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SPARE PARTS PRODUCTION

24 March 1949

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COMMANDER FAIRCHILD: Gentlemen, Mr. Bahr who was scheduled to speak today is unable to be with us. We are very fortunate to have as his alternate, Captain John O. Huse.

Captain Huse brings to us a wealth of knowledge and practical experience, both military and civilian. While in the Navy, he devoted almost his entire career to the engineering phases of producing and maintaining ships. Much of this duty was directly concerned with the procurement and distribution of spare parts. During the early part of the last war, he originated the Navy Fleet spare part supply system and later was in charge of the Pacific area program during the height of that campaign. In 1947 he retired from the Navy, due to physical disability, and accepted a position with Chrysler Corporation. For the past year and a half, he has been sales manager for Chrysler Motors Parts Corporation. Today he will explain to us how his organization handles its spare parts program, how it supplies parts for new models while still in production, and at the same time maintains previous models through continental and overseas supply systems. We feel that this problem closely parallels that of the military and that we should be able to learn much from industry in this respect.

I take extreme pleasure in introducing to you Captain John O. Huse of Chrysler Corporation.

CAPTAIN HUSE: Thank you very much, Dale, Staff, faculty, students and guests of the Industrial College: You are very gracious indeed to invite the Chrysler Parts Corporation to come down here to Washington to tell you about our method of handling our service parts. Mr. Bahr, who was to have come, is unable to be here and has asked me to come in his place.

You have, we believe, in the past admirably handled your own parts' supply and your infinitely more complicated problem. But if our experience in Chrysler Corporation, related to your problem, can in any way help in your future planning, we are delighted to be of assistance to you.

The subject you have outlined may be stated in the form of a question: "In producing a new vehicle, who decides what service parts are to be produced, in what quantity, at what time, and by whom?"

You asked us especially to deal with, first, means to secure greater flexibility in the production of these "service parts" and, secondly,

an effective organization for production so as to more promptly meet widely varying demands. I understand that you, at one time at least, spoke of "spare parts" whether shipped concurrently or as replacement spare parts. In the automotive industry we usually refer to "replacement parts" or "service parts." In this discussion we should keep in mind that these terms refer to the same thing.

For a clear understanding of how our corporation operates to provide "spare parts" for our vehicles, I will speak this morning on the following subjects:

1. The over-all organization of Chrysler Corporation with particular emphasis on service parts.
2. The contribution of service engineering in deciding what parts are to be produced.
3. The function of procurement and inventory control in deciding on how many and at what time the parts will be produced.
4. The function of the master mechanics group in deciding how they will be produced and how to obtain an adequate source of supply.
5. The contribution of Chrysler's distribution or pipe line to our vehicle owners to prevent widely fluctuating demands on the production lines.

Returning now to our first subject, "Chrysler Organization," there are four major car divisions for the production job. There are:

First, the Chrysler Division, manufacturing the Chrysler passenger cars and the Chrysler marine and industrial engines.

Second, the De Soto Division, manufacturing the De Soto line of passenger cars.

Third, the Dodge Division's line of passenger cars and "Job-rated" trucks of every sort and description.

Fourth and last, but not least, we have the Plymouth Division's passenger car.

These car divisions are in four separate main assembly plants, all in the Detroit area, plus other parts manufacturing plants operated by them in Detroit and the Midwest.

There are also other non-vehicle end-product divisions of the corporation which do not come into our picture this morning. For example,

Airtemp, heating and air conditioning; Cycle-weld, cement; Amplex, powdered metal products, etc. These latter are called subsidiary operations.

The foregoing manufacturing divisions are served by certain centralized divisions, namely, Engineering, Purchasing, and Finance. The only one of these three we need to speak about this morning is the Engineering Division which employs about 2,500 people. As you may suppose, it has to do with research, development, and design.

Naturally, these things all come ahead of production, which is the second main segment of our business.

The third segment of our business is sales, but, for the moment, we will pass it by without any detailed comment.

Fourth comes the Parts Division. After all engineering knots have been tied and the jobs are in production at the four main vehicle production plants, the engineers immediately swing their attention to improvements in the vehicles as a whole, and their individual parts. Obviously, the technical records developed by the Engineering Division for the job in production are no longer of interest to people exploring for something new and different. Hence, these records are moved over to the Parts Division.

Not only do the records from Engineering move to the Parts Division, but likewise when a line of vehicles ends its production run and a change-over is necessary to bring out a new series of vehicles, all the dies, jigs, tools, fixtures, and inspection tooling move to the Parts Division. All these things are necessary to provide the wherewithal for reruns required by the Parts Division as time goes on. These reruns of after-model parts are accomplished by the Parts Division either in corporation plants or the plants of outside vendors.

This rerun production problem is a serious and ever-changing one. It will be a very important one in military procurement, particularly so after equipment get scattered in far-flung military operations. Unless there is a streamlined method of proper identification, or if a workable system for the replacement of parts requirements is not developed by the military organization in peacetime a very serious problem will result. We at Chrysler Corporation can tell you what has happened in regard to various commercial groups of parts. You can decide how our experience can be related to a military organization, meeting, as it must, many and varied problems of transportation, terrain, weather, attrition, and all the other factors peculiar to wartime supply of replacement parts.

