A MUSEUM
FOR THE INDIANAPOLIS MOTOR SPEEDWAY

A Facility Program for the Indianapolis Motor Speedway Corp.,
Speedway, Indiana

Mark Prange

College of Architecture and Planning
Ball State University
Muncie, Indiana

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The Indianapolis Motor Speedway was built in 1909 when four prominent Indianapolis businessmen—Carl G. Fisher, James A. Allison, Arthur C. Newby and Frank H. Wheeler—brought their resources together to create a "great outdoor laboratory" for the fledgling automobile industry. The inaugural program of auto races was held August 19, 1909 on a racing surface of crushed stone and tar. But by the end of three days of races, the track surface had deteriorated badly, causing Fisher and his associates to make plans to have the course resurfaced with 3,200,000 paving bricks grouted in concrete.

After holding several racing events over the ensuing two year period with diminishing attendance, it was decided to concentrate on a single racing event to be held annually. The distance was to be five-hundred miles since, the owners reasoned, that would give the spectators a nearly equal amount of action as the multi-race program held in 1910. The first 500-mile race at Indianapolis was run on May 30, 1911. The winning driver, Ray Harroun, completed the distance in six hours, forty-two minutes, averaging 74.6 miles per hour.

During the war years of 1917-1918, racing activity was suspended and the Speedway was used as an aviation repair depot for military aircraft flying between bases in Dayton, Ohio and Rantoul, Illinois. Many acres of the grounds were planted in hay and grain to aid in meeting taxes and maintenance costs. With the war's end, though, preparations for the resumption of racing in 1919 began immediately.

During the late 1920's, when Carl Fisher's business interests began to take his attention elsewhere, the founders of the Speedway decided to sell the property. Captain Eddie Rickenbacker, a former Indianapolis driver and a World War I ace, purchased the Speedway in 1927. However, the Depression years required all of Rickenbacker's ingenuity in an effort to keep the Speedway in operation. Just as the financial outlook brightened and competition reached new levels, World War II caused the suspension of racing activity from 1942-1945, due to the strict rationing of petroleum and rubber products.

When Wilbur Shaw, a three-time winner at Indianapolis, returned to the track in 1945, he found that the property had suffered greatly due to its four years of idleness and neglect. Upon visiting Rickenbacker, he learned that the owner had neither the funds nor the desire required to restore the facilities for resumption of racing at the end of the war. However, Rickenbacker offered to sell the track at his cost.

Shaw's ensuing search for a buyer found Anton Hulman, Jr. of Terre Haute, Indiana. Hulman's assessment of the situation was that "the Speedway always has been as much a part of Indiana as the Derby is part of Kentucky and the 500-Mile Race definately
should be resumed." The transfer of ownership took place in November 1945 and preparations for the 1946 race began immediately.

Tony Hulman's ownership of the Indianapolis Motor Speedway was marked by expansion and growth. New grandstands, gates, tunnels and interior roads were completed in his first decade at the track. An office-museum facility for a growing collection of racing machines and memorabilia was built in 1956, an enlarged pit area and control tower were completed the following year. The Golden Anniversary 500 in 1961 saw the paving of the last segments of the brick racing surface except for one yard of brick at the start/finish line. Construction of huge grandstands in the four turns have brought the reserved seating to approximately 235,000.

During its early years, the Indianapolis Motor Speedway gained recognition as a proving ground for experiments in automotive design and innovation in areas such as high-compression engines, four-wheel brakes, experimental fuels and lubricants and hydraulic shock absorbers. The current experimentation in aerodynamics, tire design and turbocharging have seen, and will continue to see, borrowing of these technologies by the automobile industry.

The nearly thirty-two years of Tony Hulman's ownership, ending with his death in October 1977, established the Indianapolis 500-Mile Race as the premier sporting event in the world, the drama of which is witnessed by nearly 400,000 spectators each year, with a worldwide audience of many, many millions linked to the event by radio and television.

---taken and condensed from the 1979 Indianapolis Motor Speedway brochure.

SCOPE OF PROGRAM AND APPROACH

The scope of this program, in an objective sense, is to define and articulate users and their needs, spatial and functional requirements and all applicable environmental and design criteria as pertinent to a racing museum.

In a subjective sense, it must be realized and conceived as the museum for the Indianapolis Motor Speedway, and the inherent character understood. The Indianapolis 500 is a powerful event, whose best historical and contextual images embody a rich series of visual, auditory and emotional sensations of one of the most captivating single day experiences in the world.

Therefore, as designer, one should remain sensitive, attuned to these sensations and images as design influences. Their character is strong enough to be felt (at least by this author) even when the track is silent; the images of car, driver and multitude seem to linger long after the track is deserted. This spirit has been personified by some as "Old Man Indy," and it may well be that the history and character of Indianapolis is more presence than legend.
PARTICIPANTS

The following individuals have contributed their time and knowledge toward the development of this program:

Mr. Albert W. Bloemker, Vice-President, Indianapolis Motor Speedway Corporation.

Mr. Charles Thompson, Superintendent of Grounds, Indianapolis Motor Speedway.

Mr. Robert Lamson of the firm Fink, Roberts and Petrie, Inc., engineers, Indianapolis.

RESOURCES


Time Saver Standards for Building Types.


Uniform Plumbing Code (Indiana addenda), 1976.
GOALS OF THE PROJECT

- Primarily, to house, protect and display elements of the history and character of the principle event in motor sport.

- Provide a design in sympathy with present and historic images of the Indianapolis Motor Speedway.

- Capture, articulate and express the character and excitement of the month of May at Indianapolis throughout the year.

- Provide a focal point for all visitors and for all administrative activity of the Speedway—and to provide a link between the Speedway and the community.

- Consolidate the museum and the display preparation facility into one complex, additionally housing all administrative offices and functions.

- Attempt to achieve an intimacy between car, history, site and the visitor to create an exciting feeling of involvement (imagination) and a sense of place, history, etc.

- Provide for future growth and expansion.

- Provide for handicapped accessibility to all displays and experiences.

USER GOALS AND OBJECTIVES

As a starting point toward achieving project goals, the objectives of the user/client as well as those of visitors must be realized and understood.

Administration

- to maintain and promote the image, fame and appeal of the Indianapolis 500 with both participants and the public.

- to maintain and promote the image of the Indianapolis Motor Speedway Corporation within the community by warmly and openly addressing community concerns and desires.

- to organize and implement efficient and effective means for the running of the 500-Mile Race.

- to gather funds for maintenance of grounds, expansion or improvement of facilities, prize monies, etc. This includes the luring of sponsorships and advertising.

- to properly maintain all Speedway property, to coordinate and delegate maintenance activities, and to maintain a good visual image.

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-adherence to the rules and regulations of the sanctioning body (United States Auto Club).

-to provide security and protection for the Speedway property, the museum facility, and the museum displays themselves.

Curator and Display Preparation Personnel

-to restore display automobiles to "race-day condition."

-to protect displays from theft and damage.

-to provide safe storage for parts of the museum collection not currently on display or in need of restoration.

Visitors

-to get an "up-close" look at famous cars, drivers and museum displays.

-to not only see, but experience the Indianapolis Motor Speedway and the 500-Mile Race.

-to gain an appreciation for the race's history and character.

-to have their imagination stimulated (letting their imagination place them in the car and on the track).

