizable part of the output of this industry is exported to the USSR.

Hardly had the war ended when, with the help of the USSR, the serial manufacture of gondola and tank cars began in Hungary. More recently, the Hungarian railroad car industry has been engaged in the production of a record-breaking number of second-class passenger cars for the USSR and rail motorcars and consists for Czechoslovakia, Bulgaria, Poland, and other friendly countries, and even in filling export orders for certain capitalist countries. At the same time, the domestic demand for passenger and freight cars has been increasing.

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It is characteristic of the enormous growth which has taken place in Hungary's national economy since the liberation that, according to current plans, nearly ten times as many passenger cars and nearly five times as many freight cars will be produced in 1953 as in 1938.

As a result, the two Hungarian railroad car factories became inadequate, despite the large capital investments which had been made; and in 1952, a former repair shop of the MAV (Magyar Allamvasutak, Hungarian State Railroads) was converted into the Dunakeszi Vagongyar (Dunakeszi Railroad Car Factory).

The tasks, however, continue to grow and now include the manufacture of first-class passenger cars for the USSR, model Ha passenger cars for the domestic suburban traffic, and model BCa passenger cars for international traffic. In addition, it is planned to develop numerous other models.

The growth of the Hungarian railroad car industry has naturally led to many problems of manufacture, design, and industrial organization.

Current Position of the Railroad Car Industry

In Hungary, the following enterprises are engaged in the production of railroad cars and railroad car equipment:

1. Wilhelm Pieck Vagon- es Gepgyar (Wilhelm Pieck Railroad Car and Machine Factory) of Gyor, which produces passenger and special freight cars.
2. Dunakeszi Vagongyar (Dunakeszi Railroad Car Factory), which produces passenger cars for the MAV, rail motorcars for the FVV (Fovarosi Villamos Vasutak, Budapest Electric Streetcar Line), and cars for the HEV (Helyierdeku Villamos Vasut, Suburban Electric Railway). In addition, it repairs 4-axle passenger cars.
3. Ganz Vagon- es Gepgyar (Ganz Railroad Car and Machine Factory), which produces mostly rail motorcars and consists. It also makes diesel and diesel-electric consists, tank cars, and special passenger cars.
4. Jarmufelszerelési Gyar (Vehicle Equipment Factory), which produces small parts, such as locks, doorknobs, window frames, fittings, etc., for the railroad car factories.

The Wilhelm Pieck and Ganz enterprises have, in addition to their railroad car and consist departments, also general machine- and vehicle-building departments.

Certain important railroad car and locomotive parts, such as brakes and springs, are not manufactured by these factories but by other enterprises. Thus, generators, electric motors, and other electrical equipment for railroad cars, rail motorcars, and consists are made by the various enterprises of the electric industry, primarily by Ganz Villamosagi (Ganz Electric). In addition, 2-axle freight cars are manufactured and repaired at Debrecen under the jurisdiction of the Ministry of Transportation.

Each of the three railroad car factories produces all component parts -- with the exception of the brakes, springs, doorknobs, locks, window frames, and fittings mentioned above -- for its own requirements. It would be, of course, impossible to enumerate all the other enterprises that supply the railroad car factories with semifinished products.

The current problems of the railroad car factories may be summarized as follows:

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Each of the three enterprises has different traditions and manufacturing experience. As a result, considerable differences in organization and technology exist between them.

The Wilhelm Pieck Vagon- es Gepgyar is engaged in serial production based on prefabrication, and has the most advanced technology of the three factories. It also has the largest capacity. As a result of better organization of tooling and manufacture, its production time per unit is the most favorable. This, of course, does not mean that the enterprise is free of defects. By comparison with foreign railroad car factories, for example, the enterprise still has much to learn in tooling and technology; and the production time could be reduced considerably.

The Dunakeszi Vagongyar is the youngest enterprise in this field. It was necessary to resort to a number of technical makeshifts to introduce the prefabrication method, since the factory had originally been built for repair work and is not equipped with cranes. Organizational and technological standards are, accordingly, still unsatisfactory; but improvement in these respects is expected to result in a considerable increase in capacity.

The Ganz Vagon- es Gepgyar is one of the old strongholds of the railroad car industry. It should logically follow that it leads in production. The fact is, however, that instead of progress a decline has taken place in recent years. At present, only 10 percent of the old specialists are still employed, the technological standards are on the same level as 10 years ago, and organizations in general is poor.