We have talked briefly of the Chrysler organization for engineering, production, and parts supply. The third segment of our business is vehicle sales. Our Sales Department establishes a dealer organization, signs the

sales agreements, and moves the vehicles production through the members of the dealer organization to the ultimate vehicle consumer or owner.

Our vehicles are guaranteed, therefore, during this warranty period, we consider all these vehicles a Sales Department responsibility because sales are very close to current vehicle production. However, after passing out of this guarantee period, the Parts Division is in control of the inventory of parts taken over from Car Production, the tooling and everything necessary to reproduce the parts in six months, a year, in five or ten years hence. When owners are kept happy with good parts and service, we feel our dealers' future car sales problems are greatly helped. Happy car owners make a powerful sales instrument. It makes no difference to the Parts Division, operating in every nook and corner, whether the owners of our end products are first, second, third, or even fifth owners. Every owner is entitled to the best we can give in parts and service.

The Parts Division has decentralized its distribution function by establishing five main distribution centers. Detroit and Marysville, in Michigan, take in the Great Lakes area. The Delaware Parts plant serves the area of New England to approximately South Carolina. Atlanta, the Old South; from Kentucky to the Gulf; and from the Atlantic to the Mississippi River. At Kansas City we have a mid-continent parts distribution center, which handles the area from the Mississippi west to the Rockies, and from Canada to Mexico. And our fifth point of a centralized distribution is located in the Bay area of California, where it handles the Pacific slope east to approximately the Continental Divide. There is a great deal involved in both time and freight rates when it comes to this type of distribution system. Auxiliary to these five parts plants we have a much smaller depot in Chicago which is more or less a present requirement for supply in an unusually condensed car-population area.

Since it is the Parts Division's responsibility to see that repair shops taking care of owners' vehicles are properly supplied with parts--whether the owner chooses to take his car to one of our dealers or to an independent garage--we have found it expedient to employ certain contractors to provide the availability necessary in any given area and to solicit and deliver parts to all types of independent service stations.

The sales agreements between the Chrysler Corporation and the dealer are alike, regardless of what label is on the vehicle the dealer handles.

But, naturally, in any group of 11,000 dealers, there are some located at important points of redistribution and some of these are very well organized and equipped. To these strategically located dealers, to the extent we find necessary, we offer an additional parts wholesaling agreement. If these competent dealers did not exist, we might have to have other types of contractors for this local distribution, or we might have to do it ourselves. We have tried the latter and have now abandoned it at every point but Chicago.

I would like to emphasize that all direct dealer agreements are exactly alike--having to do with the sales of vehicles, service facilities and parts, and from this major group of dealers we have approximately 150 who can provide the breadth and depth of inventory adequate to provide quick local parts availability.

Last year--its 55th--the automotive industry in the United States completed its 100,000,000th vehicle. This is more than four times as many cars and trucks as were produced in all the rest of the world combined. Of the 13,000,000 of these which Chrysler produced since its incorporation in June 1925, there are about 8,000,000 in operation in the United States today. Over 130,000 of these domestic vehicles are 18 years old or over.

We are continuously endeavoring, to the maximum possible, to provide replacements for those parts that may be worn or damaged in these 8,000,000 vehicles. These cars and trucks are of hundreds upon hundreds of different basic vehicle models and tens of thousands of combinations when you consider body styles, color, upholstery, and trim. In addition, in the trucks there are variations in wheel base, transmissions, rear axles, springs, wheels, and so on. On exported vehicles there are even more differences--12-volt electrical systems and right-hand drive--just to mention two items.

Specifying some of these parts for individual vehicles would be nearly impossible if we did not have microfilm records of all this detail for each vehicle we have built. By this means any of our parts plants can quickly tell exactly what part is required if it is just given the serial number of the vehicle requiring a new part. That is comparable to the "Ship's Characteristic Card" of the Navy.

The supply of replacement parts is big business--big in volume, big in the problems it presents, and big in its influence on the sale of new cars. For instance, last year's parts sales for the 35 million vehicles in the country were just about 2.5 billion dollars, that is, parts and accessories. The labor would bring the total service bill on the cars up to about seven or eight billion dollars. Now of the 2.5 billion dollars, our share is about 20 to 25 percent. We don't get it all because there are independents, replacement parts manufacturers who are independent of us, who supply some of that. But you can see that to keep our vehicles running and to equip them with accessories required a half billion dollars last year.

Chrysler Corporation, operating as it does in a very competitive field, must be effective and economical. It must show a return on the investments made by the 64,000 owners of the business. Where you in wartime must economize in manpower, production facilities, and raw materials, we must similarly economize to be competitive price-wise in peacetime.

In 1929 the problems of parts supply for all Chrysler Corporation-built vehicles were put in the hands of the Parts Division, an organization that has no other responsibility except that of parts supply. Parts procurement and distribution cannot be run as a side line. It is too important a phase of the corporation's relationship with its car owners. So much for Chrysler Corporation organization.

In the Parts Division we have found that our problems break down into three broad classifications--namely, Service Engineering, Procurement, and Distribution. Accordingly, our organization is set up to correspond with these three separate functions and we will treat them in that sequence.