-to have the ability to see the displays from a variety of views, to see into the "guts" of the car (cockpit, engine compartment, etc.), and to experience a "hands-on" display.

-to learn how these cars work (in terms of aerodynamics, suspension systems, etc.) and to see how they are assembled.

-to experience what it's like to be a driver.

-to see what goes on in the pits, garage area and display preparation facility.

-if handicapped, to be able to have access to all displays, views and experiences.

ORGANIZATIONAL ROLES AND FORMAT

The Indianapolis Motor Speedway Foundation acts as a governing body, with the Indianapolis Motor Speedway Corporation acting as the administrative, managerial body.

The Office of Publicity (under Mr. Albert W. Bloemker, Vice-
President) is responsible for promoting the Indianapolis 500 and all attendant activities with all forms of the news media. They are additionally responsible for the distribution, publicizing and reception of the race entry forms.

The Office of Grounds (under Mr. Charles Thompson, Superintendent) has jurisdiction over all Speedway property and the museum facility--this includes all maintenance, repair, painting, grounds-keeping, janitorial services, etc.

The Auditor's Office is responsible for the recordkeeping of all transactions and the handling of all monies.

The Curator of the museum acquires displays and memorabilia through acquisitions made by the Indianapolis Motor Speedway (IMS) Foundation (often through the generous donation of an individual or organization). He also works in close collaboration with the library/archives of the museum. The display preparation personnel work under the direction of the Curator. Their main function is the restoration of the display automobiles to "race-day condition" before their placement in the museum.

The Ticket Office is responsible for, first, filling all mail-order ticket sales and, secondly, for over-the-counter sales. This office works independantly of the other administrative functions.

The Official Photographer records all racing-team photographs after qualification and the race, as well as other race and 500-Festival activities.

It should be noted that the Speedway maintains a small group of full-time employees in the administrative departments, but additional personnel are hired into these departments as the tempo of activity and the work load increase with the approach of the month of May.

In this same vein, the President of the IMS Corporation is only in his office at the Speedway once a week during the "off-season" due to his other business interests. But during the month of May, he is in his office nearly full-time.

Similarly, the nature of the Curator's work is such that he need not be at his office at the museum on a daily basis.
LIST OF USERS

Users of a project can not only be specific groups, but there are also important diversities within these groups that should be addressed.

Administration

- President of IMS Corporation

Offices of: Publicity
Auditor
Grounds
Ticket sales
Official Photographer
Curator
Library/archives

Additional personnel include:
Museum guides and security
Display-preparation mechanics
Gift shop clerks
Maintenance and janitorial personnel

Visitors

- avid race fans
- the curious, part-time race fan
- groups: school children, clubs
- selected visitors (by special invitation)
- researchers (of library/archives)
- consumers (restaurant, gift shop)

Non-Speedway employees

- all restaurant personnel

Museum Displays

- racing machines
- classic automobiles
- trophies
- driving gear of historic value (helmets, gloves, etc.)
- engine blocks and other mechanical equipment
- photography and artwork
SPACE REQUIREMENTS: President's Office

Activity Performance:
Space for the President to make phone calls, do paperwork, receive visitors, hold small meetings, etc.

Space Performance:
The President may come into his office only a few days a week during the "off-season," but will be in his office daily during April and May. This should be considered in the space's design as well as the appropriate image for the role of President.

Environmental Criteria:
-since the office space will not be used on a daily basis during much of the year, a "borrowing" of space, lighting and ventilation from other spaces might be considered (see Design Criteria--Interior).
-provisions for acoustic and visual privacy should be made.
-visual link to exterior and/or museum space should be provided.

Furniture and Equipment:
-desk and chair
-2 guest chairs
-couch
-small conference table
-shelf space and storage

Space Standard (see drawing):
(scale: 1/8"=1'-0")

380 square feet
SPACE REQUIREMENTS: Auditor's Office

Activity Performance:
Space for Auditor(Controller) and six employees to perform routine office work, typing, making and receiving phone calls, etc.

Space Performance:
This should be a pleasant working environment, lit by natural light (preferably northern light); floor space should be planned for efficient, yet comfortable office operation.

Environmental Criteria:
- Natural lighting (preferably northern light)
- If direct sunlight is admitted to space, care should be taken to prevent it from striking work stations, in order to prevent excessive heat gain and discomfort for personnel.
- Visual link to exterior or interior spaces of interest should be provided.
- Noise isolation criteria of NC 30-35; sound isolation of STC 37-47.

Furniture and Equipment:
- six desks and chairs
- file cabinets
- couch
- coat racks
(furniture and equipment for Auditor's private office and office vault under individual space requirements)

Space Standard (see drawing):
(scale: 1/8"=1'-0"

725 square feet

(space will also have a vault and a private office for Auditor's use. See individual Space Reqsmts. for square footages.)
SPACE REQUIREMENTS: Publicity Office

Activity Performance:
Space for Mr. Bloemker and three full-time employees (two assistants and one secretary) to perform routine office work, type, file, make phone calls and prepare mailings. Space must also be provided for as many as seven additional employees that are needed during the month of May. Since Mr. Bloemker also receives several visitors, a private office will be provided for him.

Space Performance:
This should be a pleasant working environment, lit by natural lighting (preferably northern light); floor space should be planned for efficient, yet comfortable office operation. Consideration should be given to reducing volume and floor space during the year when only Mr. Bloemker and the three full-time employees are present.

Environmental Criteria:
-Natural lighting (preferably northern light)
-If direct sunlight is to be admitted to the space, care should be taken to prevent it from striking work stations, in order to prevent excessive heat gain and discomfort for personnel.
-Visual link to exterior or interior spaces of interest should be provided.
-Noise isolation criteria of NC 30-35; sound isolation of STC 37-47.
-Provide for task lighting.
-Provide for reduction of built volume and floor space when only full-time employees are required (i.e. closing-off of unnecessary square footage to reduce energy consumption and air conditioning loads).

Furniture and Equipment:
-10 desks and chairs
-file cabinets
-work table
-addressograph
-mimeograph
-collator
(furniture and equipment for Mr. Bloemker's private office and office vault are under individual Space Requirements)

Space Standard (see drawing on following page)
(scale 1/8"=1'-0")

contd
1100 square feet

(Space will also have a vault and a private office. See individual space requirements for square footages.)

SPACE REQUIREMENTS: Grounds Office

Activity Performance:
Space for Mr. Thompson and four full-time employees (three assistants and one secretary) to perform routine office work, type, file, make phone calls, etc. Space must also be provided for three additional employees that are needed during the month of May. A private office is to be provided for Mr. Thompson.

Space Performance:
This should be a pleasant working environment, lit by natural lighting (preferably northern light); floor space should be planned for efficient, yet comfortable office operation. Consideration should be given to reducing volume and floor space during the year when only Mr. Thompson and the four full-time employees are present.

Environmental Criteria:
- Natural lighting (preferably northern light)
- If direct sunlight is to be admitted to the space, care should be taken to prevent it from striking work stations, in order to prevent excessive heat gain and discomfort for personnel.
- Visual link to exterior or interior spaces of interest should be provided.
- Noise isolation criteria of NC 30-35; sound isolation of STC 37-47.
- Provide for task lighting.
- Provide for reduction of built volume and floor space when only full-time employees are required (i.e., closing-off of unnecessary square footage to reduce energy consumption and air conditioning loads).

