VICTOR GRUEN ASSOCIATES

CHRYSLER ENGINEERING DIVISION

Functions and Communications Analysis

October 4, 1957

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In order to develop a preliminary guide to the function of the future Chrysler Engineering Center the present Engineering Center operation has been carefully studied. To supplement these studies we have held many conferences with Chrysler Engineering Staff personnel, and with our consultants. We have also carefully reviewed and analysed all written and graphic material available from the Chrysler Corporation dealing specifically with the policies, philosophy, organization, and future plans for the Engineering Division.

Specifically, during the past 6 months

-Meetings have been held regularly with the Architectural Coordination Committee to review and discuss planning progress. This Committee consists of representatives of the Chrysler Engineering Division, the Chrysler Corporation, Yamasaki, Leinweber & Associates, and Victor Gruen Associates.

-Meetings have been held as required with the Planning Group. This group consists of representatives of the Chrysler Engineering Division, Victor Gruen Associates and, as needed, Yamasaki, Leinweber & Associates. These conferences have dealt primarily with working aspects of Phase I and Phase II work as outlined in our Purchase Order agreement.

-We have made a detailed inspection of all areas of the present Chrysler Engineering Division. Approximately 155 of the 180 departments were personally visited by Norman Ziegelman and Bernard Gulowski of our firm, accompanied by Bill Jarratt of Yamasaki, Leinweber & Associates. Notes were taken during these inspection trips and a brief review prepared of information not found in data provided us by the Chrysler Engineering Division.

-A detailed survey was made by the Chrysler Engineering Division of its approximately 180 departments. The survey was then used to prepare communication charts and summary data charts of the entire Division

operation. In the following report we have analyzed the communications and summary survey data in line with our discussions and observations to provide a working guide in the development of a master plan for the new Engineering Center.

-Interviews were conducted with each of the eight group heads of the Engineering Division. All meetings were arranged by Mr. Bob Smith of Chrysler and were attended in the main by Ralph Stephenson of Victor Gruen Associates, Minoru Yamasaki, Bill Jarratt, and Gunnar Birkerts of Yamasaki, Leinweber & Associates, and Bob Smith and George Berry of Chrysler Engineering Division. These conferences provided executive insight as to the desires of each group regarding the new Engineering Center. Some of the meetings dealt with the group operation only, while others explored the psychology and philosophy which the group felt should be expressed in the new Center.

-Lloyd Reid prepared a preliminary analysis of the expected traffic origin of Chrysler employees at the new Engineering Center. This study initially covered three phases of growth, 4,000, 8,000 and 12,000 employees, but has been progressively revised as our preliminary project planning approaches completion. In addition, Mr. Reid has maintained close contact with all agencies concerned with highway planning and construction in the vicinity of the proposed Center. Through this liaison we have kept and have been kept aware of most improvement plans for the area.

-Larry Smith has prepared an economic analysis in which is developed the economic pattern to be expected as certain uses are made of the total Chrysler properties.

It has become apparent as our studies proceed that communications now and in the future will play an important part -

in the function of the Engineering Division. Mr. A. G. Loofbourrow, Executive Engineer of the Product Development and Planning Group, particularly emphasized this in our preliminary conference with him. Since the Engineering Division deals primarily with thoughts, ideas, concepts and generally abstract products, it is important to consider how the flow of people's thoughts proceed through the Center. The movement of material such as test products, automobiles and other physical items appears to be less important but, nevertheless, must be adequately provided for if the idea flow is to be properly expedited.

For the purpose of this report let us consider that there are two major flow streams in the Engineering Division: thought flow and material flow.

Thought flow refers to the flow of ideas conveyed by normal communication methods such as confrontation, telephone, or mail. An additional method of thought flow can be through the media of material. It is in this fourth method that the channeling of thought and the channeling of material coincide or have touchdown points.

Material flow is the actual physical routing of objects such as engineering metal drafts, clay bodies, mock-ups, samples, test products, drawings, specifications, test cars, et cetera.

At certain times it will be difficult to separate what is thought flow and what is material flow since they coincide or overlap at many places. However, each must play an important role in our total planning.

As we studied our communication data in conjunction with other organizational material available, it became apparent that we must group the approximately 180 individual departments into larger units for our preliminary planning. In conjunction with the Planning Group it was decided to classify functional and organizational characteristics. These 27 major sections are discussed on the following pages.

SECTION 10 - EXECUTIVE SECTION

Present net space and personnel:

	Space	Personnel
Private Office	4160	9
Semi-private Office	1015	6
General Office	480	3
Office Sub-total	5655	18
Drafting Space	0	0
Laboratories or Studios	0	0
Shop	0	0
Stock and Storage	0	0
General Space	400	0
Total	6055	18

(Male - 9)
(Female - 9)

Departments included:

Department 10 - Executive

Comments:

This section consists of the space and facilities provided for the vice president and director of engineering and his engineering executive committee. These people direct the entire activity of the Engineering Center, assisted by the division chief engineers for Plymouth, Dodge, DeSoto, Chrysler and Canada. The offices of the executive engineers and the director of styling are carpeted, have individual air conditioning and are designed primarily for high level conferences. Executive engineers in charge of Administration, Research, Laboratories, Vehicle Testing, Product Programming, Product Development and Planning, and the Vice President are located together in one area. The office of the director of styling and the executive engineers for Chassis Design, Electrical Management and Truck are located adjacent to their immediate work spaces. Offices of the division chief engineers are located in the same building, same floor, but are removed from the majority of the executive engineers' offices. It appears that a rather independent spirit pervades the Styling, Chassis Design, Electrical Management and Truck areas, and that these people, by choice, want to be close to their work. In the case of the other executive engineers, it appears that, although a desire to be near the functional area is expressed from time to time, more efficient staff operation is maintained by having them grouped in the area with Mr. Ackerman, Vice President.

Confrontation communications analysis:

Major two-way confrontations occur with Buildings and Facilities, Product Programming, Body Engineering, Materials Laboratories, General Laboratories and Research. This indicates a natural interest in staff functions and high level functions. Comparison with other sections shows the absolute quantity of confrontations is quite low. Particularly noticeable is the complete lack of confrontation within the executive section. It is entirely possible this is due to the lack of proper recording but it might indicate an attitude tendency which should be checked with this section's personnel.

SECTION 20 - PRODUCT DEVELOPMENT AND PLANNING

Present net space and personnel:

	Space	Personnel
Private Office	413	2
Semi-private Office	463	5
General Office	0	0
Sub-total	976	7
Drafting Space	0	0
Laboratories or Studios	0	0
Shop	0	0
Stock and Storage	0	0
General Space	0	0
Total	976	7

(Male - 5)
(Female - 2)

Departments included:

Department 20 - Product Development and Planning
- Automotive Safety

Comments:

A recent addition to this section is the Automotive Safety Engineering Department. This is an advisory group which works with Body Design, Electrical Management, Materials Laboratories and General Laboratories as well as with Vehicle Testing. It appears possible that expansion of the Safety Department's activities will occur, since automotive safety considerations are becoming of more and more interest to the industry. However, it is possible that as the department grows it will be eliminated from the Product Development and Planning Section to be placed in a more appropriate grouping.

