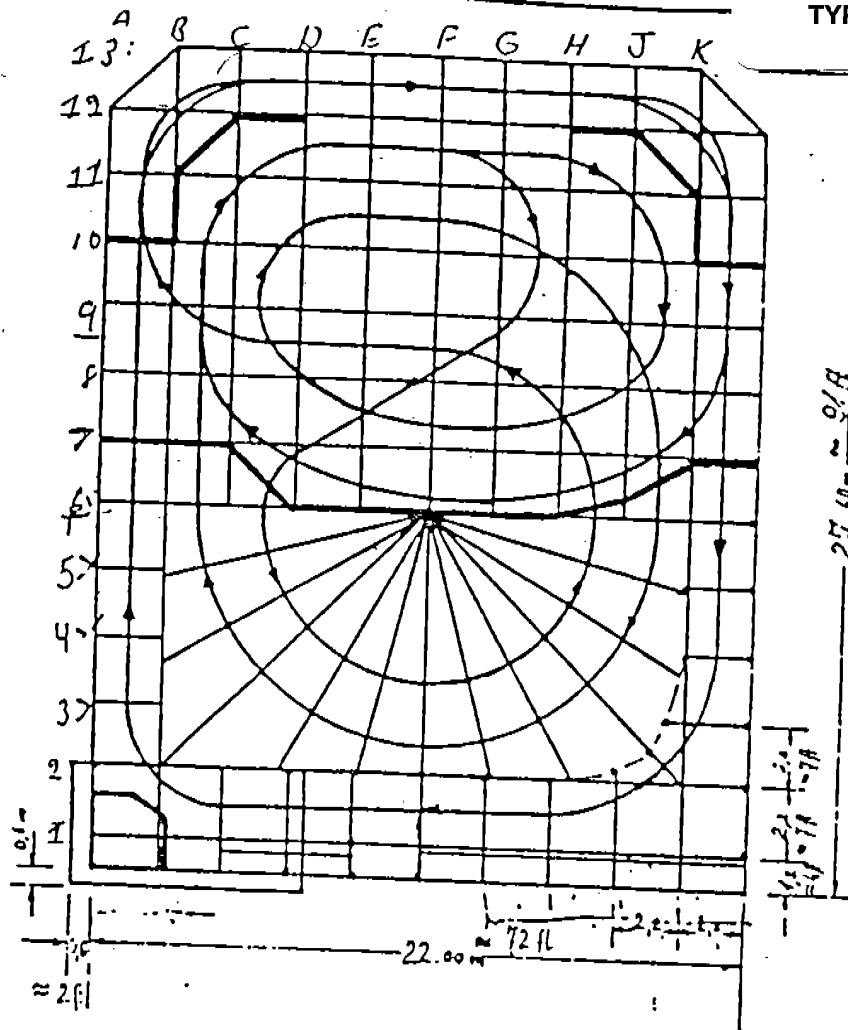


"THE FLITZER"

MFG: ZIERER
NAME: FLITZER
TYPE: NON-KIDDIE



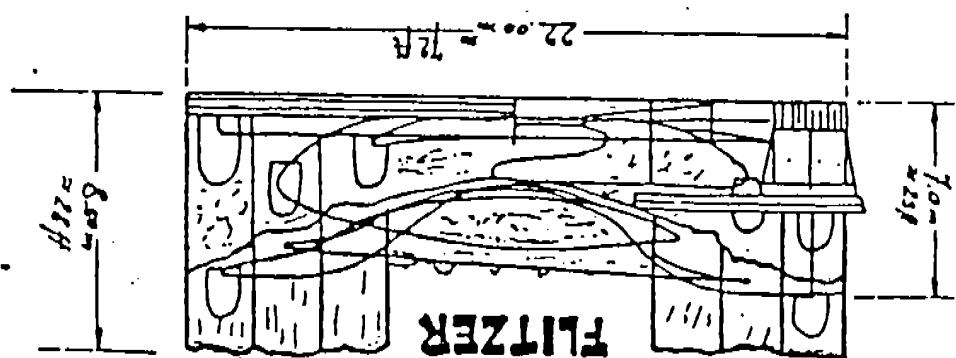
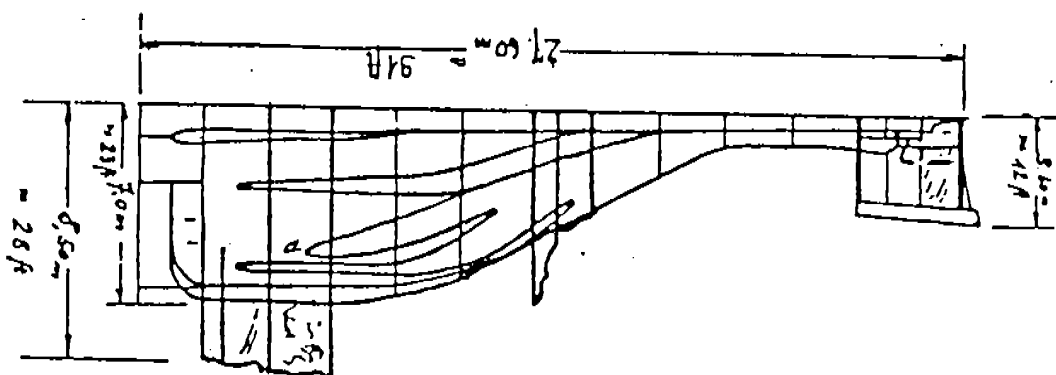
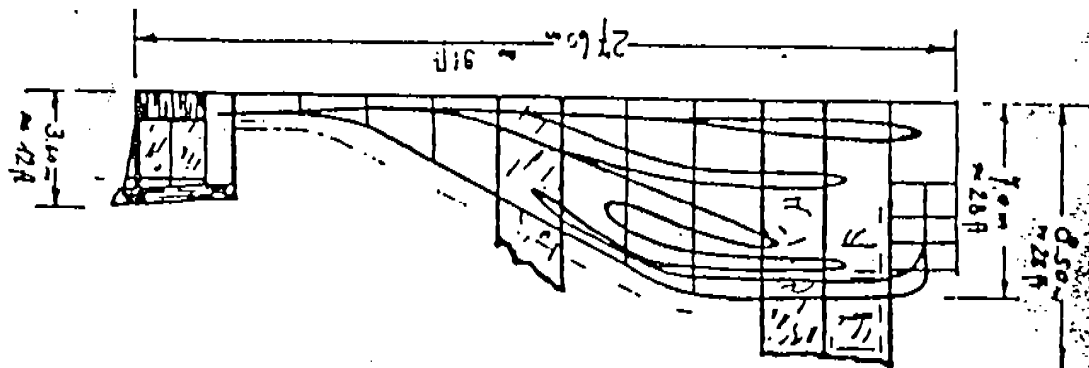
The Flitzer is a new ride to the American market. European formula style racing cars are conveyed to the peak of a 23 foot high inclined ramp. From this point, the cars are gravity propelled through approximately 1030 feet of curving track simulating a Grand Prix race. Capacity is approximately 900 riders per hour on a 60 second cycle.