Furniture and Equipment:
- 7 desks and chairs
- drawing files
- file cabinets
- work table
- 2 guest/waiting chairs

Space Standard (see drawing on following page):
(scale 1/8" = 1'-0")

contd
810 square feet

(Space will also have a vault and a private office. See individual space requirements for square footages.)

Space Standards from: Time Saver Standards for Building Types.
SPACE REQUIREMENTS: Private office

Activity Performance:
Space for an individual or group of individuals to work or have a small meeting; this space is necessary for privacy or lack of disturbance. Its use could be for a select individual (rank) or an individual member of a work group.

Space Performance:
This is a small space that can be isolated or screened from adjacent areas for visual or acoustic privacy.

Environmental Criteria:
- Due to small size, lighting and ventilation could be "borrowed" from adjacent spaces.
- Space must have provisions for visual and acoustic privacy.
- Provide for task lighting.

Furniture and Equipment:
- 1 desk and chair
- work table
- 2 guest chairs
- file or storage cabinets
- shelf space

Space Standard (see drawing):
(scale 1/8"=1'-0")

270 square feet
SPACE REQUIREMENTS: Vault

Activity Performance:
A protective space for storage and safekeeping of certain files, records, documents, etc.

Space Performance:
This is purely a utilitarian space, with no amenities beyond basic functional criteria (see Environmental Criteria).

Environmental Criteria:
- Security and fire protection should be integral with the vaults design; alarm systems should be provided.
- Adequate space for storage should be provided (file cabinets, drawing files, etc.).
- Adequate artificial lighting should be provided for filing, reading, etc.

Furniture and Equipment: (dependant upon office function using vault)
- file cabinets
- drawing files
- shelf storage

Space Standard:
100 square feet
SPACE REQUIREMENTS: Curator's office

Activity Performance:
Space for the Curator to keep records, receive visitors, make phone calls, do paperwork, etc.

Space Performance:
A relatively simple space is required due to the simplicity of function as well as the fact that the Curator's work is such that he need not be at the Museum on a daily basis. From a spatial and aesthetic sense, though, it should be remembered that he will be receiving occasional visitors, so a space in keeping with his position is also required.

Environmental Criteria:
- Visual link to exterior and/or to museum space should be considered.
- Provisions for acoustic and visual privacy should be provided.
- Since the office space will not be used on a daily basis, a "borrowing" of floor space, lighting, and ventilation from other spaces might be considered.

Furniture and Equipment:
- 1 desk and chair
- 2 guest chairs
- File cabinets
- Shelf storage
- Work table

Space Standard (see drawing):
(scale 1/8"=1'-0"

270 square feet
SPACE REQUIREMENTS: Reception/Secretarial

Activity Performance:
Space for one full-time secretary to both the President and the Curator; since neither the President nor the Curator are in their offices on a full-time basis during most of the year, one secretary can serve both. However, space should be provided for an additional secretary during the month of May due to the increase in activity. The secretary will also handle incoming calls. This space will also serve as a waiting area for visitors to the President or the Curator.

Space Performance:
This area can serve as an orientation point to the office area; therefore it should be visible and easily accessible. The space should have a pleasant character since it may be one of the first office areas seen by visitors; it should also have appropriate character as the waiting area for the President's and the Curator's offices.

Environmental Criteria:
- The space should offer views to the exterior and/or interior spaces of interest.
- The space need not be an enclosed area, but possibly adjacent to and opening onto a circulation path. However, noise received from adjacent areas must be controlled if this is done.
- Provide for task lighting.

Furniture and Equipment:
- 2 desks and chairs
- 1 couch
- 2 guest chairs
- 1 table
- Cabinet storage

Space Standard (see drawing):
(scale 1/8"=1'-0")

380 square feet
SPACE REQUIREMENTS: Ticket Office

Activity Performance:
Space for ten full-time employees to perform routine office work in addition to the reception of mail-orders for tickets and the subsequent filling of those orders. The employees will also fill walk-up, over-the-counter ticket orders, so there will be contact with the public.

Space Performance:
This should be a pleasant working environment, lit by natural lighting (preferably northern light); floor space should be planned for efficient, yet comfortable office operation. Public image is also an important consideration here.

Environmental Criteria:
- Natural lighting (preferably northern light)
- If direct sunlight is to be admitted to the space, care should be taken to prevent it from striking work stations, in order to prevent excessive heat gain and discomfort for personnel.
- Visual link to exterior or interior spaces of interest should be provided.
- Noise isolation criteria of NC 30-35; sound isolation of STC 37-47.
- Provide for task lighting.
- Finishes and materials that the public come in contact with should be durable and easily cleaned.

Furniture and Equipment:
- 10 desks and chairs
- Xerox machine, addressograph, mimeograph
- File cabinets
- 2 work tables
- Ticket window or counter
- Counter-height chairs or stools
(This space is to have two (or the equivalent of two) vaults. All furniture and equipment for these is under its individual space requirement.)

Space Standard (see drawing on following page):
(scale 1/8" = 1' - 0")

contd
1148 square feet

(Space will also have two or the equivalent of two vaults. See the individual space requirement for square footage.)

Space Standards from: Time Saver Standards for Building Types.
SPACE REQUIREMENTS: Photographer's office and workroom

Activity Performance:
Space for the official photographer and a full-time secretary plus additional photographers during May. Secretary performs routine office work, types, files, answers phone calls, etc. Workroom activities include print drying and mounting, print layout, storage of supplies, chemical preparation, etc.

Space Performance:
Both spaces should be cheerful and pleasant; activity may be busy and moderately noisy.

Environmental Criteria:
- Task lighting should be provided at desks and work tables.
- Natural lighting (preferably northern light) should be admitted to both areas.
- Water supply and drainage systems should be provided in work area.
- Workroom should have direct access to darkroom.
- Workroom finishes and materials should be easily cleaned.
- Spaces should be well ventilated and relatively dust-free.

Furniture and Equipment:
- 2 desks and chairs
- 2 guest chairs
- 2 work tables
- stools
- cabinet storage
- print dryer
- sink(s) and countertop
- shelf storage

Space Standard (see drawing on following page):
(scale 1/8"=1'-0")

contd
736 square feet
SPACE REQUIREMENTS: Photographers' Darkroom

Activity Performance:
Space for film development and print enlargement.

Space Performance:
This is to be a purely utilitarian space—determined by the functional requirements of a darkroom. No natural lighting is allowed. Entry must be baffled to prevent admittance of light from adjoining spaces.

Environmental Criteria:
-Finishes and materials in darkroom must be easily cleaned and maintained.
-Darkroom should be well ventilated and relatively dust-free.
-Power outlets should be provided at each enlarger station.
-Water supply and drainage system should be provided.
-Entry to darkroom must be baffled to prevent light from adjoining spaces from entering.
-Film loading space must be totally "light-isolated."

Furniture and Equipment:
-4 enlargers
-cabinet storage
-sink/tub
-"whirlpool" sink
-"light-lock" doorway
-2 stools
-countertop

Space Standard (see drawing):
(scale 1/8"=1'-0")

272 square feet
SPACE REQUIREMENTS: Conference/Meeting Room

Activity Performance:
Space for in-house, inter-office meetings as well as conferences with outside groups or individuals (sponsors, car owners, drivers, sanctioning-body officials, etc.).