SERVICE ENGINEERING

Service Engineering is that branch of the corporation's central engineering activity which works on Parts Division problems. In order to understand the functions of Service Engineering, it will be helpful to take a brief look at the working of our Engineering Department preparatory to the introduction of a new model.

The public is conscious of model change--new models are the milestones of progress--but the public does not see the real engineering progress that moves slowly but steadily forward, little by little. Our engineers are continuously striving to improve performance, prolong vehicle life, and effect economies in the manufacture and operation of vehicles. As a result, each year thousands of new parts are designed and added to those already in our distribution channels.

For each part used in a vehicle the Engineering Department issues a "release" which indicates part number, nomenclature, model application, and quantity used in production for each vehicle.

Let us stop just a minute to stress the importance of nomenclature in the parts business. It is quite understandable that in different sections of the country and among different groups of designers, parts with identical functions should be assigned various names. For example, "steering knuckle king pins" have been called, "king pins," "steering pivot pins," "steering knuckle pins," and so on. There is another complication and that is an identical part with many part numbers. I have seen as many as 87 part numbers for the same part--not in Chrysler Corporation, however.

As explained, the nomenclature appears on the "release" along with part number, model application, and quantity used in production for each vehicle. Before releasing a part, the responsible engineers check it against similar parts previously released for both production and service, so as to avoid unnecessary duplication.

While designing an axle shaft, for instance, the engineer has a folder beside him with prints of all those previously released. This does not mean that design engineers are limited in their task of designing new and better cars. They are not. But they are carefully trained to appreciate the costliness of unnecessary duplication--cost in designing, in manufacturing, in distributing, and in part numbers compounding on the dealers' shelves. They strive always to avoid releasing new parts which do not pay off in style, operating economy, safety, comfort, and convenience to vehicle owners, or trouble-free service, or easier and more economical production. In making this check, the design engineers constantly consult with the service engineers.

Up to the point of release the work is all in the hands of the production engineers. As soon as a part number is released, copies of the release go to Service Engineering for further scrutiny and for what is called a "service ruling," and also to the Production Staff's master mechanic. This latter, in cooperation with Central Purchasing, determines from a knowledge of machine capacity, work load, and other factors, whether the part will be fabricated in our own plants, or by outside sources. This selected source or "line-up" is also then indicated on the engineering release, which will designate "corporation plant" or "purchase finished," the latter meaning it is to be allocated to an outside vendor.

At Service Engineering a group of specialists determines whether the new part will be serviced and if it is decided to service it, they also decide how to service it. (Examples of parts not serviced are thread, tires, and glass; parts welded to others; parts which do not wear; parts serviced only in assemblies or subassemblies.) This service ruling group, in making its rulings, takes into consideration many factors, among which are cost to car owner--that is, cost of part plus the cost of installation. For instance, the door lock spring is a very cheap part, but it is not serviced because to install it would cost more than the cost of the lock spring. Therefore, we service that as a lock assembly. The release of unnecessary service parts is avoided. Both engineering standards and ease of installation are maintained in the field. No one consideration is at all times of paramount importance. These "service rulings" tell whether or not to service, whether to service as an assembly (e.g. fluid drive unit) or the component parts, or both (e.g. fuel pumps).

Besides ruling on parts which are released for use in production models, there are two other functions performed by this group. These are, first, the release of parts "for service only," and, secondly, the continuous re-examination of old part numbers.

Quite frequently there is need of a part for service even though no such parts are or ever were used in production. A case in point is oversized pistons and rings for rebered engines. Undersized bearings to fit reground crankshafts are in the same category, as also are body repair panels.

The continuous re-examination of old part numbers is a subject having to do with "supersedence" and "stock reduction" and it will be dealt with more fully later on. We shall now take a look at procurement.

PROCUREMENT

The Procurement Department determines initial and replenishment parts requirements, issues requisitions, and maintains stock records and inventory controls. When the service ruling group has decided that a part will be serviced, a copy of the release goes to the Procurement Department for "purchase action." If the part was used on prior models, existing stocks are augmented commensurate with current demand, plus the requirement for the total number of new models to be built.

On new parts, quantities have to be ordered mainly on the basis of past experience with similar items, and with due regard to the prospective volume in which the new model is to be manufactured and its rate of manufacture.

When requirements for service have been determined, requisitions are issued to the car and truck production plants--or to Central Purchasing if the item is to be supplied by an outside vendor. Here the service requirements are combined with the requirements for production and a schedule is prepared and submitted to the production plant, or a purchase order issued to the vendor.

It might seem that as long as an item is in production we could withdraw our needs from the production supply and eliminate manufacture expressly for service purposes. Our experience shows us that this will not work. Our requirements for service are great and the need for service parts is frequently urgent. If we are to have parts available when and where they are needed, we must determine long in advance what our needs are to be, and have the items produced, warehoused, and distributed to the points where the demand will materialize. There have been occasions when we have had our "all-time requirement" of an item even before a single car of that model has been built. One I recall is a supply of replacement hoods for a low volume model. We determined our requirements, had them scheduled along with the production run, and took them off the production line. We had them in our parts plants before a single car of this model was assembled. Collision parts, such as fenders, bumpers, and gas tanks, were en route to our dealers before these new models, you have just seen, were displayed to the public. Before these new models were in the showrooms of the dealers, we had parts to take care of the collisions there ahead of them.