In the survey it is noted that influential persons frequently visit the Automotive Safety Engineer and that this office should present a pleasing appearance and that display space of a limited nature would be desirable.

Confrontation communications analysis:

The absolute number of confrontations between the Product Development Section and other sections is quite small, being limited mainly to Body Design, Electrical Design, Materials Laboratories, General Laboratories and Vehicle Testing. It would appear that the majority of contact is with outside visitors and with line areas of the Division.

Although Product Development and Planning should probably remain in the executive area group, the Automotive Safety Engineer could conceivably be located in a more central position relative to his consulting area and outside visitors.

SECTION 40 - PATENT SECTION

Present net space and personnel:

	Space	Personnel
Private Office	350	1
Semi-private Office	2097	9
General Office	1200	5
Sub-total	3647	15
Drafting Space	0	0
Laboratory or Studio	0	0
Shop	0	0
Stock and Storage	252	0
General Space	0	0
Total	3899	15

(Male - 10)
(Female - 5)

Departments included:

Department 40 - Patent Department

Comments:

The Patent Department deals with outside vendors, patent attorneys, et cetera, and should be located near a central entrance so that visitors do not have to pass through work areas. Of special interest is the request by this department to provide space for their patent art collection.

Confrontation communication analysis:

Major two-way confrontations occur with Body Design. The remainder of the confrontations are spread over Body Engineering, Styling, Chassis Design, Electrical, General Laboratories and Research. Absolute number of contacts is small.

SECTION 80 - COMPTROLLER

Present net space and personnel:

	Space	Personnel
Private Office	2164	10
Semi-private Office	1127	13
General Office	7334	94
Sub-total	10625	117
Drafting Space	0	0
Laboratory or Studio	0	0
Shop	0	0
Stock and Storage	281	0
General Space	1200	18
Total	12106	135

(Male - 92)
(Female - 43)

Departments included:

Department 80 - Comptroller
Department 81 - Accounting
Department 82 - Program Analysis
Department 83 - Cost and Financial Analysis
Department 84 - Budget and Project Analysis
Department 85 - Methods Analysis
Department 86 - Data Processing

Comments:

The major function of this section is conducted in space normally designated as office. Each of the departments is closely related to the bookkeeping function and, as was expressed by the Comptroller's office, it should be convenient to the executive area because of its functional reporting relationship.

The only department which is related to other areas of the Engineering Division and which has different physical problems is the Data Processing Department. They may be called upon to perform computation processing for any other portion of the Engineering Division. Because of the more extensive use anticipated of electronic data processing, it is entirely possible that a large expansion of this department will take place in the future. The high noise level and the monotonous nature of the work indicates special attention in the design and location of this facility.

Confrontation communications analysis:

Major two-way confrontations occur within the section and with Personnel and General Services, Material Procurement, and Buildings and Facilities. Within Section 80, the Accounting Department and the Budget and Project Analysis Department have heavy contact with Data Processing. A large number of communications also occur between Cost Analysis and Program Analysis.

SECTION 110 - PERSONNEL AND GENERAL SERVICES

Present net space and personnel:

	Space	Personnel
Private Office	1046	6
Semi-private Office	3350	42
General Office	3621	36
Sub-total	8017	84
Drafting Space	0	0
Laboratory or Studio	600	0
Shop	0	0
Stock and Storage	2243	0
General Space (Includes Engineering Aud.)	23389	89
Total	34259	173

(Male - 91)
(Female - 82)

Departments included:

Department 111 - Administrative Services
Department 112 - Engineering Cafeteria
Department 114 - Labor Relations and Safety
Department 115 - Personnel Development
Department 118 - Employment
Department 119 - Technical Personnel Recruitment
Department 121 - Engineering Library

Department 122 - Personnel and General Services
Proving Ground

Comments:

Key personnel in this section seem to emphasize a central location relative to the entire Engineering Center operation.

The cafeteria has a serious problem in that they must feed large numbers of people in short periods of time. At present canteen service is being tried for in-plant feeding. However, it is not proving completely satisfactory and is being studied by the Cafeteria Department. Some emphasis is placed on a grade level location, not only for convenience to personnel using the cafeteria, but for ease of servicing incoming food shipments.

Presently the supervisors dining room and the cafeteria are serviced by the same kitchen. Access to the supervisors dining room is through the cafeteria. This causes congestion in the cafeteria and results in an unnecessary delay to the supervisors dining room. The kitchen should be located adjacent to the supervisors dining room and the cafeteria so that both can be serviced directly.

Survey comments on the library should be reviewed carefully for a summary of their space requirements.

Medical facilities for employee physical examinations are required by this section. The current facility is located in the Highland Park General Hospital. Chrysler medical personnel at the hospital require ten examination rooms.

Confrontation communications analysis:

Major external contacts are with the Comptroller, Materials Procurement, Product Programming and Research. However, by far the most frequent confrontations are within the section.

The major internal confrontations are between Department 118, Employment, and Department 115, Personnel Development. Department 114, Labor Relations and Safety, also have a large number of contacts with Department 115, Personnel Development, and Department 118, Employment. It appears that those functions dealing with Employment, Personnel Development, and Labor Relations and Safety have the greatest need for confrontations.

The cafeteria has the least amount of confrontation contact with other departments within this section. The Engineering Library is used by all departments but shows up particularly heavy with the Research Section, Chemical Research Department. The relative confrontations between Section 110 and the Chrysler Institute (61 as opposed to 1302 within Section 110) indicate a physical operational detachment. Because of the nature of Department 110, it should perhaps have a closer tie with the Institute, particularly with Departments 115, Personnel Development; 118, Employment; and 119, Technical Personnel Recruitment.

SECTION 140 - ENGINEERING STAFF SERVICES

Present net space and personnel:

	Space	Personnel
Private Office	1407	8
Semi-private Office	0	0
General Office	19634	183
Sub-total	21041	191
Drafting Space	0	0
Laboratory or Studio	0	0
Shop	0	0
Stock and Storage	0	0
General Space	283	0
	21324	191

(Male - 82)
(Female - 109)

Departments included:

Department 141 - Engineering Records
Department 142 - Service Parts Analysis
Department 143 - Engineering Design Standards
Department 144 - Reproductions and Vault

Comments:

There is a feeling on the part of the management of this section that ultimately they would like to station some key people in design areas and break up the Records Department, retaining only central supervision. This may be an effort to furnish more closely identified staff services to the line sections.

For additional comments see the survey sheets.

Confrontation communication analysis:

Major contacts are with Chassis Design, Electrical and Section 510, non-Engineering. The relationship with non-Engineering, which includes Department 3301, Product Planning and Analysis, as well as Department 3310, Product Analysis, is due to the close coordination necessary in the release of parts specifications. The number of confrontations between Chassis Design, Electrical Management and this section is due to the large number of components which are the responsibility of Chassis and Electrical.

Within the section major confrontations occur between Department 141, Engineering Records, and Department 144, Reproductions and Vault.