Space Performance:
The room should have a spacious "character" while not being oversized in volume or floor space (enough area should be provided, though, for larger, "standing room" meetings that occasionally take place. Natural lighting is encouraged, but views to the exterior should be limited as this is an inwardly oriented space.

Environmental Criteria:
- Visual and acoustic privacy should be provided, as well as acoustic isolation (minimizing of noise from adjoining spaces).
- Natural lighting should be utilized (preferably northern). Artificial lighting should be used to augment natural lighting as required over conference table.
- All lighting (natural and artificial) should be easily controlled so that presentations requiring a darkened room can be made.

Furniture and Equipment:
- conference table, eight chairs
- storage space for coats and equipment
- projection screen

Space Standard (see drawing):
(scale 1/8"=1'-0")

375 square feet
SPACE REQUIREMENTS: Employee Lounge

Activity Performance:
Space for all employees to rest, eat lunch, take a break, etc.

Space Performance:
This should be a cheerful, pleasant space, near to or viewing onto exterior or interior activity but not to be disturbed by it. It should be an exciting yet restful space...active yet not distracting.

Environmental Criteria:
-Natural lighting, possibly direct sunlight, should be provided.
-Durable, easily cleaned, materials and finishes should be used.
-Lounge should be well ventilated.
-Noise or conversation should not disturb adjacent areas.
-This space could overlook other areas of interest (museum?).
-Warm, pleasant colors and finishes should be used.
-A physical link to the exterior (terrace?) should be considered.
-Power outlets should be provided at each vending machine and at kitchenette counter.

Furniture and Equipment:
-3 tables, 24 chairs
-2 couches
-4 chairs
-1 refrigerator
-1 microwave oven
-3 vending machines (soft drinks, snacks, juice, etc.)
-coffee machine
-sink, counter, cabinets
-storage lockers

Space Standard (see drawing on following page):
(scale 1/8"=1'-0")

contd
849 square feet
SPACE REQUIREMENTS: Theater

Activity Performance:
Space for seventy visitors to view films on the history of the Speedway or particular races, famous cars and drivers, the experience of driving on the track, etc.

Space Performance:
For a movie theatre, a relatively small audience with a maximum-size projected image has the effect of "picture dominance" or an "at the scene" feeling for the viewer; this is of particular importance here as it can lend a "behind the wheel" look at driving at Indianapolis. The location of this space might be such that it becomes part of a sequential order of displays and information in the museum.

Environmental Criteria:
- According to Time Saver Standards, theater lighting must serve three separate functions:
  1. Emergency exit and mood lighting, used during screen presentations
  2. Lighting needed during intermissions
  3. Lighting of sufficient intensity for making announcements, clearing the house, or other rare occasions.
These three conditions must be considered and met.
- Space should be well ventilated.
- All materials, upholstery and finishes should be durable and easily cleaned.
- Noise criteria of NC 30; sound isolation of STC 47-52.

Furniture and Equipment:
- Seating for 70
- Projection screen
- Sound system
- Projector

Space Standard:
For a "theater," the Uniform Building Code requires 7 sq. ft. per occupant. Architectural Graphic Standards lists two minimums:
6-8 sq. ft. per occupant (conventional seating)
8-10 sq. ft. per occupant (continental seating)

Therefore: 70 seats x 8 sq. ft. per occupant = 560 sq. ft.

Environmental Criteria (lighting) from: Time Saver Standards for Building Types, page 913; (acoustics) from: Arch. Graphic Stnds.
SPACE REQUIREMENTS: Library-Record Archives

Activity Performance:
Space in which all records, documents, articles, photographs, films and similar materials are catalogued and stored. Researchers may have access to these materials with staff supervision.

Space Performance:
This should be a simple space providing for efficient and effective storage with adequate means for expansion; an appropriate atmosphere of quiet or muffled sound should pervade. There should be a point of control for staff members over the entry/exit of the space.

Environmental Criteria:
- Automatic fire and security systems must be installed.
- North lighting should be provided to read by; task lighting should also be provided.
- Noise criteria level of NC 30; sound isolation of STC 47-52.
- Visual connection to museum display space or to exterior may be desired.
- Humidity and temperature should be closely controlled to aid in the preservation of older documents and records.
- Projection space should have acoustic and light isolation.

Furniture and Equipment:
- Book shelves
- Reading table and six chairs
- Countertop and chair
- Projector and screen
- Card catalogue
- 2 chairs
- Cabinet storage

Space Standard (see drawing on following page):
(scale 1/8"=1'-0")

contd
1079 square feet

(This space will also have two or the equivalent of two vault spaces. See the individual space requirement for square footage.)

SPACE REQUIREMENTS: Museum/Display space

Activity Performance:
This is the primary exhibition space for all museum displays. Car displays include historic and contemporary Indianapolis-type, many classic varieties, closed-cockpit/road course cars, land-speed record holders, etc. Other displays include a hydroboat, motorcycles, many trophies, demonstrations of working components (engine cutaways, suspension systems, aerodynamic designs), photography, artwork, helmets, driving equipment and other racing memorabilia of interest. Visitors are encouraged to look, study, and in certain situations, even touch and operate.

Space Performance:
A strong conceptual understanding of the entire project is critical to the success of this space. The issues of context and imagery must be woven with the experience-orientation of the museum itself. This implies a weaving of the displays, people and the architecture into sympathetic union. Views are an important consideration here, both to interior functions (display restoration space?) and to exterior space. As a museum with a large collection, internal flexibility for the movement of displays is an equally important consideration.

Environmental Criteria:
- Lighting should not be treated uniformly; spotlighting or the admission of sunlight can add the needed sparkle and brilliance that will lend life to the cars.
- An acceptable level of exterior noise (from cars on the track, the crowd) may be desirable, in this case, as it adds to the character of the space.
- Space should be isolated or buffered from the main entrance in order to maintain air conditioning levels, as the coming and going of many people will cause losses of heated or cooled air.
- The ability to control or modulate natural lighting should be included.
- Automatic fire and security protection should be installed.
  (see Design Criteria--Interior)
- Access to Display Storage space and Display Preparation area is required.

Furniture and Equipment:
- All display stands and cases
- Seating (for watching or resting)

Space Standard:
A space of this type is listed in Chapter 33 of the Uniform Building Code under "Assembly Room." The code specifies a minimum of 15 sq. ft. per occupant. The maximum visitor contd
occupancy of this space will be 650-700 people.

675 people (avg.) x 15 sq. ft. per occupant = 10,125 sq. ft.

The exhibition space must house a maximum of 70 cars. The average area of a typical displayed car is 128 square feet.

A protection zone of three feet on all sides of the car brings the total area of a typical display to 308 square feet. The necessity or size of this zone depends on the type of display. The modern Indianapolis-type car is more fragile, due to lighter construction, than older cars, so this zone may be limited to these newer cars. Other protective means may be devised, but this area will allow for circulation around each display.

70 displays x 308 sq. ft. per display = 21,560 sq. ft.

TOTAL SQUARE FOOTAGE FOR DISPLAY SPACE = 31,685 sq. ft.
SPACE REQUIREMENTS: Display Storage

Activity Performance:
Space for storage of a maximum of 95 display vehicles.