The Procurement Department also performs the follow-up function, whether items are supplied by outside vendors or by our own production plants. As a passenger car or truck draws close to the end of its

production run, the Procurement Department must carefully review and plan methods of satisfying future service demands. This can be accomplished either by obtaining an all-time requirement--that is taking in a supply which we estimate will last for the life of the vehicle and which, as you see, is sometimes over eighteen years--or by establishing a source of supply separate from that devoted to producing parts for new model cars or trucks. This is a specialized function which requires keen judgment and personnel whose experience and training qualify them to handle these specialized responsibilities.

If storage problems--including cost--prevent our taking the "all-time requirement" before breaking up a particular production line, it is necessary for the parts master mechanic to analyze all the tooling which will be required to re-establish production at some later date. Even though we can't take an "all-time," we may be in a position to take a "long-time" supply and thus secure parts at production prices before the parts production lines are broken up.

The release of a new part carries on it the part number it supersedes and states whether or not it is interchangeable with the old. When the release is received in the Parts Division, a DPN (discontinued parts notice) is sent to the parts master mechanic.

On this DPN we have the part number superseded, the new part number which is superseding, the numbers of the vehicles it is used on, and the estimated quantity required. If the production tooling is to be converted to make the new model, the parts master mechanic then has to determine the cost of the tooling, the cost of the setup, and various other factors. Then he decides what to do. Whether to take the all-time requirement, or whether to have it run by an outside vendor. This is a very important job. On frames we take the all-time requirement. They are very expensive and the tooling is always converted. I know of one case where we ran out of frames and when we ran 600 of them ten years later, they cost ten times as much as their original production cost.

From our discussion of the Procurement Department thus far, I am sure you can see in performing its main function of determining requirements that it has need of accurate, up-to-date information on sales' movement and spread of inventory. This fact, among others, has led to assigning the maintenance of stock records and controls to "Procurement."

Currently our "Procurement" has the responsibility of maintaining controls so that the records will reveal at all times the stock position on more than 103,000 different items. These records also must show in detail the trend of demand for each, so that future requirements may be planned on a thoroughly realistic basis. The records show the "lead time" or reprocurment time for each item. This varies greatly for different items, and is even now as much as a year on some items. In wartime, with materials, manpower and machine capacity limited, it is even more.

The inventory control system includes stock in our five decentralized parts plants and enables us to know in the home office the stock condition at all points on any item. Although inventory policies and stocking points are fixed by the Procurement Department in Detroit, each plant also keeps appropriate stock and inventory records for its own use.

The five parts plants and the Procurement Department in Detroit are all interconnected by a teletype system--in fact many of our parts wholesalers also have teletype facilities--thus making it possible to quickly transfer supplies from one plant to another, or dealers' orders may be referred to the nearest point of availability for immediate shipment. This shuffling of inventories between parts plants and the referring of dealers' orders is very helpful in taking care of urgent emergency requirements. Since it is expensive, it is not the routine handling. Extremely slow-moving items are stocked at Marysville only. Our target with respect to some 30,000 of the fastest moving items is to keep adequate stock on hand at each of the five decentralized parts plants. These stocks act as reservoirs for their respective areas and they cushion one another.

Determining requirements, placing orders and factory requisitions, and an energetic follow-up are only the initial steps in the mission of supply. The parts themselves must be received, inspected, properly identified by number and name, and given such protection against rust, corrosion and damage from handling, as the nature of the particular item may require. This varies widely. Dipping or spraying frames or sheet metal may give adequate protection even for outdoor storage. On the other hand, piston rings and bearings may have to be individually preserved, wrapped, and packaged in merchandising and identifying containers.

This brings us to the subject of warehousing. The Parts Division, as we have seen, operates a warehousing and distribution system consisting of these five parts plants strategically located to serve their several sections of the country. These plants carry substantial stocks of approximately 30,000 different items. The plants at Marysville and Detroit, in Michigan, act, in addition, as a reservoir for the remaining 70,000 or 75,000 slower moving part numbers. You can relate these plants to comparable depots in your own Service of Supply.

DISTRIBUTION

Between the military distribution problems and ours there are great differences. For example, we not only know pretty well right where our vehicles are in operation, but we also know there will be no perceptible mass migrations from one place to another. We know the types and numbers of vehicles in use in each state, yes, even in each county. It may interest you to know that about 25 percent of the Chrysler-made vehicles located in the United States lies in only 23 counties. The next 25 percent

lies in approximately another 90 counties. The third quarter lies in about the next 400 counties, and the last 25 percent is in 2,556 counties.

Another radical difference lies in the fact that we must sell parts, whereas in the military, allowance lists can be prepared and imposed upon organizational units. All of your supply is distributed from sources under your control, whereas, in our case, estimation of requirements is complicated by the fact that we have independent jobbers competing with us for the market.