SECTION 150 - MATERIALS PROCUREMENT OPERATIONS

Present net space and personnel:

	Space	Personnel
Private Office	2073	14
Semi-private Office	800	8
General Office	5961	85
Sub-total	8834	107
Drafting Space	0	0
Laboratory or Studio	0	0
Shop	3720	25
Stock and Storage	85033	102
General Space	4375	19
Total	101962	253

(Male - 214)
(Female - 39)

Departments included:

Department 151 - Passenger Car Materials Procurement
Department 152 - Truck Materials Procurement
Department 153 - Research Materials Procurement
Department 154 - Procurement and Processing Records

Department 155 - Estimating and Planning
Department 156 - Materials Handling
Department 157 - Experimental Machine Shop
Department 158 - Inspection
Department 159 - Materials Procurement Operations - Outer Drive

Comments:

Generally, department heads in this section feel that they should occupy grade level space where receiving and shipping can be accomplished most conveniently. Because of the large number of outside contacts, particularly from Department 151, Passenger Car Materials Procurement; Department 152, Truck Materials Procurement; and Department 153, Research Materials Procurement, easy access should be provided to vendors and to the outside of the Center. Adjacent parking space is mentioned as very desirable.

Emphasis was also placed on a central geographic location, closeness to Body Shop and Body Engineering, and expediting of paper work, drawings and standards by which materials are procured. From our inspection trips and from the functional relationship described in the organizational brochure, it would seem that these departments are extremely closely related functions. This indicates that in the new Center they should be grouped together and located as a unit rather than as departments.

Incoming material is received by Materials Handling who require a covered receiving area with an overhead travelling crane. Materials such as fuels and food are delivered directly to their respective departments. Items which must be inspected go first to Materials Handling and then to Inspection, which is set up for examination of precision tools, parts and machines.

Stock rooms other than for office supplies are the responsibility of Materials Handling. Storage areas in addition to central general storage are required adjacent each stock room.

Since congestion in the materials handling area is generated by interference between corporate and non-corporate vehicles, separation of the two shall be considered.

Confrontation communications analysis:

Major external contacts occur with the Comptroller, Buildings and Facilities, Body Engineering, Body Engineering Shop, General Laboratories, and Vehicle Testing. Internal contacts far exceed confrontations with any other section. Within the section major contact occurs between Department 150, Materials Procurement Operations Management, and Department 151, Passenger Car Materials Procurement; and Department 155, Estimating and Planning, and Department 159, Materials Procurement Operations, Outer Drive. The large number of internal communications with the Outer Drive operation is probably due to its location. The external contacts with the Comptroller's office indicates a close financial tie. Contacts with Body Engineering and Body Engineering Shop are undoubtedly due to the large number of components associated with the operation of these departments. The large number of contacts with the car build-up sections, laboratories sections, and the testing sections indicate that Materials Procurement works more closely with the physical operation than the design operation. In this respect it should be noticed that there are very few contacts with Body Design and Chassis Design.

SECTION 170 - BUILDINGS AND FACILITIES

Present net space and personnel:

	Space	Personnel
Private Office	650	3
Semi-private Office	790	5
General Office	1881	27
Sub-total	3321	35
Drafting Space	657	8
Laboratory or Studio	565	4
Shop	0	0
Stock and Storage	4879	121
General Space	8587	110
Total	18009	278

(Male - 261)
(Female - 17)

Departments included:

Department 171 - Architectural Styling
Department 173 - Architectural Engineering
- Plant Engineer

Department 175 - Buildings and Equipment Maintenance
Department 176 - Buildings and Grounds Maintenance Service
Department 177 - Facilities Procurement

Comments:

This section is charged basically with the provision of an operating environment for the Engineering Center. The Architectural Styling and Architectural Engineering provide the limited aesthetic and instructive advice required for current building and improvement operations.

The two biggest departments in the section are Department 175, Buildings and Equipment Maintenance, and Department 176, Buildings and Grounds Maintenance Service. There is at present some discussion of zone maintenance as opposed to central maintenance. This apparently is a serious problem in the existing facilities, and attention should be given it in the new Center. Mention was made that the Buildings and Equipment Department should be close to those areas which made extensive use of rotating equipment. This might be a place where zone maintenance would be of value.

The Facilities Procurement Department emphasizes their need to be close to the Comptroller and the Executive Offices. Interestingly, they have expressed a desire to conduct most of their business by mail or telephone.

Confrontation communications analysis:

Major contacts are with the Comptroller, Material Procurement, Body Engineering Shop and Research. The large number of contacts with the Body Engineering Shop could be attributed to the extensive maintenance required in this heavily equipped area, which is borne out by the large number of confrontations between Department 175, Buildings and Equipment Maintenance, and Department 311, Wood Mill, Highland Park.

It is interesting to note that very few internal confrontations are recorded. Apparently the departments operate as a unit without requiring frequent internal contacts. This might be taken to mean that the departments could be separated from each other (except in the case of Architectural Styling, 171, and Architectural Engineering, 173) without too much difficulty.

Consideration should also be given to a possible combination of departments 175, Buildings and Equipment Maintenance, and 176, Buildings and Grounds Maintenance Service.

12/10/57-CH

SECTION 190 - CHRYSLER INSTITUTE

Present net space and personnel:

	Space	Personnel
Private Office	1390	7
Semi-private Office	306	2
General Office	1795	15
Sub-total	3491	24
Drafting Space	5736	2
Laboratory or Studio	5643	0
Shop	8972	0
Stock and Storage	1431	0
General Space	900	1
Total	26200	27

(Male - 14)
(Female - 13)

Departments included:

Department 190 - Chrysler Institute

Comments:

It seems apparent that the institute will increase rather than remain static in importance as the new Engineering Center is developed. There is a strong desire on the part of its director to make it an accredited school. In light of this, improvements will have to be made in the present library facilities, auditorium space and possibly in convenience of laboratory facilities. In a discussion with the director of the institute, he indicated these improvements might have great influence on the accrediting parties.

The institute trains large groups of technical people, all at various levels of development. For example, they provide a drafting room training course, a series of technical and management courses which are at college level, and a two year course leading up to a master's degree.

Ease of access to the institute from within the Center is necessary, since practically all of the students work in the Center and attend school part time. However, provision should also be made for night access when other areas of the Center have closed down. Connection by covered walkways, tunnels, or even small electric cars to provide fast, convenient, all-weather transportation between the Center and the institute would be a big advantage.

The auditorium might possibly double as the Engineering Center Auditorium if it could be made multiple purpose enough. There is some concern expressed over this due to the difficulty in scheduling a facility in use as often as an auditorium. We might consider the provision of a small auditorium for the day-to-day needs of the institute and locate a large auditorium for Engineering Center use elsewhere in the Center. Functions of the institute (such as graduations) which require a large auditorium could then be shifted to the Engineering Center Auditorium.

Confrontation communications Analysis:

Major contacts are with Personnel and General Services, Body Engineering, Chassis Design, General Labortories, Vehicle

Testing and Research. The contacts with the General Laboratories Section are by far the most frequent. This might indicate a location convenient to laboratory facilities.

SECTION 200 - PRODUCT PROGRAMMING

Present net space and personnel:

Included in figures for Department 10.

Departments included:

Department 200 - Product Programming

Comments:

No comments.

Confrontation communications analysis:

Major contact is internal. A small amount of contact is maintained with Styling, but no others are listed.