Space Performance:
This is an inactive space, so few aesthetic amenities are required. The parking layout of the vehicles should be efficient, while allowing for sufficient circulation space to move cars in.
Every several months, a rotation of 6-10 vehicles takes place, so access to the museum space is required. Additionally, vehicle access is required to the display restoration garage and to an exterior drive.

Environmental Criteria:
- Automatic fire and security systems must be installed.
- Floor materials should be durable and easily cleaned.
- Mechanical systems (particularly water lines) should be routed around this space, not over parked vehicles.
- Exterior openings and windows should be limited for security and energy considerations.

Furniture and Equipment:
- all necessary doorways to provide access to the museum, the display restoration garage and the exterior drive.

Space Standard:
Each car in storage is allotted 189 sq. ft. (9' x 21').
Arranged in 23 rows, 2 cars deep, with an aisle 25' in width, 90 cars can be accommodated in a space 109' x 207', or 22,563 square feet.
SPACE REQUIREMENTS: Display Preparation/Restoration Garage

Activity Performance:
Space in which two full-time personnel disassemble, repair, restore, refinish and reassemble the cars that become part of the Speedway collection.

Space Performance:
This is a noisy, dirty area requiring adequate space for circulation and storage of disassembled components (tires, wheels, nose cones, engine blocks, etc.) Access to and from the museum and the display storage must be included. The designer should be conscious of the potential for visitors of the museum to view into this space as part of the educational experience of the museum.

Environmental Criteria:
- Provide power outlets overhead, at the workbench and at machinery locations (consider voltages required).
- Dampen noise levels so as not to disturb adjacent spaces; noise criteria level of NC 40-65.
- Provide adequate ventilation, with large air exchange in refinishing room.
- Finishes and materials should be durable and easily cleaned.
- Automatic fire and security systems should be installed.

Furniture and Equipment:
- Workbench
- Overhead hoist
- Large work tables
- Storage cabinets
- Air compressor unit
- 2 hydraulic lifts
- Lathe, drill press, welding unit, etc.

Space Standard (see drawing on following page):
(scale 1/8"=1'-0")

contd
1885 square feet
SPACE REQUIREMENTS: Lobby

Activity Performance:
As the main entry, this is the first space perceived by the visitor; it acts as the “trunk” of the circulation “tree.” The lobby also acts as a point of control for the entire facility.

Space Performance:
This should be a pleasant space yet strong in character as it portrays the character or concept of the whole. The lobby will contain an information/orientation desk and the first staff members encountered by the visitors.

Environmental Criteria:
The materials and finishes should be durable and easily cleaned.
The space should have large amounts of natural lighting (no particular orientation; direct sunlight possible).
Views to exterior and glimpses of interior spaces are encouraged.
Warm colors and surfaces should be considered.
An air-lock should be provided at the entry to prevent loss of heated or cooled air.
The activity and noise of this space should not disturb adjacent spaces.

Furniture and Equipment:
Benches and/or couches for rest
Information desk
Turnstiles
Trash containers

Space Standard:
1600 square feet
SPACE REQUIREMENTS: Gift Shop

Activity Performance:
   Space in which visitors can browse about looking for gifts, post cards, souveniers, etc.

Space Performance:
   This is a casual, cheerful space; it should be an inviting area. As a "for profit" function, it should be located adjacent to the main entrance for "visual access" to visitors. Security of entry/exit point should be considered.

Environmental Criteria:
   - All finishes and materials should be durable and easily cleaned.
   - The space should be well ventilated.
   - Fire and security systems should be installed.
   - Exterior views might be limited due to inward orientation of the space.
   - Power outlets should be located adjacent to display cases.

Furniture and Equipment:
   - All display cases
   - Check-out desk with cash register

Space Standard:
   Shop space  500 square feet
   Storage    175 square feet
   Total      675 square feet
SPACE REQUIREMENTS: Restaurant/Cafeteria

Activity Performance:
Space for approximately 80 people to eat lunch or a light meal, or enjoy various refreshments and desserts.

Space Performance:
This should be a casual yet lively atmosphere with views to key areas of outdoor activity or interior space.

Environmental Criteria:
- Dining space should be well ventilated.
- Natural lighting should be encouraged (direct sunlight may be desirable here as it could add to the character of the space. Care should be exercised in its usage in order to preserve comfortable temperature conditions for the occupants.)
- All finishes and materials should be durable and easily cleaned.
- Noise criteria of NC 45; space should be buffered against noise from kitchen area.
- A physical link to the exterior (terrace?) should be considered with possible view onto the track.

Furniture and Equipment:
- Tables and chairs to accommodate 80 people.
- Reception/cashier desk

Space Standard:
Time Saver Standards for Building Types suggests 16-18 square feet per seat for a commercial cafeteria and 11-14 square feet per seat for Table Service with minimal eating.
Provisions for both types might be provided due to substantial changes in the amount of business that are experienced here. Table service could be employed when business is slower, but during May when business is brisk, the cafeteria service would be more appropriate.

80 seats x 16 sq. ft. per seat = 1280 square feet
SPACE REQUIREMENTS: Restaurant kitchen

Activity Performance:
This space is for the preparation of food and the clean-up of dishes, utensils and kitchenware.

Space Performance:
For the most part this will be purely a utilitarian space, often noisy and active.

Environmental Criteria:
- Materials and finishes should be very easily cleaned and maintained.
- Power outlets need to be supplied frequently along work stations—consider voltages required.
- Adequate water supply and drainage systems need to be provided.
- Garbage disposal and/or storage should be considered.
- A fire extinguishing system is required over heat producing equipment—grill, range, broiler, fryer, etc.
- Access for delivery and storage of supplies should be considered.
- The space should be well ventilated, with adequate exhaust systems located over heat producing equipment.
- Kitchen noise should be contained so as not to disturb the dining area.
- Task lighting should be provided at each work station.

Furniture and Equipment:
- Work tables
- Steam tables
- Oven unit
- Refrigeration unit
- Range
- Grill unit
- Exhaust hoods
- Large pot sink
(These are but a few of possible equipment types. Further consultation of kitchen design resources is necessary to complete all the necessary requirements.)

Space Standard:
A rule-of-thumb for allotting area for the kitchen is that it should be one-third to one-half the area of the dining room.

Dining area: 1280 sq. ft.
1280 sq. ft. x .40 = 512 sq. ft. for the kitchen.
SPACE REQUIREMENTS: Restrooms

Activity Performance:
  personal hygiene

Space Performance:
  a purely utilitarian space; provide separate facilities for general public and staff members.

Environmental Criteria:
  - All materials and finishes should be easily cleaned and maintained.
  - Plumbing noise should not disturb other areas.
  - Provide for handicapped accessibility to at least one water closet per restroom.
  - Restrooms should be well ventilated.

Furniture and Equipment:
  (The following is taken from the Uniform Plumbing Code, 1976.)

<table>
<thead>
<tr>
<th>Occupancy type</th>
<th>WC</th>
<th>U</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly, 400+ occupancy (Museum)</td>
<td>5</td>
<td>4</td>
<td>3</td>
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<tr>
<td>Division of facilities by percentage: (Auditorium)</td>
<td>40% male, 60% female</td>
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<tr>
<td>Office, 60+ occupancy (includes all staff)</td>
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<tr>
<td>Division of facilities by percentage:</td>
<td>40% male, 60% female</td>
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<td></td>
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</table>

Space Standard:
  see Space Summary
SPACE REQUIREMENTS: Janitorial Space

Activity Performance:
Space for janitor(s) to store equipment and supplies; he may also do some minor paperwork such as maintenance records. A small work bench should also be provided for repair work.