The subject of distribution has been touched upon in talking about our Procurement Department. It is under its jurisdiction that determinations are made as to what parts are to be stocked, at what parts plants, and in what quantity. It is at this point that the distribution function passes beyond the boundaries of our corporation into the hands of some 11,000 independent businessmen who have dealer agreements.

Perhaps the best starting place for examining this part of the distribution picture is with the corner gas station, large service garages and so-called alley garages. These are commonly lumped with dealers handling other makes of cars and fleet accounts to constitute what we call the "independent trade." Many of these places usually take care of the more minor type of repairs. They stock items which are in great demand, have wide applicability, and, hence, require no heavy investment in money or space. Mufflers, fan belts, light bulbs, and fuses, oil filters, batteries, carburetors, fuel pumps, and spark plugs are all examples. These items can be secured by these independent outlets from any Chrysler, De Soto, or Dodge dealer. That last statement needs some modification. It sounds too passive. It is better to say that these corporation dealers actively solicit and promote the sale of these parts for stock at such business places. Beyond this, they also deliver from their own parts departments items which are less frequently required for the repair of specific cars.

Our approximately 11,000 corporation dealers maintain stocks which vary greatly in breadth and depth depending upon the size of their own repair business and the resale job done with "independents." It is with these dealers that our Sales Department's missionary work has to be done.

The Sales Department.--The Sales Department's function is to educate our dealers in the sales possibilities in handling our products and to aid and train them to realize these possibilities. A field force of approximately 150 men is constantly working at these problems and a substantial home office force is kept busy preparing sales helps and aids, merchandising programs, advertising copy, etc.

Dealers secure their parts requirements from one of our five parts plants, from another dealer having more extensive stocks, or from a parts wholesaler.

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These parts wholesalers, as we have described, number about 150. They are dealers who have an additional agreement with Chrysler Corporation under which they are obligated to perform a special solicitation and delivery function among the "independents." They have stocks of parts which are much more substantial both as respects the numbers carried and the quantities carried. Their stocks usually encompass approximately 15,000 part numbers.

The missionary work of which I spoke a minute ago consists in teaching proper stock and inventory control and ordering procedure, receiving, stocking and issuing techniques and sales methods to all these dealers.

The Parts Division Sales Department also makes available in appropriate form the price and location card systems, so-called specifier's cards, which have the model application data and other useful information. We also have, of course, parts books, price lists and what we call a "parts supersedence list." This latter shows the superseding part number or part numbers and is proving of great assistance to dealers.

Briefly summarizing our distribution, at the top we see five decentralized parts plants with substantial stocks of practically all active items serviced. These fill parts wholesalers' and dealers' orders, and the parts wholesalers and dealers in turn supply other dealers, the independent trade, and fleet and vehicle owners who do their own repair work. At each level, stocks are maintained commensurate with the demand. The stocks at each level constitute a cushion against fluctuating demands at the next level of supply closer to the point of usage. These several cushions make it possible to handle procurement on a practical and economical basis without severe fluctuating demands on production lines.

It is obvious from all this, I think, that in our business we have to depend not so much on flexibility in manufacturing as on estimating requirements long in advance. Then we manufacture in economical production runs and store at our different levels of distribution. We thus build up a pipe line with cushions, reservoirs of ready availability between the demand and the production line.

INTERCHANGEABILITY STUDIES

There is one thing which we do in our corporation--I cannot speak for other manufacturers--which we know pays off in tremendous savings to us, our dealers, and, what is most important, our owners. I refer to interchangeability studies. This is a supplemental activity.

I think I can illustrate the principle involved by taking as a concrete example the plastic door and window handles, horn button, gear shift lever knobs and the like, made available to new car buyers in different

color combinations to match or harmonize with car interior and trim appointments. For a period of perhaps five or six years, we will endeavor to furnish such trim items in all color combinations. After that time, we may supersede all color combinations with a single neutral color or plated part, thus permitting reduction of our inventory as stock is exhausted. During the first four or five years of a car's life, an owner would be disappointed if he were not able to procure a replacement part in the exact color and shade originally built into the vehicle. However, as the years pass by, these same owners--or their successors--are chiefly interested in procuring replacement parts which will perform the same function in a satisfactory manner.

What can be accomplished by such studies can be illustrated by another specific instance from our own experience. In December 1937, we had 520 separate chassis wiring harnesses--the assemblies of wires which link together the headlights, taillights, dome lights, horn, dash lights; etc. Naturally, our dealers were reluctant to stock more than a few of the fastest moving ones, and, as a result, availability in the field was not what we wanted. By studying these 520 separate harnesses, we eliminated and cancelled 372, leaving 148. Through subsequent restudy and eliminations in 1940, we brought the number down to 24. These supersedences at times work out so that the superseding part may have to have a hole or two drilled for some application, or a tube may have to be cut off, or some other simple modification made.

The success in reducing the number of parts required to service our vehicles is clearly evident when you consider that approximately 1,100,000 part numbers have been released by our engineers for parts to be used in producing vehicles. With less than 10 percent of these part numbers we provide for replacement parts demands. On a piece-wise basis we do over 90 percent of our business with less than 5 percent of the parts we service--less than one-half of one percent of the total number of part numbers released.