12/10/57-CH

SECTION 210 - PRODUCT PROGRAMMING

Present net space and personnel:

	Space	Personnel
Private Office	1711	10
Semi-private Office	1088	4
General Office	3508	31
Sub-total	6307	45
Drafting Space	1317	12
Laboratory or Studio	4950	12
Shop	0	0
Stock and storage	397	0
General Space	593	0
Total	13564	69

(Male - 53)
(Female - 16)

Departments included:

Department 211 - New Product Ideas
Department 212 - Product Profiling
- Scheduling

Department 221 - Management Planning
Department 231 - Product Information
Department 232 - Presentations (includes photography laboratory)
Department 233 - Technical Reports and Standards
*Department 234 - Graphic Arts Group (publications)
*Department 235 - Presentation Work Shop (illustrations and shows)

*(Departments 234 and 235 are part of Department 232 and are separated for communication purposes only.)

Comments:

Much of the material processed in New Product Ideas, Department 211, and Product Profiling, Department 212, is confidential in nature. Thought should be given to providing reproduction equipment and maintaining an internal security on material produced by these departments which are essentially office operations.

Management Planning, Department 221, has close contact with top Engineering Center Management and accessibility to this executive group should be a prime consideration.

Presentations, Department 232, maintains a full staff of graphics personnel. Drafting and Studio space, well lighted and convenient to management groups and others who make use of graphic presentations, should be a prime consideration. Grade level space for the Presentation Group is desirable since large amounts of material are brought in and often times large and bulky displays must be transported to other areas of the Center.

Confrontation communication analysis:

Excluding contact within the section, confrontations are spread rather uniformly between Personnel and General Services,

Materials Procurement, Styling, Chassis Design, Materials Laboratories, and non-Engineering. The majority of the contacts within the section are between Department 234, Graphic Arts Group, and Department 232, Presentations and Product Programming. An interesting relationship here is the large number of contacts (243 per week) between the Presentations Department and the Materials Laboratories.

SECTION 300 - BODY ENGINEERING

Present net space and personnel:

	Space	Personnel
Private Office	628	3
Semi-private Office	580	6
General Office	1273	15
Sub-total	2481	24
Drafting Space	0	0
Laboratory or Studio	0	0
Shop	0	0
Stock and Storage	0	0
General Space	420	0
Total	2901	24

(Male - 19)
(Female - 5)

Departments included:

Department 300 - Body Engineering
Department 302 - Staff Operations

Comments:

This section of two departments is primarily a management and coordination operation. Their requirements are mainly for office space. The actual line body work is done by other sections.

Confrontation communications analysis:

Major contacts outside the section are with Materials Procurement, Body Engineering Shop, Body Design and Styling. The large number of contacts within the group indicates that they should be kept together geographically while the external contacts indicate that they should be centrally located in relation to their major contact departments. This is especially true of this section because of its prime coordination responsibility.

SECTION 310 - BODY ENGINEERING SHOPS

Present net space and personnel:

	Space	Personnel
Private Office	857	11
Semi-private Office	1337	18
General Office	2251	33
Sub-total	4445	62
Drafting Space	0	0
Laboratory or Studio	693	0
Shop	155829	466
Stock and Storage	8239	0
General Space	2199	0
Total	171405	528

(Male - 631)
(Female - 9)

Departments included:

Department 311 - Wood Mill - H.P.
Department 312 - Wood Forms Shop - H.P.
Department 313 - Metal Shop - H.P.
Department 314 - Paint Shop - H.P.
Department 315 - Trim Shop - H.P.
Department 316 - Plastic Shop - H.P.
Department 317 - General Model Shop - H.P.
Department 321 - Die Model Building - H.P.
Department 322 - Die Model Building - H.P.
Department 323 - Die Model Building - O.D.
Department 331 - Body Shops - O.D.
Department 339 - Trim Shop - O.D.

Comments:

The Body Shops contain a large number of functions which produce dirt, dust, noise, heat and general air contamination. They are concerned mainly with heavy models, equipment and bulky supplies.

The general feeling of the shop people is that location near the clay rooms and styling sections is desirable if not

essential. The Wood Forms Shop, Wood Mill and Die Model Shops should be located adjacent to each other since materials flow directly from one to the other. The Paint Shop must have facilities in a location which is dust free. The Plastic Shop has frequent contact with the clay work rooms where oftentimes half, or more, of the Plastic Shop staff may meet for viewing conferences.

The general feeling in the shops handling the wood and die models is that grade level locations are essential. These areas require close control of temperature and humidity to insure dimensional stability of the die forms.

The Trim Shop should be located away from areas where dust and paint particles are in the air. They should have adequate ventilation, temperature, and humidity control to remove lint from the air and prevent leathers from shrinking and cracking.

At the present time the Body Engineering Shops are located both in Highland Park and at the Outer Drive Center.

Undoubtedly this is because of the space limitations, and at the new Center the two operations should be combined.

During our tour of the departments it was observed that space should be provided for production and movement of full size body mock-ups. Incidentally, it may be that in the future more extensive use will be made of plastic and less of wood and metal in these mock-ups.

The Model Shop often has small parts to be plated, and the possibility of providing its own plating facilities should be considered. This would relieve the Plating Laboratory in the Chemical Laboratories Section for larger jobs. However, a plating facility for the Model Shop should be for convenience of the shop only.

Confrontation communications analysis:

Major external contacts are with Materials Procurement, Buildings and Facilities, Body Engineering, Body Design, Exterior Design, Styling Product Development, and non-Engineering. The emphasis here seems to be on contacts with departments that furnish materials and thoughts going into the actual car build ups. There is very little contact with staff sections, except in the case of Buildings and Facilities, where much contact is maintained with the Buildings and Maintenance Department.

The large number of internal contacts indicate that section organization seems to be administratively proper.

SECTION 340 - BODY DESIGN

Present net space and personnel:

	Space	Personnel
Private Office	5223	29
Semi-private Office	340	3
General Office	44209	303
Sub-total	49772	335
Drafting Space	30259	244
Laboratory or Studio	0	0
Shop	0	0
Stock and storage	108	0
General Space	1944	6
Total	82083	585

(Male - 524)
(Female - 61)

Departments included:

Department 341 - Body-in-White Design
Department 342 - Interior Design
Department 343 - Front End Design
Department 351 - Body Sealing
Department 352 - Body Hardware and Mechanisms
Department 353 - Body Components Development
Department 361 - Seating Design and Development
Department 362 - Color and Trim Specifications
Department 371 - Advance Body Design and Cost Analysis
Department 381 - Body Design - Outer Drive

Comments:

Three departments; Body Hardware and Mechanisms, Department 352; Seating Design and Development, Department 361; and Color and Trim Specifications, Department 362; have extremely large outside contacts with vendors. Their location should be readily accessible to entrance areas.

The question of proper drafting facilities is important in this Section and in the opinion of their executive Engineer, Mr. Doty, the ideal arrangement is as at the Outer Drive Buildings. This O.D. drafting room has no windows but has good North light through skylights. It should be noted that there are wide areas of disagreement among executives of the Engineering Division regarding drafting space. Some do not like windows because of their distractive quality and because of the shelf space they offer draftsmen. Others are inclined to favor drafting space which is contiguous but broken visually by ceiling high or head high partitions. This group also feels windows are desirable from the standpoint of personal comfort. Still others feel strongly that drafting rooms should not be large barn-like areas. They favor windows and privacy.