Evidently, the Wilhelm Pieck Vagon- es Gepgyar is leading the industry in organization, technology, and production time. This is due in part to the fact that the enterprise has been very active in recruitment and is, therefore, in the most favorable position among the Hungarian railroad car factories in respect to technical and labor cadres.

The Dunakeszi Vagongyar has serious problems both in technical and labor cadres and urgently needs not only additional manpower but also training for most of its present cadres.

The Ganz Vagon- es Gepgyar has not only neglected recruitment but has even lost part of its old cadres, a fact which is causing great difficulties in plan fulfillment.

In the Jarmufelszerelési Gyar, technological and organizational standards are practically nonexistent, since production is scattered among 12 separate plants, some of which are located in wooden sheds. Quick action must be taken in the near future if this enterprise is to fulfill the tasks which have been assigned to it.

Let us now take a look at the conditions which prevail outside the railroad car industry. In reviewing the external problems of the industry, it is necessary to bear in mind that the production of railroad cars is not the exclusive problem of the railroad car factories. The problem begins in the metallurgical industry, which is required to supply material of good quality in large quantities and on time.

Unfortunately, it has not yet been possible to coordinate the production plans and the production standards of the metallurgical industry with the production tasks of the railroad car factories. Currently, at least 16 months are required for the manufacture of a series of railroad cars of established design, and approximately 2 years for a series of new design. It will be seen, therefore, that both the Hungarian foreign trade agencies and the railroad car

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designers must start working a long time before the planned delivery date of the finished product, to assure undisturbed production. This is particularly important when foreign orders are received for series which have not previously been manufactured in Hungary.

Let us now consider the reason why such a long period of time is needed for delivery.

In the case of established models, it is well known that procurement of the materials requires at least 6-9 months, and usually more because of the chronic delays of the metallurgical industry. Production in the railroad car factories requires 6-8 months.

For new models, designing alone requires 8-10 months. The remainder of the required time is divided between procurement of material and production. The estimated period of 2 years does not allow time for the production and testing of a prototype. If allowance is made for the latter purpose, an additional 8-12 months are needed for the execution of the order.

It should be pointed out that serial production of railroad cars and consists should not be started without a prototype. In this connection, the current situation may be described as follows:

Our foreign trade agencies either are not familiar with the length of time required for production, or disregard these requirements. Consequently, serial manufacture must be begun immediately; and since the technical specifications are usually incomplete, and the correction of defects and the changes in specifications desired by the purchaser interfere with production, export orders are filled with considerable delay.

It may be said that lack of clear technical specifications is a characteristic of all export orders in the railroad car industry; it is, however, frequent even in orders originating in the MW, which also likes to make changes in technical specifications and special demands in the course of production. A case in point is the set of specifications for second-class passenger cars and for consists. It is, of course, impossible for use to close our eyes to useful innovations; in fact, we encourage them. However, such innovations should be specified well in advance, to avoid interference with production.

In connection with the second-class passenger cars for the USSR, we had enough time to make a prototype; however, the changes in specifications caused a serious delay. Moreover, the Hungarian metallurgical enterprises are reluctant to accept orders for the relatively small amount of material needed for a prototype. Delivery of such material is usually delayed and is finally effected only after vigorous intervention by top-level government authorities. Such delay, in turn, entails delay in the production of the prototype and of the first series. Also, even when the metallurgical enterprise is cooperative, deliveries are, as a rule, made at irregular intervals.

In procurement, and even more in designing, material conservation must be enforced. It is also imperative to use domestic substitute materials wherever possible to replace certain imported products. The Czechoslovak railroads, for example, are equipping all passenger cars with water pipes made of Vinidur. It is true that Hungary's production capacity in substitute materials is very small. Consequently, these production facilities should be enlarged speedily.

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Tasks of the Railroad Car Industry

In comparing the Hungarian railroad car models now in production with the latest foreign models, it will be clear that our models are obsolete and are below international standards. The reason therefore lies partly in the fact that our technical cadres and designers are stagnating and partly in the absence of creative imagination. Some progress has been made with the help of specifications received from abroad for export orders; however, this cannot give a new direction to the entire Hungarian railroad car industry.

Among the models now under construction or being designed, the following are the most important:

1. Passenger Cars

The model Hn passenger car for suburban traffic, the model Bca passenger car for the MAV (to be used in international traffic) and a subway coach for the Budapest subway are under construction. It is also planned to design a third-class passenger coach for Egypt, an electric streetcar for Finland, and a new car for the Budapest streetcar system. In the more distant future, a new model postal car may be developed.