Summing up our experience at Chrysler Corporation leads to the following conclusions:

1. We must first establish requirements before we can properly schedule production, and this requires not only usage from comparable parts supplied in the past, but also reduction in the number of parts serviced by service ruling, supersedence, and interchangeability studies.
2. We must spell out our requirements on a monthly, quarterly, or annual basis to provide orderly scheduling at our source of supply, whether it be our own plant or that of a vendor.
3. We must set up a pipe line from factory to consumer which provides reservoirs of stocks to prevent violent fluctuations in demand on the production lines.

Our experience at Chrysler Corporation leads us to the conclusion that for supplies of service parts, we cannot place any reliance on the production lines currently making parts for vehicle production. We can use these lines as a source, but we cannot just withdraw parts from production as needed.

Our requirements must be separately estimated. They must be scheduled for production, received, and spread through five geographically located plants, our 150 wholesalers, and our 11,000 dealers so that they will be available when and where need arises.

We regard parts supply problems as a major activity--these problems are as important as engineering, production, and vehicle sales. We have also found when we treat this activity in its proper relation that we require an unusually "bang-up" organization--people with a great deal of experience. This activity is by no means anybody's stepchild--it is one of the four drive wheels on our locomotive, and we recommend for your consideration that the military also make this a major activity, and not tie it on to some other organization as an afterthought.

In conclusion, I want to say that the problems of parts production, procurement, and distribution, whether civilian or military, must continuously revolve around research and accurate analysis. We place these studies in the hands of qualified individuals with authority to bring about simplifications limited to parts supply. Control over future engineering designs or developments is, of course, another activity entirely.

The objective is much more simply stated than achieved. Some of you no doubt have spent considerable time and have accumulated knowledge and experience of the various phases of military parts supply. From that background, you can now get across to the younger men--men who eventually will be placed in key positions--the full appreciation of the importance of parts supply in our program of national defense.

QUESTION: The spare parts business is a huge business. How about spare parts holding up the introduction of new models? Spare parts amount to billions of dollars worth of business a year to you, but I imagine it takes quite a few years to get back what you have invested in spare parts. Does that business have any effect on the introduction of new designs of automobiles, such as the rear-engine drive?

CAPTAIN HUSE: It has no effect whatsoever. We have the new designs when competition does or when we think the engineers have good improvements. And they don't think of the parts we have in stock since these stocks never exceed the requirements for the vehicles already built. Parts supply doesn't affect nor limit the new models and, from the long-range viewpoint, that is the way it should be.

QUESTION: But you do take a rap by it, don't you?

CAPTAIN HUSE: Sometimes we definitely do. For instance a new car will go into production and the front seat isn't wide enough, so production may decide to make it a few inches wider. In the meantime, we may have 5,000 seat covers that fit the original seat and we have to rework them. That is one illustration of what happens. Or we buy 10,000 bumper guards and the bumper is altered. If it is a more comfortable seat or a better bumper, our management considers the cost well worth-while.

QUESTION: How do you take care of wearing parts, such as engines? For the first five years a car won't have any piston requirements. After that, there will be quite a few. Do you have a plan whereby after a certain period of time you go into fast-moving part production?

CAPTAIN HUSE: That is a good question. I am glad you brought that up. Parts move differently. Collision parts, such as fenders, begin to move immediately after the car is delivered, and we sell possibly 30 percent of our all-time requirements in the first year of the model's life; 30 percent the second year; 17 percent the third; 8 percent the fourth; 5 percent the fifth; and then it tapers off and the last 10 percent is sold during the last five years of the car's life. That is the picture on fenders. Apparently, whether it is a new car or an old car, they all collide.

But in the case of wearing parts, we find there is a variation, but they do not start to move rapidly until two, three, or four years after delivery of the car. Therefore, we take a supply, get them all stocked on the dealers' shelves, and then we watch it. We can tell how much to buy by the demand.

On all these parts we have a reliable and continuing source. Where the parts are supplied by vendors, our Procurement will issue a requisition and Purchasing will place the order. That requisition will state "quarterly" delivery, or, if it is very fast moving, even a "monthly" delivery schedule. The same general procedure applies to our own plant-made items. We can, by watching the movement on the part, keep ahead and keep it under control.

QUESTION: In storing these parts over long periods of time, you have the same problem as the Army does in packing and crating. Do you have any process that keeps your parts stored for ten years, for instance, without deteriorating--a process that the Army could adopt?

CAPTAIN HUSE: I have been down to Bayonne and have seen your latest programs for preservation, packing and crating. I think that the Army, the Navy and the Air Force methods are way ahead of ours, not because of lack of knowledge on our part, but because we don't need such expensive techniques. We don't have to meet the same conditions that

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you do. Therefore, your packing, preservation, and wrapping are far more expensive than ours, and far better, because you must meet more exacting conditions in handling, transport, climate, etc.