In our planning we should attempt to crystallize Chrysler Corporations thinking on drafting space. One approach might be to vary the spaces according to its group location and desires. Another approach might be to impress our own thoughts on the Engineering Division so that standardized, and consequently more economical and possibly more efficient, drafting space standards would be adopted. There are many approaches and we should be prepared to make positive recommendations since the drafting function is a very important part of the total Engineering Center function.

In the Advance Body Design and Cost Analysis, Department 371, frequent need of their own reproduction equipment for expediting of cost data is very desirable. The production of the Engineering Metal Drafts (EMD's) is another important operation of the Body Design Section. This subject is covered more fully in Norman Ziegelman's department comments. We should consider, however, that

in the new Engineering Center all E.M.D.'s will probably be produced at the center. At the present only those used in the Outer Drive area are processed by Chrysler.

A security problem exists in all body design departments. Security is controlled by challenging any suspicious or unknown person who is within the area. If a person has business within the department he can remain; if a person has no justification for being there he is asked to leave. The security problem is complicated by people using the center aisle as a corridor in order to get to adjacent departments.

Confrontation communications analysis:

Major external contacts are with Body Engineering, Body Engineering Shop, Interior Design, Styling Production Development, Materials Laboratories, General Laboratories and non-Engineering. The greatest number of contacts is with the Body Engineering Shops. This poses somewhat of a problem since the nuisance character of shop work is generally detrimental to good drafting room environment. Thus, we should attempt a solution which would allow close contact but provide physically separate areas to prevent transfer of odors, dust, noise and vibration.

The large number of contacts with non-Engineering is between Department 371, Advance Body Design and Cost Analysis, and Department 3301, Production Planning and Analysis. Contact with staff services seems to be mainly with the Patent Department and Section 110, Personnel and General Services. The latter is undoubtedly due to the large number of persons employed in this section.

SECTION 600 - STYLING MANAGEMENT

Present net space and personnel:

	Space	Personnel
Private Office	2255	9
Semi-private Office	0	0
General Office	1488	20
Sub-total	3743	29
Drafting Space	0	0
Laboratory or Studio	315	3
Shop	0	0
Stock and Storage	440	0
General Space	7590	0
Total	12088	32

(Male - 16)
(Female - 16)

Departments included:

Department 600 - Styling
Department 602 - Product Cost Control
Department 605 - Long Range Planning
Department 608 - Personnel Administration

Comments:

In this section we find an indication of greater group autonomy than with any of the other sections. The departments are mainly staff, and service the remainder of the styling group.

Confrontation communications analysis:

Contacts with Body Engineering are almost three times greater than with the next most frequent contact, the Body Engineering Shop. Next is Body Design and Product Programming. Internal contacts are rather low which is indicative of the staff function of this section.

SECTION 610 - EXTERIOR DESIGN

Present net space and personnel:

	Space	Personnel
Private Office	2622	13
Semi-private Office	0	0
General Office	0	0
Sub-total	2622	13
Drafting Space	0	0
Laboratory or Studio	12563	50
Shop	0	0
Stock and storage	800	0
General Space	0	0
Total	15985	63

(Male - 62)
(Female - 1)

Departments included:

Department 611 - Plymouth Exterior Studio
Department 612 - Dodge Exterior Studio
Department 613 - Suburban Studio
Department 614 - Commercial Studio
Department 621 - DeSoto Exterior Studio
Department 622 - Chrysler Exterior Studio
Department 623 - Accessory Studio
Department 624 - Imperial Exterior Studio

Comments:

The design studios are directly concerned with construction of 3/8 clay models. The models are very heavy (1000 pounds each). Because they are viewed under daylight conditions quite often, both north light and accessibility to outdoor areas are important.

Mention is made in the comments of the department heads that grade level space is essential. However, this is generally an accepted viewpoint because of the concept of grade level viewing yards. It is desirable that the design studios be very close to the Styling Design rooms.

The Accessory Studio, Department 623, is concerned primarily with vendor contacts. Here, access to the outside lobby is important. (NOTE: We should probably think of putting ALL vendor contact departments in a central area especially designed for maintaining outside contacts.) Provision of adequate security is a must for this section.

Confrontation communications analysis:

Major contacts are with Body Engineering, Styling, Body Design, Interior Design and non-Engineering. It appears that the non-Engineering functions, particularly the Cost analysis function, are quite important to the Design Studios. The contacts with the staff groups and the executive areas indicate an autonomy which is borne out by our discussions and inspections of the operations.

SECTION 640 - INTERIOR DESIGN

Present net space and personnel:

	Space	Personnel
Private Office	3498	15
Semi-private Office	0	0
General Office	0	0
Sub-total	3498	15
Drafting Space	0	0
Laboratory or Studio	4738	30
Shop	0	0
Stock and Storage	105	0
General Space	110	0
Total	8451	45

(Male - 41)
(Female - 4)

Departments included:

Department 642 - Fabric and Materials Studio
Department 643 - Color Studio
Department 645 - Plymouth Interior Studio
Department 646 - Dodge Interior Studio
Department 647 - DeSoto Interior Studio
Department 648 - Chrysler Interior Studio
Department 649 - Imperial Interior Studio

Comments:

Adequate north light seems to be the predominant request of this department so far as facilities are concerned. There is a great amount of work with all elements of styling and the section should be located as closely as possible to other elements of the group. Security is a prime consideration, and thought should be given to prevent vendors from moving in and out of the design studios.

Confrontation communications analysis:

Major contacts are with Body Engineering Shop, Body Design, Exterior Design and Materials Laboratories. Contact with Sections 310, Body Engineering Shops, and 340, Body Design, are primarily for fitting of interior elements into body mock-ups. The Materials Laboratories confrontations are apparently important because of fabric testing.

SECTION 650 - STYLING PRODUCT DEVELOPMENT

Present net space and personnel:

	Space	Personnel
Private Office	925	5
Semi-private Office	0	0
General Office	625	11
Sub-total	1550	16
Drafting Space	6010	28
Laboratory or Studio	2391	15
Shop	0	0
Stock and Storage	275	0
General Space	0	0
Total	10226	59

(Male - 59)
(Female - 0)

Departments included:

Department 651 - Preliminary Body Development
Department 653 - Technical
Department 654 - Preliminary Body Design
Department 656 - Advance Exterior
Department 657 - Advance Interior
Department 658 - Styling Product Development

Comments:

An outstanding characteristic of this section is the need for high security provision. However, close liaison is apparently maintained between this section and other styling sections. Preliminary Body Development and Preliminary Body Design Departments provide line engineering services of a preliminary nature to this section.

Confrontation communications analysis:

The majority of contacts are with the Clay Studios and Clay Shops which must continually check templates and dimensions with the Body Design and Shop Departments.

SECTION 660 - CLAY STUDIOS AND CLAY SHOPS

Present net space and personnel:

	Space	Personnel
Private Office	0	0
Semi-private Office	120	2
General Office	520	5
Sub-total	640	7
Drafting Space	0	0
Laboratory or Studio	29515	88
Shop	1764	7
Stock and Storage	160	0
General Space	0	0
Total	32079	102

(Male - 102)
(Female - 0)

Departments included:

Department 662 - Clay Studios
Department 663 - Clay Shops

Comments:

Because of the unique characteristics of the Clay Studios and the Clay Shops, these functions are considered a separate section.