Space Performance:
This is a purely utilitarian space, so few visual amenities are required.

Environmental Criteria:
- Space should be well ventilated.
- Task lighting should be provided.
- Materials and finishes should be durable with little maintenance required.
- Power outlets should be installed at work bench.
- Water supply and drainage systems are required.

Furniture and Equipment:
- 1 desk and chair
- File cabinet
- Shelf storage
- Cabinet storage
- Tool storage
- Work bench
- Sink (laundry tub variety)

Space Standard:
see Space Summary
### SPACE SUMMARY

<table>
<thead>
<tr>
<th>Administration</th>
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<tbody>
<tr>
<td>President's office</td>
<td>380</td>
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<tr>
<td>Auditor</td>
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<tr>
<td>-controller's office</td>
<td>725</td>
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<tr>
<td>-vault</td>
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<td>Grounds office</td>
<td>190</td>
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<tr>
<td>-Superintendent's office</td>
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<tr>
<td>Publicity office</td>
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<tr>
<td>-Mr. Bloemker's office</td>
<td>1100</td>
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<td>-vault</td>
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<tr>
<td>Curator's office</td>
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<tr>
<td>Secretarial/Reception</td>
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<td>380</td>
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<tr>
<td>Photographer's office and workroom</td>
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<tr>
<td>-darkroom</td>
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<tr>
<td>Conference/Meeting room</td>
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<tr>
<td>Employee Lounge</td>
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<table>
<thead>
<tr>
<th>Museum</th>
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<tbody>
<tr>
<td>Theater</td>
<td>560</td>
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<tr>
<td>Library/Record Archives</td>
<td>1079</td>
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<tr>
<td>-vault(s)</td>
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<tr>
<td>Museum Exhibit space</td>
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<tr>
<td>Display storage</td>
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<td>Display Preparation/Restoration</td>
<td>1885</td>
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<tr>
<td>Lobby</td>
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<td>Gift shop</td>
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<td>Restaurant</td>
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<tr>
<td>-kitchen</td>
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**TOTAL NET AREA**

70,394 square feet

Assignable square footage: 70,394

Efficiency ratio for museum type: 65/35%

**TOTAL GROSS AREA**

108,299 square feet

<table>
<thead>
<tr>
<th>Circulation</th>
<th>20% of gross</th>
<th>21,660 square feet</th>
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<tbody>
<tr>
<td>Mechanical</td>
<td>5.5%</td>
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<tr>
<td>Public toilets</td>
<td>1.5%</td>
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<tr>
<td>Janitor closets</td>
<td>.5%</td>
<td>542</td>
</tr>
<tr>
<td>Unassigned storage</td>
<td>.5%</td>
<td>542</td>
</tr>
<tr>
<td>Walls, partitions, structure</td>
<td>7.0%</td>
<td>7581</td>
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</tbody>
</table>
COST ESTIMATE

Building cost (108,299 sf @ $60/sf) $6,497,940.00
Fixed equipment (12.5% of Building cost) 812,242.50
Site development (14% of Building cost) 909,711.60

TOTAL CONSTRUCTION COST $8,219,894.10

No site acquisition costs
Movable equipment cost

(10% of Building cost) 649,794.00
Professional fees (7% of Construction cost) 575,392.60
Contingencies (10% of Construction cost) 821,989.41
Administrative costs (2% of Construction cost) 164,397.88

TOTAL BUDGET $10,431,467.99
DESIGN CRITERIA

Energy Conservation:

The environmental criteria of the individual space requirements have dealt with certain specific issues of energy conservation that bear summarizing here.

1. Natural lighting is encouraged throughout the facility. Northern light is suggested for office areas for its even, gentle quality. Spaces where direct sunlight may be appropriate have also been noted. These include the museum exhibit space, the restaurant, employee lounge, etc. The final decision as to the quality and orientation of natural lighting is left to the designer, but considerations toward the issues of heat gain and heat loss through exterior glass should act as an element of control in his decision. This suggests a flexible, seasonal condition where heat gain is restricted in the summer and admitted and used during the winter. The subsequent comfort of the users of a particular space can help in determining this application.

2. Natural ventilation is also encouraged throughout the facility. Operable windows are required for office areas and areas where the environment (temperature) should be controlled directly by the individual users of the space. The designer should also be aware of naturally induced ventilation techniques such as thermal chimneys.

Since the site consists of large open areas with very few obstructions of solar exposure, there is inherently great potential for passive and/or active systems of heating and ventilating using the sun.

3. As has been noted, the size of various office staffs increases as the work load increases with the approach of the race. This implies an office layout where the air conditioned (heated and cooled) volume of space expands or contracts according to the working floor area required. This can result in large energy cost savings since the built volume would be in the reduced state during much of the year. This office space reduction also has implications toward office efficiency in general.

Displays:

The emphasis in the presentation of the displays in this museum is toward the education and involvement of the visitors; the greater the sense of the racing spectrum, from driving to building the car, the greater the success of the museum. This implies a true variety of display viewing and not a regimented
"street and avenue" arrangement of cars. The presentation of each display becomes important as well; cutaway sections, operational displays and the ability to sit behind the wheel of a car should be explored.

Perhaps equally important in this facility is not only the "circulating" of people but also of cars and other exhibits. This movement must take place between the museum itself and the storage and/or the preparation garage. The changing of displays takes place on a limited basis every few months; since the museum is proposed to be a "learning through observation" experience, this change-over of displays might take place as part of that experience, such that people and cars would have to circulate simultaneously for short periods of time.

Since the displays are of a historical nature, the cars, driving gear (helmets, gloves, goggles, etc.) and trophies should be displayed in a corresponding, coordinated fashion. This, though, should not imply a strict separation of displays due to chronology, since comparison between cars and equipment of different time periods can be interesting and educational.

Display security:

Traditionally, museum security for a display has meant a distinct separation of visitor and the display by a padded rope, locked case, security guards, alarm systems, etc. This museum's emphasis toward visitor "participation" and experience seems to present a conflict with such security procedures, not only in terms of protection against theft, but also against breakage, scratching, etc. This dichotomy can be resolved by not applying a blanket security system over the entire display area, dependant upon the type of display and the amount of visitor participation desired, security should be tailored accordingly. The type of car being displayed may help determine the amount or type of security provided. The construction of a 1950's roadster is much less prone to damage than a late 1960's-1970's car, with its fiberglass components, wins and generally lighter-weight materials. The "touchability" of a display and the distance that people are kept/not kept from it should take these conditions into account. The historic value of a particular car should also determine whether or not people are allowed to closely interact with it, and if so, how.

Again, the traditional security techniques have often limited the viewer's ability to perceive and appreciate the car from any angle and in any detail.

contd
A better situation would exist if the visitor is allowed to walk between and around cars for a variety of views and the ability to get a closer look into the engine, cockpit, etc.