2. Freight Cars

Work is progressing on a hopper coal car, based on the Talbot system, and on a new tender. Later a new dump car and a new type of tender may be designed.

3. Rail Motorcars

This field includes the model Bcb five-axle MAV rail motorcar; a rail motorcar, tender and parlor car for Poland; a five-axle car for Czechoslovakia; and an agricultural narrow-gauge rail motorcar for Keckskemet.

4. Consists

This category includes a modernized variant of the Soviet consists, the four-section consist for the MAV, a three-section consist for Czechoslovakia, and a four-section consist for East Germany.

In this connection, it may be mentioned that Hungarian railroad car factories are also manufacturing various types of diesel locomotives, such as the 2,000-horsepower and 600-horsepower diesel electric and the 130-horsepower diesel locomotives. In addition, mine locomotives and special hauling machines are also produced.

Because of the shortage of raw materials, Hungarian industry as a whole has concentrated its output in high-value products. In line with this trend, it is advisable for the railroad car industry to specialize in passenger and rail motorcars, which require relatively little raw material. Domestic requirements for freight cars, for which a large amount of material is needed, should be filled, as far as possible, in the friendly states.

In connection with the numerous new models now under construction, a few additional comments on prototypes are in order. Although a decree regulating this problem exists, in practice the railroad car manufacturers have not had enough time, in the past, to make and test prototypes before proceeding to serial production. As a rule, serial manufacture is begun immediately after receipt of the material, the first one or two cars are designated as prototypes, and modifications are effected for the whole series after a short test run. Very

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often, however, test runs cannot be made because of the difference in gauge, and the cars and consists can be tested only after exportation, on the tracks of the receiving country. I need not go into detail as to the difficulties which this method engenders in the railroad car industry.

The defects which have appeared during the tests made by the purchasers indicate that the quality of the Hungarian products is substandard. This is due partly to poor quality control at the plants. If we want to satisfy our foreign customers, and to secure repeat orders from them, the professional competence of the personnel of the railroad car factories must be raised. The tasks before us, therefore, are to solve the problem of the manufacture of prototypes, to enable the plants to test the cars and consists before delivery, and to work out a system which will permit the orderly incorporation of changes in specifications during production.

Serious tasks exist also in specialization. Different types of products should be manufactured by different factories; and it would be advisable also to stipulate the minimum number of units per series. Minimum series should consist of 50 passenger cars or 100 freight cars. We suggest that passenger cars for export and special freight cars should be manufactured by the Wilhelm Pieck Vagon- es Gepgyar.

The Dunakeszi Vagongyar should engage primarily in the manufacture of railroad cars for domestic use. The Ganz Vagon- es Gepgyar should, as far as possible, make only rail motorcars and consists. Because of the prospective increase in the production of electric and diesel-electric rail motorcars, it will be necessary to build a special factory for these types of cars.

Besides specialization in the types of cars, the manufacture of equipment should also be specialized. The manufacture of railroad car brakes, for example, which are currently produced outside the railroad car industry, should be brought within the industry.

The Jarmufelszerelesi Gyar should be moved into a new factory, to be built in the future. It is also necessary to determine whether the manufacture of buffers and car trucks can be centralized. Before centralization, the number of equipment types should be reduced, to simplify production. Doors, windows, etc. should be standardized, and it would be advisable to standardize their manufacture. After solving all these problems, the railroad car factories would become largely assembly plants and production would be rationalized.

On the basis of a survey of export and domestic requirements, enlargement of the Wilhelm Pieck Vagon- es Gepgyar and of the Dunakeszi Vagongyar will begin this year.

One of the basic problems affecting the increase in the capacity of the railroad car industry is the construction of assembly tracks. Building of assembly tracks equipped with cranes requires a large capital investment. For this reason, it is important to reduce the length of time which this phase of railroad car production requires.

While truck assembly at the Wilhelm Pieck Vagon- es Gepgyar, for example, requires 15-20 days, in the German factories it requires only 12 days. Similarly, the Wilhelm Pieck enterprise requires 105 working days, that is, more than 4 months, to build and to complete the interior equipment of a model Cak car, as compared with only 3 months in the German factories.

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To parallel foreign results, technical preparation and work organization must be brought to a higher level of proficiency. In this field, some of the Hungarian railroad car factories are considerably behind the times. If the length of manufacturing time is to be reduced, and the production capacity of the Hungarian railroad car industry thereby increased, it is necessary to improve the technical preparations, to increase the size of the series, to introduce pneumatic hand tools, to employ advanced welding technology, and to expand steel-plate pressing capacity.