Their activities are primarily concerned with the production of full-scale clay mock-ups. Good lighting and accessibility to a viewing area is important. An interior viewing space such as an auditorium with a turntable would be used by this section in conjunction with the other styling departments. The Clay Studios must have temperature and humidity control to maintain dimensional stability of clay models, and uniform illumination is essential to provide contrast-free and shadow-free work stations.

The full-size clay models are used as releases from which Engineering Metal Drafts (EMD's) are prepared as working drawings for the entire body.

Confrontation communications analysis:

Major external contacts are with Body Engineering Shops and Body Design. This is due to the use of the clay models as a medium for the transfer of information to the Body Engineering functions.

SECTION 670 - SPECIAL FUNCTIONS - STYLING

Present net space and personnel:

	Space	Personnel
Private Office	160	1
Semi-private Office	0	0
General Office	0	0
Sub-total	160	1
Drafting Space	0	0
Laboratory or Studio	1729	15
Shop	216	0
Stock and Storage	0	0
General Space	0	0
Total	2105	16

(Male - 16)
(Female -0)

Departments included:

Department 671 - Product and Exhibits
Department 672 - Styling Training School

Comments:

The Product and Exhibits Department concerns itself with styling of non-automotive consumer products. It performs a completely different function from the Automotive Styling Section. The Styling Training School must be provided maximum security. Because of stringent section provisions, an inspection trip to this small area was not made.

Confrontation communications analysis:

Communications from this section are negligible.

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SECTION 710 - CHASSIS DESIGN

Present net space and personnel:

	Space	Personnel
Private Office	3255	18
Semi-private Office	400	3
General Office	8772	82
Sub-total	12427	103
Drafting Space	24548	236
Laboratory or Studio	0	0
Shop	0	0
Stock and Storage	0	0
General Space	4445	6
Total	41420	345

(Male - 320)
(Female - 25)

Departments included:

Department 711 - Special Projects
Department 712 - Engine Design
Department 714 - Chassis Comp. Design

Department 716 - Advance Chassis Design
Department 718 - Transmission Design
Department 721 - Development Design

Comments:

It has been requested that the Special Projects, Department 711, be located near the mock-up room. This would facilitate the transfer of the chassis in and out of the mock-up. The location of the chassis area should also consider the Body Design Section. These two operations require close proximity to each other. The mock-up room requires a grade level location because of the necessity of moving cars in and out of the area. It follows then that the Chassis Section should also have a grade level location if possible.

The Engine Design and Transmission Design drafting rooms should be provided with an Engine Assembly and component display area. This area is used for displays to facilitate the understanding of various engine parts and components for design personnel.

It has been requested by the Development Design Department that the provision of laboratory facilities adequate for full range of advance projects should be located adjacent to the Development Design drafting room. Perhaps this facility would resemble the present facility of the Research Laboratory, Department 962.

It should be noted that the Chassis build-up operation is expedited in the mock-up room, which is under the direction of the General Laboratories. This is unlike the Body Design and Body Shops relationship, where the design and build-up operations are under one group head.

Chassis feels that drafting space should be pleasant, reasonably non-regimented, and should definitely have outside windows. The Executive Engineer mentioned that offices should have entrances which do not go through drafting areas or administration areas so that executive personnel are not stopped on the way to the wash rooms, lunch room, conferences or business calls, et cetera, by questions or complaints along the way.

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Confrontation communications analysis:

Major outside contacts are with Engineering Staff Services, Chrysler Institute, Body Design, Product Programming, Materials Laboratories, General Laboratories and non-Engineering.

The largest number of contacts are with General Laboratories because the Chassis build-up operation is performed in this area. There is high internal communication, probably due to the large variety and quantity of component design activity within the Chassis section.

SECTION 740 - ELECTRICAL DESIGN AND DEVELOPMENT

Present net space and personnel:

	Space	Personnel
Private Office	1060	5
Semi-private Office	2829	25
General Office	6225	56
Sub-total	10114	86
Drafting Space	8338	93
Laboratory or Studio	13638	61
Shop	0	0
Stock and Storage	100	0
General Space	5918	0
Total	38108	240

(Male - 226)
(Female - 14)

Departments included:

Department 741 - Special Projects
Department 742 - Advance Electrical Design
Department 743 - Production Car Electrical Design
Department 744 - Truck Electrical Design
Department 751 - Engine Electrical Systems

Department 752 - Car and Engine Electrical Application
Department 753 - Electrical Actuator Systems
Department 756 - Lighting and Switching
Department 757 - Radio and Instrumentation
Department 758 - Car Air Conditioning
Department 759 - Wiring Systems

Comments:

Car and Engine Electrical Application, Department 752, requires taking cars from cold rooms and testing them immediately. The cold rooms could not be used properly if they were not at grade level.

Department 752, Car and Engine Electrical Application, is used by all departments in Engineering, therefore, a central location for it should be considered.

The Lighting and Switching Department conducts photometric testing of headlights. Headlight tests require a 40 foot unobstructed viewing distance. Taillight tests require a separate 10 foot unobstructed viewing distance. Space should be provided to accommodate the entire car in this laboratory.

The radio laboratory in Department 757, Radio and Instrumentation, should be located remotely from sources of radio interference such as large electric motors, gasoline equipment and welding equipment.

Confrontation communications analysis:

Major external contacts are with Engineering Staff Services, Materials Procurement, Body Engineering Shop, Truck, Materials Laboratories, General Laboratories, Vehicle Testing and non-Engineering.

The largest number of contacts are with Engineering Staff Services and General Laboratories. Engineering Records, Department 141, and Reproduction and Vaults, Department 144, are the primary contacts in the Engineering Staff Services Section.

The high number of confrontations with the General Laboratories Section is due to the mock-up operation of the Chassis Section. The large number of internal contacts is due to the closely knit character of automotive electrical systems and instrumentation.

SECTION 770 - TRUCK

Present net space and personnel:

	Space	Personnel
Private Office	2726	18
Semi-private Office	520	4
General Office	8945	65
Sub-total	12191	87
Drafting Space	18080	152
Laboratory or Studio	0	0
Shop	0	0
Stock and Storage	180	0
General Space	465	0
Total	30914	239

(Male -221)
(Female - 18)

Departments included:

Department 771 - Truck Special Projects
Department 777 - Heavy Truck Chassis
Department 778 - Heavy Truck Body
Department 782 - Light Truck Chassis
Department 783 - Light Truck Special Models
Department 786 - Light Truck Body

Comments:

The Truck Section has requested an educational area, which would serve the entire Truck Section, to be used in conducting accelerated reading classes and to be used in showing educational training films. This section should also have two conference rooms; one located close to the administrative offices for staff meetings, and the other out in the engineering area where contact with vendors could be held.

Close proximity to the truck build-up and all truck and design engineering departments is essential for successful operation. The Truck Section design and drafting facilities should be similar to that of the Passenger Car Chassis Section.

Confrontation communications analysis:

Major external contacts are with Electrical, Materials, Procurement, Vehicle Testing Staff and non-Engineering.

