

Track Propulsion Specifications

SPECIAL REQUIREMENTS

GENERAL: The provisions of the section on General Conditions are supplemented and modified by the Special Requirements, and, like the General Conditions, are a part of the several trade sections of the specifications with the same force and effect as though fully repeated in each section. The provisions of this Section supersede conflicting or contradictory provisions occurring in General Conditions.

BACKGROUND DATA: The principal exhibit will be viewed by visitors riding in new model Ford cars on two indoor tracks which wind through the animated displays. The one track is approximately 2,300 feet long and the other track is 2,330 feet long. Seventy-eight cars will be on each track and will move continuously without drivers along the route which winds up and downhill and through tunnels with the cars accelerating or slowing down as required for safety and interest. At the start of the ride visitors enter the moving cars from moving sidewalks, and similarly at the end of the ride alight from the car onto moving sidewalks.

To evolve and test the design ideas upon which this track is based, two tracks were built and operated.

TRACK CONCEPT: Although the outward appearance of each car is completely normal the cars have been stripped of engine, transmission, and radiator and are modified to have a hinged steering pin projected below the front chassis. When this pin is dropped and locked into a prepared channel built along the route of the track, the car is accurately steered so long as it moves in a forward direction.

A plywood platen 12 feet long and 3 feet wide is mounted underneath the chassis of each car at a precise height above the track. This platen serves as a bearing surface for drive wheels mounted in the track to press against. At any moment, three or four drive wheels are in contact with the platen under each car.

Set into a trench in the track are a large number of propulsion units consisting of an electric motor with toothed belt drive and sheaves, a reduction gear box, and a 16" diameter resilient rubber or plastic drive wheel with only the tire of this wheel projecting several inches

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above the track. This endless-series of spinning wheels is the means of moving cars along the track. On the steeper up and down grades two motors are mounted on each drive unit.

Where passengers are loaded into the cars, they first step onto a moving endless-belt speedway which is traveling at the same rate of 2.2 feet per second as are the cars on the track. The cars on this section of the track are quite close together with approximately 12" from bumper to bumper. Attendants will open the doors and passengers will step in and be seated in the same manner as though both the walk and the cars were stationary.

Cars will leave the loading area on exactly 9 second intervals at 2.2 f.p.s. and are then accelerated to a higher speed of 6.0 feet per second. A synchronous motor driven signal generator associated with the control system releases a pulse signal every 9 seconds and the position of each car is thus compared with this signal generator to determine whether or not a car is in its assigned position. For example, near the end of this first portion of the track a switch is operated by each car and the actual location of the car determined. An electrical comparator notes the actual position as compared to the assigned position and determines what respacing is necessary to locate the car at precisely its assigned position. By means of special respacing drive units following the directions of this comparator each car is slowed down or accelerated briefly until in its correct position. Because some cars are heavy, some cars are light, and because deviations in turning occur from one car to another, respacing is essential to keep one car from bumping into the next. As each car travels around its track it will encounter eight repositioning zones.

At designated positions in the track the cars are decelerated to 4 feet per second. Still later, cars are decelerated to 3 feet per second at which speed most of the track is traversed. Finally the cars are decelerated to 2.2 feet per second as they approach the unloading zone, where passengers alight onto another speed walk and make their exit from this portion of the Ford Exhibit. Each car is repositioned, cleaned in a servicing area, and then sent on into the loading zone where the cycle is repeated. Each track is expected to send its cars through the circuit not less than 70 times per day.

The prime consideration of this track is that safety to visitors and to operating personnel be absolute. Second, that trouble free and dependable performance be assured. And third, that quiet, smooth, precise, distraction free behavior of all track equipment is certain. In addition to normal morning start up and at night shutdown of the track

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special consideration has been given to provision for panic stops at time of trouble or accident. Attendants at designated locations through the exhibit can be communicated with through a private telephone system to give local supervision.

MECHANICAL REQUIREMENTS

(a) Rolling Resistance: 15 lbs. per 1000 lbs.