In the field of machining, the Hungarian enterprises are characterized by a lack of initiative to utilize fully all available machines. Some enterprises are laboring under the misconception that besides the basic machine tools, especially the center lathe, the other machines have only an auxiliary function; they fail even to attempt lathing on idle machines of a different type. Because of the existing difficulties in the procurement of machine tools, and also for reasons of economy, this situation must be changed, even if it should be necessary to carry out an extensive retooling program.

The problems outlined in the foregoing can, of course, be solved only if the tool- and equipment-manufacturing capacity of the railroad car industry is considerably increased. The difficulties inherent in increased tooling will, in turn, lead our engineering staff to standardize the machine parts and, consequently, to realize economies. As a result, it will be possible to produce tools in larger series with greater economy and, at the same time, to reduce the number of tools.

Serious tasks confront us in the replenishment of the cadres. The level of apprentice training should be raised by the employment of outstanding instructors and the publication of good textbooks. Moreover, the MTH (Munkaerő-tartalék Hivatala, Office of Manpower Reserve) training workshops should be provided with special railroad car manufacturing equipment, to teach the apprentices in the same environment in which they will work after the completion of their studies.

Technical intermediary schools and evening courses should be developed along the same lines and should offer opportunity for specialization. The engineering schools on university level should be supplemented with special courses for the training of specialists in railroad car manufacture. It is particularly important to teach technical quality control, with a view to raising the level of the quality control departments of the railroad car factories.

The magnitude of the tasks may be visualized by realizing that the production facilities of the Wilhelm Pieck enterprises and of the Dunakeszi Vagongyar will be expanded to enable these establishments to double their output; and that, in addition, the production of diesel locomotives and of rail motorcars will also be considerably increased. All this means that we shall have to recruit, during the next 3-4 years, a greater number of personnel than would be sufficient to man a complete railroad car factory.

Solution of the Problems

The solution of the problems of the railroad car industry begins with the preparation of offers and the proper drafting of the sales contracts. It is important to establish close and sound cooperation with both foreign and domestic purchasers, in an effort to clarify technical specifications and details of delivery.

Before concluding a sales contract, the manufacturer should call the attention of the purchaser to possible modifications which can be made in the

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prototype. In connection with serial manufacture, the manufacturer must clearly stipulate the minor and major modifications which can be made, and must also state at what stage of the production they are acceptable.

The prototypes must be designed and constructed with great care. It is important to complete them on time, and the manufacturer must see that the target dates for the various phases of the construction are also observed. This, of course, is possible only if the due dates for the delivery of raw materials have been scheduled competently and are enforced.

It would be advisable to set up a special department in each factory for the assembly of the prototypes. A decree exists which makes it mandatory for each designing department to set up a special prototype-designing section; however, this decree has not been enforced so far. A sound solution of this problem would be to create an institute for the development of rolling stock and to assign the designing of new models to this institute. The factories would retain the construction departments, which would also supply recruits for the cadres of the designing institute.

In the near future, the Hungarian railroad car industry will have to develop and to manufacture serially numerous new models. To assure the best possible quality, it will be imperative to run the prototypes through a series of tests. In the past, it has been impossible to carry out such tests even with standard-gauge cars designed for domestic use, because the manufacturers had to adapt themselves to the traffic conditions of the MAV. As far as broad-gauge cars and locomotives are concerned, thorough technical testing has been entirely out of the question.

I am convinced that all specialists of Hungary's railroad car industry and railroad transportation will agree with me that the best plan would be to build a circular road testing track. In my opinion, the track should be at least 10 kilometers long and should have various curvatures and gradients in addition to a level section. A testing track of this kind would guarantee that, after the testing of the prototypes, our factories would serially produce up-to-date and perfect rolling stock.

For the shortening of production time and the fulfillment of manufacturing tasks in general, the following possibilities exist:

1. Standardization

Production time can be shortened considerably by the standardization of component parts. Thus, the trucks and roofing of the cars can be standardized and minor deviations from the standards requested by the purchaser would require little additional work.

The problems which confront us in connection with the standardization of rolling stock are largely similar to those which have already been solved in the USSR. The measures which the Soviet Railroad Directorate employed to increase economy in operation are divided into two groups. The first group includes technical provisions aimed at facilitating work and making it more economical, and the second group includes labor protection provisions.

During the first years after the liberation, when we were faced with the task of rebuilding a large part of our rolling stock, we had great difficulties because of the enormous diversity of models. In the meantime, the number of models has been diminished considerably, although there is still much to do in this field.