The large number of contacts with Electrical is due to the similarity of the Passenger Car and Truck engine design. It should be noted that the truck engine is converted from the passenger car engine through the rearranging of component parts. The large number of contacts with non-Engineering should be noted.

SECTION 810 - MATERIALS LABORATORIES

Present net space and personnel:

	Space	Personnel
Private Office	3700	19
Semi-private Office	1555	22
General Office	5480	57
Sub-total	10735	98
Drafting Space	829	8
Laboratory or Studio	27927	120
Shop	0	0
Stock and Storage	2516	0
General Space	0	0
Total	52007	226

(Male - 201)
(Female - 25)

Departments included:

Department 811 - Chemical
Department 816 - Metallurgical
Department 821 - Organic Materials

Comments:

These laboratories primarily perform a service function to other departments in the Engineering Center. The operations in Department 811, Chemical, necessitate the handling of chemicals which may be corrosive, inflamable, explosive or toxic. A combination of one or more of these conditions is often encountered. Consideration should be given to this hazard when planning ventilation, disposal of waste, fire protection and chemical storage.

A large number of vendor contacts occur as a normal part of this section's activities. All departments share equipment within the Materials Laboratories, therefore, it is essential that the departments be grouped to avoid duplication of equipment and personnel.

Clean air, temperature and humidity control are primary factors at many of the test stations. These are absolutely essential in the spectrographic room so as to eliminate adverse effects on test results.

Several of the laboratories have need of photographic dark room facilities. A central dark room could be maintained to service their needs. This would eliminate a duplication of equipment and personnel.

The glass and optics laboratory should be capable of being darkened without disturbing other laboratories. This laboratory has experimental glass breaking equipment that provides 35 feet of free fall height. The present unit now extends above the roof. However, efforts should be made to conceal this equipment within the building in the new Center.

The salt spray laboratory is on the ground floor of Building 108 apart from other chemical laboratory operations. It would be advantageous to locate the salt spray laboratory in close proximity to the other chemical laboratories since the same personnel use both areas. Adequate ventilation should be provided.

The outdoor exposure laboratory, now located on the roof of Building 108, will be affected by different air characteristics. Radioactivity may have some effect on the experiments. Exposed area required is 135 feet by 30 feet.

The corrosion laboratory experiments with relatively small metal parts such as bumpers and door handles. The paint shop uses this laboratory extensively.

The radiographic laboratory has 1/4" thick lead lined walls and a 16" thick concrete floor slab.

The rubber compounding and processing laboratories in the Organic Materials Department require adequate exhaust and clean air supply because of the presence of lampblack particles. The exhaust system should also be able to take care of the offensive odors that are released during operations.

Confrontation communications analysis:

Major external communications are with Material Procurement, Product Programming, Body Engineering Shops, Body Design, Chassis Design, Electrical Management and General Laboratories.

The largest number of confrontations are with the General Laboratories. This is due to sharing General Laboratories' equipment, a common practice in the laboratories group. There is a large number of internal confrontations because of the many conferences and consultations that occur within this section.

SECTION 830 - GENERAL LABORATORIES

Present net space and personnel:

	Space	Personnel
Private Office	5227	29
Semi-private Office	3094	43
General Office	19747	228
Sub-total	28068	300
Drafting Space	90	1
Laboratory or Studio	78696	235
Shop	7705	32
Stock and Storage	5120	2
General Space	1360	0
	121039	570

(Male - 550)
(Female - 20)

Departments included:

Department 831 - Engines
Department 832 - Fuel Systems
Department 833 - Engine Cooling
Department 841 - Sound and Vibration

Department 843 - Dynamics Facilities
Department 851 - Mechanical
Department 852 - Transmission and Hydraulic Drive
Department 853 - Axle and Gear Functions
Department 854 - Product Development
Department 861 - Structures
Department 862 - Suspension and Steering
Department 863 - Fluid Dynamics
Department 864 - Body Components
Department 865 - Body Analysis

Comments:

The General Laboratories are a service function primarily concerned with testing the chassis and its body components. In these laboratories there are dynamometer cells for testing engines. It has been requested that the dynamometer facilities should be decentralized within the Chassis Design group in order to utilize the cells to the best advantage.

The Engine Development Laboratory creates exhaust noises and exhaust fumes. This should be of prime consideration in the location of this department in the new Center.

The Fuel Systems Laboratory, Department 832, indicates that there should be close parking areas for thirty test cars. Inside working space, either within the department or nearby, with space for four cars (2 stalls) is essential. This laboratory should be located in close proximity to the dynamometer laboratory, road test garage and machine shop due to the necessity of transporting parts between these areas and the laboratory.

The Engine Cooling group, Department 833, requests a front end component wind tunnel for testing and development work on vehicle cooling systems. Since this tunnel must accommodate a full size car it should have direct access to grade level and be housed in a separate building. The facility would be available to all sections.

The Sound and Vibration Laboratory, Department 841, requires the use of a smooth asphalt pavement for the evaluation of vehicle modification. Proximity to the test track should be considered.

In the Transmission and Hydraulic Drive Laboratory, Department 852, there is movement of heavy transmission assemblies between departments. Therefore, it is essential to locate this department near the following areas: Experimental Car Garage Operations, Department 882, Mechanical Laboratory, Department 851; Materials Handling, Department 156.

The Structures Laboratory, Department 861, receives bodies-in-white (prototype and program) from the Body Shops for structural tests. This department, in turn, sends these bodies to the experimental build-up department. Therefore, close proximity of these departments should be considered.

Confrontation communications analysis:

Major confrontations are with Materials Procurement, Chrysler Institute, Body Engineering Shop, Body Design, Chassis Design, Electrical Management, Materials Laboratories, and Vehicle Testing Staff. The largest number of contacts are with Vehicle Testing Staff and Chassis Design.

There is a high degree of communication within the section. This is especially true between Engines, Department 831, and Fuel Systems, Department 832, due to the close coordination of their operations.

SECTION 870 - VEHICLE TESTING

Present net space and personnel:

	Space	Personnel
Private Office	885	4
Semi-private Office	720	5
General Office	4261	47
Sub-total	5866	56
Drafting Space	0	0
Laboratory or Studio	8200	12
Shop	64300	143
Stock and Storage	1300	0
General Space	0	0
Total	79666	211

(Male - 204)
(Female - 7)

Departments included:

Department 871 - Product Evaluation
Department 872 - Engineering Development Coordination
Department 873 - Performance
Department 874 - Trucks

Department 875 - Mechanical Service
Department 881 - Experimental Car Engineering
Department 882 - Experimental Car Garage Operations
Department 886 - Experimental Truck Development
Department 887 - Experimental Truck Testing
Department 891 - Buildings Maintenance Proving Grounds
Department 892 - Grounds Maintenance Proving Grounds
Department 896 - Plant Protection Proving Grounds
Department 897 - Vehicle Performance Analysis

Comments:

The Vehicle Testing Section operation is concerned with the testing of roadable passenger cars and trucks, and the facilities are much like that of dealer garages. It should be noted that the Vehicle Testing Section has a large part of its operation at the Chelsea Proving Grounds, which is about sixty miles from the central engineering at Highland Park. The Proving Grounds operation is used for extensive testing of passenger cars and trucks under the most severe road conditions. This facility will continue its operation when Central Engineering relocates at Troy, Michigan.