(b) Car weight:

Min. Car, Unloaded: 1600 lbs.

Min. Car, Loaded: 2500 lbs.

Max. Car, Unloaded: 3600 lbs.

Max. Car, Loaded: 4500 lbs.

(c) Percentage of Weight on Platen:

60% of Car Wt. on Platen on 10% Grade.

17% of Car Wt. on Platen on Level

(d) Grades: Variable to 10% Up and Down

(e) Length of Platen: 12 ft.

SCOPE OF WORK covered by this contract shall include furnishing all approved material, equipment, transportation, services and labor necessary to complete the Interior Exhibit general contract work in accordance with the full meaning and intent of the contract documents prepared by WED Enterprises, Inc. In general, this work shall include, but not be limited to:

(a) Two-track support systems, including structural steel and miscellaneous metals, columns, beams, girders, wood framing and decking for the support of two complete ride tracks.

(b) Structural steel and miscellaneous metal, columns, beams, girders, wood framing and carpentry work necessary for the complete exhibit set systems.

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- (c) Concrete fill for stairs and railings.
- (d) Two complete electrical propulsion systems, including starting equipment, control equipment, wiring, drive motor assemblies and other special equipment for the complete ride, including that portion in the transition and exhibit areas.
- (e) Drive motors and control equipment for two loading sections and two unloading sections.

JOB SITE CONDITIONS: This Contractor will note that the major portion of the work covered by these specifications and the drawings is to be installed in a building now under construction as hereinafter noted under the Article titled, "Separate Contracts."

GENERAL CONDITIONS: -Page 13 - Article 29: Delete in its entirety and substitute the following in lieu thereof:

"29. INSURANCE: The Contractor shall procure, maintain and require its subcontracts to procure and maintain with companies acceptable to the New York World's Fair 1964-65 Corporation, and before starting work shall provide Owner and New York World's Fair 1964-65 Corporation with certificates evidencing insurance in amounts and with coverages as set forth below:

- (a) Liability Insurance: Coverage shall include operations (including standard form, libel, slander, false arrest and other usual personal injury insurance); elevators and escalators; Owner's and Contractor's protective; and contractual; to the termination date and acceptance of all work to be performed under this contract in at least the following amounts:

- (1) Bodily Injury Liability
\$ 250,000 each person
1,000,000 each occurrence
- (2) Property Damage Liability
\$100,000 each person
200,000 each occurrence
200,000 each contractual

- (b) Automobile Liability Insurance: Including all owned, non-owned or hired vehicles, with limits of not less than:

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- (1) Bodily Injury Liability
\$100,000 each person
300,000 each accident
 - (2) Property Damage Liability
\$ 50,000 each accident
- (c) Workmen's Compensation Insurance: All Contractors and Subcontractors must comply with Chapter 41 of the New York State Laws of 1914, as amended, known as the New York Workmen's Compensation Law, including Article 'a' thereof, commonly referred to as "Disability Insurance Law." If Contractor or any of his Subcontractors is qualified as a self-insurer by the Industrial Commission of the State of New York, he must file with the Fair Corporation and Owner a certificate from the Department of Labor certifying that such privilege has been granted in lieu of a certificate of insurance issued by an insurance carrier.
- (d) The Furnishing of the Foregoing Certificates of Insurance or evidence of self-insurance, however, shall not operate to relieve the Contractor from any liability or obligation for which he would otherwise be responsible under this Contract."

WATCHMEN: This Contractor shall employ a sufficient number of men to guard and protect his work at all times outside of regular working hours until the complete work is turned over to the Owner.

CONSTRUCTION ROADS: Temporary construction roads for access to the site are provided under another contract, and will be available for reasonable and necessary use by scheduled arrangement with that Contractor.

TEMPORARY STRUCTURES: Furnish and maintain all temporary structures for all operations of these contracts, including storage facilities for equipment, tools and materials.

- (a) Toilet Facilities: The Contractor shall erect, install and maintain temporary toilet facilities for the duration of the operations as required for himself and his Sub-Contractors.

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