QUESTION: Would you discuss a little further the matter you mentioned on the nomenclature and cataloging of parts. Some of the things that I would like to have covered are, when you go from year to year, I gather that you have the same part number for the same part. Does that apply whether it is a Plymouth part, a DeSoto part, or a Chrysler part? Also, if a part is discontinued, for example, in one year and picked up a couple of years later--let us say, for example, the 1948 Plymouth might go back and use a 1942 Chrysler part as cars grow bigger--would that have the same number? Is there a place where you have an interchangeable part but not exactly the same part? Are those readily identifiable by the same major part number and a letter after it, something like that, so a person will know that it is interchangeable? Was the Chrysler Corporation smart enough to think about getting what I understand you have--which is a pretty good system--to start with or did you have to come along and do it later? If so, how did you do it? We have exactly that problem now. In other words, do engineering people go back and pick up your part numbers; did your master mechanic; did you get information from the field; did you do it all at one time; or did you attempt to let it go by attrition and move old parts out and order new parts? In other words, how did you do the thing?

CAPTAIN HUSE: Your question shows you know more about it than I do. I will try to answer those questions, one at a time. The service ruling group takes a release from the production engineer. That release shows on it the superseded part number and whether it is interchangeable with the new one or not. Now, in many cases, as you stated, a new number coming in may be interchangeable with an old one; but it may have better heat-treatment; it may be made of better material; or have a superior finish. Therefore, stated on the release is information whether the new part is interchangeable with the old--and the old with the new. In the latter case, the Service Ruling Group would add to the release the information to use the old part until exhausted and then supersede it with the new. In the former case, decision is made as to whether to obsolete the stock of the old part.

If a number drops out of production entirely, it is canceled. Later the engineers, who review all the old numbers in designing a new one, may find an old canceled number meets the new requirements. Then the old number is simply reinstated. If it is reinstated, the part is put back in production and carries the same part number. Does that answer your question?

QUESTIONER: Provided you tell us whether it is done for one car or whether Chrysler Corporation does it.

CAPTAIN HUSE: Some of our parts are interchangeable across the board. We use them in all of our cars. Or they may be interchangeable in two or more of the four types. And, of course, we have so many body styles, so many models, that they may be interchangeable in just two or three. All technical records including the release carry this model application. In other words, interchangeability studies are being made at all times. And don't forget that our Engineering is centralized, combining all four car divisions under one management.

QUESTION: I believe you mentioned having about 150 wholesalers and 11,000 dealers. I realize that you have to do a great deal of selling to convince these dealers to give real Chrysler service by having large inventories. Many of the dealers must be very backward and also lack funds. What financial arrangements do you make with them in order to guarantee good service in every community?

CAPTAIN HUSE: Another good question. We have no financial arrangements with the dealers whatsoever. They are completely independent businessmen.

Before we pick them out, we make sure that they have financial backing, that they are able to perform the necessary service to our owners for the class of dealer to which they belong. If they get into financial trouble, our credit department gets right into it as well as the Car Division controlling their contracts. These men are independent of us entirely. Our parts wholesalers are expected to carry three months' stock of parts.

Then we get monthly reports from the dealers, statements showing how many parts they sold, how many complete engines, and how many accessories. Every month we get a report on how much they sold to other dealers; how much to independents. We watch their inventories, and, where monthly sales are excessive compared to the inventory carried, we work with them to try to convince them to increase their inventories and give our car owners better availability.

QUESTION: Getting back to the part numbers, in the Navy we found that there was one case of 1,085 items that carried different numbers and they were all interchangeable. I understand the only way we could find out all about it is by a lot of pick and shovel work on the part of the Services. Relating to a previous question, is there an easier way to do it, what is an easy way to do it, and how many manufacturers use different numbers where it is an identical part?

CAPTAIN HUSE: That is your gigantic problem. We are just one manufacturer. We have solved ours but we know that you have a larger problem. I would be presumptuous to tell you how to do it. The way we do it, of course, is to study similar parts and see where they are similar,

see if they are interchangeable. If they are, we put the numbers together. Chrysler developed for the Army a pictorial method using dimensional identification. Very few parts have the exact same length, fewer the same width and length, and almost none all three similar dimensions--unless they are the same part for the same function. If you developed this dimensional method of cataloging and filed by a method similar to fingerprint identification systems, identical parts with different numbers would fall together

Now, with so many vendors--we have about 2,000 outside vendors--every one of those parts the vendors make is approved by our engineers if the engineers didn't design it themselves. If it is an assembly which we procure complete, every part in it is studied by our engineers and approved. The engineer is charged with the job of seeing that we don't get a duplication of part numbers for fully interchangeable parts.

QUESTION: In the event you have an unprecedented demand for a specific part on, say, a new vehicle, do you have a procedure, and, if so, what do you do to get the information back to your engineers to find out what is wrong?

CAPTAIN HUSE: That is called "product complaint." When we get an orgy of movement of a part that we can't understand, our field forces--each Car Division, Central Service, and the Parts Division has a field force--send these reports back to us. We get into it right away and correct it.

If we get into an orgy of trouble on a certain part, and it is urgent, we must increase the sources of supply as fast as we can, just as you had to do during the war. Of course, the first remedy we think of is to take those fast-moving parts out of the production line. Then we have blocks, crankshafts, all the slow-moving parts out of the production line piled up in the corner while we are getting the fast-moving parts from a line tooled for the end product, plus only normal demand on the defective parts. That is what we did during the war in many cases and it does not pay off.

QUESTION: As to worn parts, does your company engage in overhauling engines or reconditioning old parts?