Lighting of the displays:

Since the cars are restored by the Speedway to "race-day condition," it could also be appropriate to present the cars in a "race-day atmosphere." It should be noted that these cars' beauty is best revealed on a bright sunny day; the sunlight brings out metallic paints, day-glo colors, and brightly polished surfaces to their best advantage. Therefore the lighting of the museum space should not be of an even quality (as in a luminous ceiling), but rather of a spotlighting, hi-lighting nature. This is, of course, dependant on the individual car and the method of presentation, but it should remain a consideration. The potential exists for allowing direct sunlight into the space as a means of achieving "sunlight quality lighting," this could be supplemented by artificial lighting when and where appropriate. This type of lighting is also conducive to the atmosphere or character of the space as a place in which machines capable of 200 mph are displayed.

Architecture:

The design of the museum display area should be thought of, not independantly as a space, but as an area in which space, car and visitor become a coordinated, orchestrated whole. Therefore, each element must be sympathetic to the other. The experience of the visitor can be made a difficult one if both the cars and the architecture are competing for the visitor's attention. Rather, the cars and the architecture can complete a scheme where each complements the other. It is left to the judgement of the designer as to what space, forms or materials achieve this goal.

Building security:

In terms of building security, several programmed functional contd
areas can serve as points of control over circulation and visibility. The reception/information desk in the lobby and the secretarial/reception area in the administrative area can be placed such that they act as a focus for their respective spaces.

Security can be thought of, not only in terms of limited access to an area, but also as visual and acoustic privacy of spaces such as the conference room, private offices, etc. These spaces could be buffered from main circulation paths by other less private areas.

Economic efficiency:

Very briefly, economic efficiency implies an "economy of means," wherein elements such as light, views, heating and cooling, circulation, and other physical services (telephones, electrical supply, plumbing, etc.) are "borrowed" from area to area. Even psychology space can be exchange between areas.

The designer should be aware of the potentials that exist for such savings, but also of the potential pitfalls of such borrowing: individual vs. group control lighting and ventilation, acoustic and visual privacy loss, etc.
Flexibility:

The display space and display storage must remain flexible in order to facilitate change and variety in the presentation of the cars and other items. This takes into account not only the actual circulation from one space to another of cars, but also the ability to have a variety of presentations through such means as movable partition panels, track lighting for easy adjustment, access flooring to allow for a flexible electrical system, etc. These are but a few of the possibilities.

In order to facilitate flexibility of the exhibit space in terms of the building shell, there should be no load bearing internal partitions, but a column or long-span system of structure. For future expansion, this can provide for an additive, organic growth of space.

Handicapped:

The handicapped should have access to all functions and spaces. A design as barrier-free as possible should be encouraged. This should include all exhibits and display cases.

Adequate alternative routes are acceptable if treated equally with the "standard" for non-handicapped.
DESIGN CRITERIA--EXTERIOR

Parking:

Despite the 650-700 visitor capacity of the museum, the parking to be provided does not need to have a corresponding capacity unless it is to serve as parking for the spectators on qualifying days or race day. The reasoning for this is that the maximum capacity of the museum will be reached only during the month of May. People will have come to the track to watch the action and will have left their cars near the gate they entered at and will have wandered over to the museum on foot.

Approximately 50 spaces for full-time employees
Approximately 220 spaces for visitors and additional employees

Total \( \overline{270 \text{ spaces}} \)

Service:

Several types of deliveries can be expected, the most common being to the gift shop and restaurant kitchen. Appropriate access should be provided to loading areas and garbage collection points.

Exterior access to the display storage area and preparation garage should be provided for the arrival/departure of exhibits (these two areas can share the same access point). In terms of building maintenance, exterior access should be provided to the mechanical space(s) of the facility such that, in the event any large piece of equipment need repair or replacement, this can be accomplished with minimal disruption of building function and use.

Access:

Access to the museum facility should take advantage of existing pedestrian routes and gathering points with the potential for expanding these areas. Access should also consider that larger numbers of people visit the museum at various times of the year (many/summer---fewer/winter). The appropriate seasonal and functional treatment of the entrance should be sought.

Egress:

This should be treated with the same consideration given the entrance, both in terms of functional and architectural criteria. Fire exits should avoid the gathering points for pedestrians that
could potentially hamper emergency egress by museum visitor and personnel.

Lighting:

This is of course dependant on the hours of the facility, but there may be special "after-hours" showings, meetings, etc., which should be considered. Required lighting includes the parking lot, pedestrian access and egress (especially stairs and ramps), and all entries. "Architectural illumination" of the building itself is discouraged as unnecessary cost in equipment and energy.

Handicapped:

All walkways, level changes, entries, and parking should be accessible to the handicapped (adequate alternative routes for the handicapped are acceptable as long as they are treated equally with the "standard" type for non-handicapped people).

Landscaping:

It should be pointed out that the larger crowds at the Speedway bring a tremendous amount of trash to the grounds. Therefore the exterior treatment of this project should minimize corners or depressions that invite the collection of garbage. Adequate trash receptacles should be provided.

The use and placement of any exterior planting should take into consideration the problem of damage (both accidental and deliberate) from passersby. Proximity to people and traffic may be the key here—to minimize the potential (and the temptation) for damage.

Exterior materials, hardware, lighting, handrails, etc:

Those elements most likely to come into contact with large crowds or heavy traffic should be very durable or specially designed to minimize breakage, snags, denting or other similar conditions due to use or abuse.

In the past, crowds at the Speedway have attempted to climb just about anything in an effort to get a better view of track action. It is possible that this inclination could be controlled and dealt with in a positive way such that a public amenity (such as a viewing platform) is created in which views are offered but not at the building's expense.
SITE DESCRIPTION

The Speedway property consists of 59 acres, much of which is taken by the infield bounded by the two-and-one-half mile track. The infield is a vast grassy field with little topography; the majority of the vegetation consists of the coniferous trees in the area of the nine-hole golf course that occupies the center of the infield. The garage area, track hospital, and several gift shops and concession stands are also located here. Access to the infield is through a series of pedestrian and vehicular tunnels that run beneath the track on all four sides.

The property on the outside of the track consists of a narrow band on the west and south sides, much of which is occupied by huge grandstands. The east side, which has seating only in the turns, consists of a maintenance depot and an eighteen-hole golf course. The northern edge of the track is, like the south, bounded by seating, but a large grassy field beyond the seats extends approximately three-eighths of a mile to the northern property line.

The adjacent environment on the south side of the property consists of West Sixteenth Street, much of the area along it in this vicinity is a commercial strip with some light industry. To the west is Georgetown Road and several private residences. Just beyond the northwest corner of the Speedway is a Coca-Cola plant; it is set back several hundred yards from Georgetown Road and the grassy field created by this is used for parking by the Speedway. The north side of the property is bounded by West Thirtieth Street and many private residences. The east side is similarly enclosed by more private residences and the Central State Hospital Colony.
SITE CRITERIA

In siting the museum, an appropriate relationship to pedestrian circulation, racing activity, views and focus should be sought. Looking at the track in a graphic sense, one can see a long-established hierarchy of organization based on spectator proximity to racing action.

The main (west) straightaway has the highest concentration of seating; these provide views of the start/finish line, pit action, the famous "flying start" of the thirty-three cars, and the turns leading into and out of this stretch. The designer should take note that the view down this straightaway is the most famous view in motor sport; it is a view rich in the history of the place.