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The railroad car industry has already begun to solve the problem of standardization. It appears to us that the first step should be the standardization of such parts as fittings, doorknobs, locks, levers, etc. We are planning to compile these standards in a manual, the application of which will be mandatory for the entire railroad car industry as well as for the MAV, HEV, and FVV.

Manufacturing and assembly time can be considerably shortened by better work organization, increased mechanization, improvement in welding technology, utilization of leading Soviet technological methods, and the use of pressed-steel plates and profiles. Standardization of smaller pieces should be developed to such an extent as to permit production in large series for stock, instead of for immediate assembly needs.

2. Plant Development

Current proposals for the long-range development of the Hungarian railroad car industry are not based on a solid foundation, in part because the existing plans for the various products are not definitive. This uncertainty will prevail through 1954 and, to an even greater extent, in succeeding years.

As mentioned in the foregoing, orders are accepted for delivery in 16 months for established models and for delivery in 2-2 1/2 years for new models. These long terms of delivery are, in part, due to the fact that the railroad car industry in general and the Jarmufelszerelesi Gyar in particular are lagging behind in the fulfillment of the investment program. The demand is so great that it is imperative to expand our manufacturing facilities; we must, therefore, take action to carry out the investment program in its entirety during the current year.

Plant expansion is, of course, limited by conditions of location and by reasons of economy. During 1953-54, new buildings will be added to the Wilhelm Pieck Vagon- es Gepgyar to provide maximum assembly room. At the Dunakeszi Vagongyar, a new assembly hall, equaling in size the existing assembly hall, will be built during the next few years. At the Jarmufelszerelesi Gyar, a new complete plant will be built in 1954.

With a view to increasing the size of the series to be produced for domestic use, it might be expedient to adopt a rotating program. For example, only MAV cars would be made during a certain period; in the following period, rail motorcars and cars for consists would be built only for the HEV or FVV; etc. This program would represent a radical departure from the current practice of making cars and consists of all types simultaneously.

3. Organization, Technology

The solution of the problems outlined in the foregoing would be conducive to a considerable expansion of the railroad car industry. Within the enterprises, it will be necessary to pay greater attention to production management, the production program, and work organization. To this end, it is imperative to assign to the chief technologists and their departments much greater participation in coordinating the various manufacturing processes.

Introduction of prefabricated elements in manufacturing demands a change in construction: the larger structures will be fitted together from smaller parts in a mosaic-like pattern. Well-constructed and thoroughly tested welding equipment, together with the latest welding methods, should be employed to a greater extent in the manufacture of both structures and component parts.

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5. Quality Production

In the foregoing, attention has been called to the demands which the railroad car industry is entitled to make on the purchasers. In our opinion, these demands are justified. On the other hand, the purchaser is justified in demanding excellent quality from the industry. Excellent quality concerns the entire country, whether the demand is made by foreign buyers or by the domestic transportation systems. Hungary's prestige is enhanced by good quality, while it is seriously damaged by poor quality.

A case in point is the production of the consists which were designed and made by the Ganz Vagon- es Gepgyar. If all departments of the factory, especially the MEO (Minosegi Ellenorzo Osztaly, Quality Control Department), had fulfilled their duties, the damage to our national economy as a whole would have been avoided. It is true that the unclear contracts were also to blame, because they failed to specify all technical details and mutual obligations. In this connection, it may be pointed out that achieving smooth operation of fast rail motorcars and stable and up-to-date construction of trucks presents vital problems; for which a solution must be found speedily.

What, then, is necessary to assure good quality? First, constant development of the workers' consciousness, strict technological discipline, and better MEO work are needed. It is also necessary to strengthen the authority of the shop chiefs and to free them from extraneous duties. Finally, we must have adequate tooling and equipment.

Summary

From the foregoing, the tasks with which we are faced may be summed up as follows:

1. Better cooperation with both foreign and domestic purchasers.
2. Specialization by subcontractors.
3. Production and testing of prototypes (construction of a proving track).
4. Shortening of production time.
5. Complete and speedy fulfillment of the investment program.
6. Better production organization.
7. Introduction of the latest technological methods.
8. Vigorous revival of the various movements.
9. Recruitment and training of personnel.
10. Increased standardization.
11. Increased production.
12. Use of substitute materials, material conservation, and other economies in imported materials.
13. Coordination of the export, metallurgical, and other plans with the production plans of the railroad car industry.

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