It has been requested that Department 881, the Experimental Car Engineering group, be considered for location close to the new Center test track. However, this may not be necessary since the vehicle being tested is generally driven to the track, and it would not be essential to locate a department directly adjacent to the track if it were not convenient. This also applies to Experimental Car Garage operations, Department 882, since both Departments 881 and 882 have a closely knit operation.

The Experimental Truck Development group, Department 886, requires garage facilities such that school buses and tractor trailers can be brought into the garage without excessive maneuvering around columns and under low overhead piping. Consideration of a stall that would permit driving in one door and driving out another without turning would be ideal.

Note that the Vehicle Testing Section advocates the centralization of all garage facilities. Some of the other sections, such as General Laboratories and Chassis Design, feel that a central facility, plus several zone garages, would be more efficient than the present operation.

In the Experimental Garage adequate temporary storage should be provided for parts removed from the cars on which work is being done. Tire storage space is also required. A parts washing and degreasing facility should be available to remove grease, oil, and dirt from such parts as the differential and wheels.

An automatic car wash would be useful since dirty cars cannot enter the garage. The present car washing facility is a bottle-neck in the Experimental Car Garage operation.

Additional rest room facilities are needed within the garage. This facility should be capable of handling garage personnel as well as other personnel who use the Experimental Car Garage.

Confrontation communication analysis:

Major confrontations are with Materials Procurement, Body Engineering Shops and General Laboratories. The largest number of communications is with the Materials Procurement Section, and is explained by the fact that procurement of all test automobiles is requested by the Vehicle Testing staff.

The large number of communications with General Laboratories is due to the car build-up work that is associated with the design, build-up test operation.

Internal communication in this section is the highest in the Engineering Division (over 6600). Department 881, Experimental Car Engineering, and Department 882, Experimental Car Garage operations, comprised the bulk of departmental confrontations, with Department 887, Experimental Truck Testing, and Department 870, Vehicle Testing Management following closely.

SECTION 910 - RESEARCH

Present net space and personnel:

	Space	Personnel
Private Office	1908	9
Semi-private Office	365	2
General Office	3118	37
Sub-total	5391	48
Drafting Space	197	2
Laboratory or Studio	20318	47
Shop	0	0
Stock and Storage	1423	1
General Space	0	0
Total	27329	98

(Male-85)
(Female-13)

Departments included:

Department 921 - Physics Research
Department 922 - Instrumentation Research
Department 931 - Chemical Research
Department 941 - Metallurgical Research

This group feels that present Research laboratory facilities are arranged somewhat inefficiently. There is some feeling that even if the entire Research operation were at Greenfield it would be more satisfactory than the present arrangement.

The Research group is very sympathetic to research in the planning of their building. They feel that an administration core surrounded by spokes housing Physics and Basic Sciences, Chemistry, Metallurgy, and Automotive Research would be the ideal form for their laboratories.

They feel that they would like to have more follow through from their staff from laboratory work to practical observation.

The Physics Research Department requests that future facilities should include a laboratory designed specifically for human work factor. This will require a laboratory area which is isolated from the external disturbances such as noise.

The Instrumentation Research Laboratory, Department 922, is doing an increasing amount of work on automotive electronic devices and should be provided with facilities to test whole cars within the laboratory.

The Chemical Research Laboratory, Department 931, indicates that there are detrimental vibration problems that effect their electron microscope. This laboratory must be free from outside vibration to the standard of an analytical chemical balance. A new pilot plant chemical laboratory operation should be considered. This pilot plant is set up to test a production-operation. A clear height of at least 20 feet is needed to house an overhead crane and a mezzanine for material hoppers. Many pieces of equipment in this plant will require their own foundations.

Confrontation communications analysis

Major external contacts are with Buildings and Facilities, and Automotive Research, the latter having the greatest

number. This section shows relatively few confrontations with any specific section. This would indicate a generally self-contained operation. Department 931, Chemical Research, and Department 941, Metallurgical Research, maintain the bulk of confrontations in this section.

SECTION 950 - AUTOMOTIVE RESEARCH

Present net space and personnel:

	Space	Personnel
Private Office	810	5
Semi-private Office	0	0
General Office	8200	59
Sub-total	9010	64
Drafting Space	3890	20
Laboratory or Studio	23865	67
Shop	0	0
Stock and Storage	0	0
General Space	0	0
Total	36736	151

(Male - 145)
(Female - 6)

Departments included:

Department 951 - Gas Turbine Design
Department 952 - Gas Turbine Power Plants
Department 953 - Gas Turbine Components
Department 961 - Research Design

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Department 962 - Research Mechanical Laboratory
Department 963 - Computer Laboratory
Department 971 - Automotive Research

Comments:

A new field in automotive power plant design is foreseen with the coming of the gas turbine. Gas turbines will be used extensively in automobiles within the next ten years. With this in mind, the new Engineering Center should be designed to accommodate this new type of engine. Already there are several roadable prototype cars with gas turbine power plants being tested.

The testing dynamometer facility for gas turbines is entirely different from the conventional reciprocating engine dynamometer. It can be a relatively light structure because of mounting methods developed by the research laboratories. This is contrasted with the extremely heavy bed plates and engine foundation required for reciprocating engine testing.

The various research departments have requested that all departments except the Computer Laboratory, Department 963, be grouped as a working unit. This allows the greatest efficiency within the Automotive Research Section.

The Computer Laboratory should be, by its rather delicate nature, located at some point where physical disturbances would not hinder its operation.

In the Research Mechanical Laboratory, Department 962, a large amount of work is done directly on automobiles, which requires garage facilities within the laboratory.

Confrontation communication analysis:

Major external communications are with Research. It is interesting to note that there is little confrontation outside of the research group. Internal communications are almost four times that of those with Section 910.

The largest contract within the section is between Research Mechanical Laboratory, Department 962, and Automotive Research, Department 971. A high degree of confrontations exists between Gas Turbine Design, Department 951, and Research Design, Department 961. This substantiates the previous observation regarding the desirability of grouping these departments as a working unit.

SECTION 510 - NON-ENGINEERING

Present net space and personnel:

	Space	Personnel
Private Office	1934	11
Semi-private Office	925	10
General Office	15655	262
Sub-total	18514	283
Drafting Space	0	0
Laboratory or Studio	7000	4
Shop	0	0
Stock and Storage	1000	0
General Space	0	0
	26514	287

(Male - 247)
(Female - 40)

Departments included:

Department 3110 - Pre-production Planning
Department 3120 - Pre-production Analysis
Department 3210 - Staff Master Mechanic Process
Department 3301 - Production Planning and Analysis
Department 3310 - Production Analysis

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Comments:

This section consists of non-Engineering Departments that are located within the Engineering Division to coordinate production operations within the Corporation. It is composed primarily of office type work areas.

Confrontation communications analysis:

Major external communications are with Engineering Staff Services, Product Programming, Body Engineering Shops, Body Design, Chassis Design, Electrical Management, and Truck.

The highest number of confrontations is with Body Engineering Shops - almost twice that of any other section. This is due to the close relationship of Production Analysis, Department 3310, that must be incorporated into planning the car for production. Internal communications are very low, which seems to indicate that decentralization of departments could be accomplished in this section if necessary without too much functional danger.