The tower terrace seats afford the spectator a close view of all the pit action, the cars and their drivers. They also provide ready access to the garage area--"Gasoline Alley"--a rather "sacrosanct" space open only to drivers, mechanics, and those with special passes (and only recently opened to women of any kind). Crowds gather at its entrance since the paths of car, driver, mechanic, and spectator cross here only for about thirty feet. This brief, open meeting of the two groups often makes for a sense of anticipation as rumours of a Foyt's or an Andretti's car being wheeled out to the pits brings people eager for a close look or an autograph.

The control tower is located opposite the start/finish line and is the center for timing and scoring of the race, the contd
officials' communication base and the origination point for the worldwide broadcast of the race by radio.

It becomes obvious that this portion of the track is more developed by necessity of the racing activity and the desire of the spectators to be near that activity.

Since the museum is to be an educational, participatory experience in terms of car, driver and history at Indianapolis, it seems essential that the museum's eventual site be determined with these elements an integral part of its immediate context.
BUILDING TYPE STUDY

Ontario Science Centre, Toronto, Ontario
Raymond Moriyama, architect

Concept:
The Ontario Science Centre most closely approximates the "fragmented" concept type.
The Centre is on a heavily-wooded, steeply sloping site. The architect felt that the natural beauty of the site should be incorporated into the experience of man and the technology that the Science Centre displays,..."man is an inherent part of nature and he cannot dissociate science and technology from nature...." Therefore, Moriyama based his concept on the Japanese character for the 'heart,' a basis for classical composition in Japanese gardens. Through this idea, the Centre becomes a "cellular,"

contd
fragmented plan, with an enclosed bridge and escalator passageway that become a "walk" through the site, orientating the visitor to the relationship between science and nature, and act as a transition from the "outer" world to the "inner" world of the Centre.

Correlation Diagram:
The following graphic illustrates the major spaces of the Centre and their relationships:

- 1. Restaurant
- 2. Assembly areas
- 3. Boiler plant
- 4. Great Hall
- 5. Administrative offices
- 6. Auditorium
- 7. Lecture rooms
- 8. Exhibits
- 9. Workshops

Circulation:
The Centre's three distinct buildings are arrayed over a site with ninety feet of topography from the highest point on the plateau to the lowest point in the valley below. One enters the reception/assembly building at the high ground and proceeds across a ravine on an enclosed bridge to the Great Hall, which serves as the Administration's offices and a public orientation facility. One then takes the escalators that parallel the slope of the land to the exhibit spaces located near the valley floor below. The Great Hall acts as a major node along the route.
serving as a center for both visitor and staff.

The major circulation is very simple and straightforward, since it consists of simple yet powerful elements of "bridge" and "passageway." The layout is very rational (but the practicality of the passageway consisting of escalators that must handle large numbers of people has been questioned by several critics). This circulation scheme is, as has been explained, critical to the concept's success.

Structure:

The Centre has a primary structural language of reinforced concrete. This overall structural image provides an element of unity and order, but the application of structural systems varies according to the particular fragment of the complex being structured, from poured-in-place to precast and prestressed. (The only exceptions are the roof of the Great Hall, which is framed in steel due to the irregular space to be spanned, and the workshop area which required no fire protection, so it too is framed in steel.

Unique features:

The unique feature of the Science Centre starts at a conceptual level and proceeds into the final built form. The Centre was conceived as a participatory learning experience with the visitors being able to discover through involvement. The visitor is able to probe, question, and sharpen his own curiosity and creativity. But through research, the architects found that contd
"Medically an average man can absorb only about 20,000 square feet of detailed man-made exhibits before his mind refuses to function." Therefore all intensive exhibit areas were broken up into areas of 20,000 square feet or less, with allowance for places to "recharge the mind,...reflect back and look forward, ...confront the eye with the outside...." This bit of information and the subsequent solution to the issues it raised reinforces the cellular concept for the plan.

Image critique:
The image presented to the viewer is a deceptive one, although straightforward in its intent. What one sees upon entering the complex is hardly a participatory museum--a massive concrete wall with a deep concrete roof hovering overhead. The architect wanted to create a "mundane" entrance building so that the bridge over the ravine became an exciting transition into the world of science and technology (see concept graphic). The image is effective in this sense. However, since the Centre is public domain, the entry image must speak to more issues than its own concept: a less grandiose, more humanly scaled image seems far more inviting for a museum of public participation. While glimpses of the entire complex can be seen from the rear that show the relationship of building and site, the architect seems to have forgotten that the entry image was more that that of the "mundane" assembly spaces alone, but also expressive of the character of the entire project as a gateway to science and the site. As a wall, the gateway idea comes through strongly, but one has little idea as to where that gateway will take you.

Information from The Canadian Architect, September, 1969.
The National Air and Space Museum, Washington, DC
Hellmuth Obata and Kassabaum, architects

Concept:
The National Air and Space Museum is a combination of the
"fragmented" and "geometric" concept types.
This parti is the result of the architects' attempt to relate
to the axial and cross-axial organization of the Mall, as well as
the Hirshorn Museum and the National Gallery of Art to which it
is immediately adjacent.

Correlation diagram:

Ground plan:
Nearly all of the ground floor is taken by gallery space with
a circulation spine.

Second floor plan:
The organization of the second floor is much the same, with
the circulation viewing onto the double height galleries;
several auditorii are also included on this level.

Third floor plan:
The third floor consists mostly of a library, staff offices,
and a dining room for employees' use.

contd
Section:

Circulation:
The circulation system for the Museum is very straightforward, being a double-loaded spine on all three levels.

Structure:
Basically the building consists of a steel-frame with marble panels clamped to the structure in curtain-wall fashion.
Over the double height gallery spaces, the glazed roof is supported by bent pipe trusses. This becomes one of the more unique features of this museum. In addition to spanning seventy-five feet and creating three major spaces, the trusses become an integral part of the method of display by allowing aircraft to be suspended from them and making for a more dramatic, dynamic exhibit.

Image critique:

Image is undoubtedly the most critical issue in this particular museum for two reasons. First of all, its site is located on the Mall in Washington directly adjacent to the National Gallery; and secondly, it is the national museum of flight. Therefore an appropriate response to context and content becomes a major conceptual issue; according to one article, in both program and physical context, the museum is "pregnant with iconic implications."

At the context scale, the building must deal with its monumental surroundings, and, more specifically, with the National Gallery of John Russell Pope. But despite the monumentality achieved by its great size and simple shapes, it is "too dumb, too repetitiously rhythmic" to become an actual monument. In addition, the public scale of the National Gallery, achieved with the publicly familiar elements of classical style, is lost on the architects of the Air and Space Museum. Its vast surfaces of marble and glass are slick, inarticulate and hardly fitting for a building of such public orientation and interest. The large areas of glazing that open onto the Mall do little to open the overall opaque image; the glass is too dark and reflective to act as an invitation to the public, or as merely an environmental barrier through which, symbolically, the suspended aircraft might fly.

On the level of content, the museum houses the United States' greatest achievements and most historic examples of flight technology. With as dramatic and significant a content as this, "one expects the architecture to be as daring, innovative, and historically important as the works displayed within." But the static massing and tremendous weight of the shapes convey a sense of containment and gravity inappropriate to the expression of flight and the sense of adventure so often associated with it. What could have been an enclosure for the plane but not its spirit has become an elegant garage for both.

Quotations and inspiration condensed from:

*Progressive Architecture*, July 1976

"Modernism and the Monolith" -- Suzanne Stephens