CAPTAIN HUSE: We deliver new engines or engine rebuilding parts packages. Some of our dealers have engine reconditioning plants and rebuild engines. The cost of these at retail is less than that of a new engine. We furnish these dealers with parts for rebuilding or remanufacturing engines.

QUESTION: How do you handle competition? Some junk dealer, for instance, will sell old or reconditioned parts for your cars. I imagine you have faced that problem.

CAPTAIN HUSE: There are in the field more repair garages, independents, than there are repair shops owned by the car manufacturer's

dealers. These may buy used parts from junk dealers or from replacement parts manufacturers, who may not sell parts to car manufacturers at all but only to jobbers, who in turn sell to the independent repair trade. We are successful in getting our share of the business, but of course, with a half billion dollars a year being sold to our eight million vehicles, we don't get all of it.

QUESTION: What function does the service engineer perform that couldn't be done by the design group? Why do you need a service engineer?

CAPTAIN HUSE: The need for a separate group of engineers to take care of the engineering problems for the Parts Division is easily explained, I think. As I have already pointed out design engineers would have no interest at all in parts which were needed for service but were never used in production, for example, oversized pistons and rings for rebored engines and undersized bearings to fit reground crankshafts. The service engineers are the ones who make the "service rulings." That is, they decide whether a particular part should be serviced or not and if it is to be serviced, they decide whether to service individual parts or assemblies, or to service both parts and assemblies. They also make supersession studies to eliminate unnecessary part numbers. The functions performed by these two different groups of engineers, that is, the design engineers and the service engineers, are varied and distinct. We in Chrysler have found that it pays to have two separate groups within our Central Engineering Department to handle these functions.

QUESTION: My inference is that the Corporation itself does not directly operate any manufacturing facilities for the rerun of these parts. If that is correct, how do you administer the jigs, dies, and gauges in the intervals before you have to order a rerun from one of your suppliers?

CAPTAIN HUSE: We have a Parts Division master mechanic. When a part comes to the end of its run and the mechanic gets a discontinued parts notice, he studies that discontinued parts notice, goes to the job or manufacturing line-up to determine all the tooling, dies, jigs and fixtures required to manufacture the part. The master mechanic knows how many are required because it was put on the discontinued parts notice by the procurement group. He knows the tooling and the serial number of the tools, whether it be manufactured by the corporation or a vendor. He decides whether he will hold that tooling for a later rerun, whether he will dispose of the tooling after taking an all-time run, or whether he will dispose of three-fourths of it because production requirements are high and he only needs one setup of tools, dies, jigs, and fixtures for service. He then finds out if the tooling in the production plant is to be converted, in other words, is the tooling to be used to make the new parts. Or he learns that the old tooling in the production plant will be used for service and the car plant will get new. This is all worked out by the Parts Division master mechanic with the Car Division master mechanic involved, and the Staff

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master mechanic, (the over-all master mechanic). If they get together and decide to keep the tooling and store it until needed for reruns, it is always stored until the rerun at the plant of the vendor or the corporation plant which originally had the line-up for production. We have a plant at Highland Park which is used for reruns of service parts with a die and tool storage yard. We keep complete records of tooling on what we call Tool and Die Record Cards. As you know, for the production of one fender, we may have 150 tons of blank, draw, restrike, forming, piercing dies, and so forth, as many as 32. One draw die may weigh 45 tons. So it is quite a job to move tooling.

QUESTION: At what time in your production line do your spare parts come off, when your dies are new or when they are just about to be given up for scrap?

CAPTAIN HUSE: We take our current requirements from the dies or tools during production. We don't know whether the part will carry on or not until just before model change, except for sheet metal which usually changes. Therefore, we release initially our estimated requirements for a year and give them a monthly or quarterly schedule of delivery. As soon as we receive a discontinued parts notice and learn that the part will go out of production at model change, we release a long-time or all-time quantity. We may have to go to three shifts to get this additional all-time or a long-time requirement before model change. The discontinued parts notice tells us when to move. It is very important to get that notice as far as possible ahead of model change.

To answer your question directly, we order additional requirements we need over current requirements just as soon as we learn that a part will not carry through to the next model and that tooling will not be available for economical reruns.

QUESTION: When you decide that a vendor will supply the spare parts, do you have a rule that you will give it to one vendor or that you will require more than one vendor dispersed geographically?

CAPTAIN HUSE: Since we have had this epidemic of labor trouble, there has been a constant move in Purchasing--we have Central Purchasing--to have alternate sources. Unfortunately, to do that sometimes takes three-quarters of a million dollars worth of tooling. It takes a lot of time and money. A new vendor coming in sometimes plays havoc with costs. So we can't provide a second source in some cases. It is the policy, however, to have alternate sources if practicable.

QUESTION: I have a question about an item which is common to the four plants. When you take that item, do you give it four separate numbers, one for each plant, or a common number for the four plants? Suppose you bought a roller bearing and it is used by the four divisions?

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CAPTAIN HUSE: It has one part number.

COMMANDER FAIRCHILD: Captain Huse, I think you have answered all the questions. Your dissertation here today showed no evidence of your having been assigned this task less than twenty-four hours ago. Thank you very much.

(11 May 1949--750)S.

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