SEATING: 9 vehicles, 2 adults per vehicle. CYCLE TIME: 60 seconds. HOURLY CAPACITY: 900.
DRIVE: Single electric motor operating a special elevator chain. POWER REQUIREMENTS: 50 kw total.
DRIVE MOTOR: 18 h. p. 220 volt, 3 phase, 4 wire, 60 hertz. LIGHTING: Nine 1000 watt projector lamps plus fluorescent and incandescent lamps. WEIGHT: Approximately 80,000 pounds. OPERATING HEIGHT: 28 feet. GROUND SPACE REQUIREMENTS: 72' wide x 91' deep. CONSTRUCTION: Structural units are all tubular steel. Entrance and exit platforms are aluminum plate, fiberglass body vehicles.

Telex 069863

ZIERER

Tel. (0991)
7051



FLITZER

I. GENERAL CONDITIONS

1. The rules and regulations laid down in this description for the operation of this installation are to be responsibly carried out and adhered to.
2. No claims whatsoever may be made on the manufacturer for damage and its consequences which occur owing to non-observance of the conditions or alternation of the installation (especially bridging of the connections and the like).
3. For all jobs on the installation a "responsible person" is to be designated, who will conscientiously carry out the required instructions and directives, or see to it that same is done.
4. Generally customary technical maintenance is not dealt with in detail, but is to be performed for the maintenance and security of the entire installation.
5. Before starting up, the installation is to be checked in accordance with the check list.
6. Defects that make their appearance during operations are to be remedied immediately and without delay. Operations are to be closed down during all repair work.
7. The required barriers are all to be set up.
8. During operation the service personnel as well must not enter the installation behind the barriers, with the exception of the specially installed service points.
9. The security keys for the key switches are to be in the safe-keeping of a responsible person.
10. When the main connection is made, care must be taken that the prescribed safety measure has been taken.
11. All instructions from the service personnel are to be complied with.
12. Intoxicated persons are to be excluded.

II. DESCRIPTION OF THE INSTALLATION

1. The installation is a scenic railway and bears the designation: "STEEL ROLLER COASTER - 65m"
2. The dimensions of the installation are as follows:

Length = 72 feet
Depth = 91 feet
Max. height = 28 feet
Rail length = 1030 feet

3. Component parts of the system:

3.1 Bottom

The bottom consists of rectangular or square tubing bolted together.

3.2 Track supports

The track supports are made up of rectangular or square tubes. They rest in casings on the bottom and are bolted to the latter. The track supports are numbered from No. 1 to No 128. Several supports are connected together for the sake of greater rigidity.

3.3 Bracing

In the two circular track sections the supports are braced against the center (anchor crown), each four times. The profiles are square tubes. Moreover, the supports are secured against buckling by bracing members (round tubing). For this purpose pins are welded on the uprights of the supports. A steel wedge tightens bracing against uprights.

3.4 Rail

The rail consists of: Tube profile Ø 51 x 5.0 and sectional steel UNP 80. The track segments are also in part reinforced with steel plate 70 x 8 or 75 x 10. The trellis consists of tubing Ø 38 with wall thickness ranging from 2.9 to 6.0. The numbering of rail segments agrees with the numbering of the supports but furnished with index 1, 2 etc. Here are some examples:

30/I means: Rail belongs to support 30,
 top (=1) track.

30/3 means: Rail belongs to support 30,
third (=3) track from top.

The rail bolting is effected on the solid block and the angle with the upright plate on the support transom. The tightening torque for the bolts M16/8.8 on the solid block amounts to:

$$M_{AN} = 22 \text{ kpm}$$

Lift with drive

The engine-house is situated between supports 3 and 4. The electrical switchboard is between supports 3 and 4. The drive consists of:

Three-phase electric motor type ZK 200 L4 ($N=30 \text{ Kw}$, $n_{ab} = 1770 \text{ rpm}$ at 60 Hz)

Turbo-coupling (366 Tri c) with V-belt pulley $d_w 200$,
5 x SPA Gears ($R 130 i = 19.70$ with V-belt pulley $d_w 224$,
5 x SPA

Power is transmitted from the motor to the gears by 5 V-belts (SPA, $L_w = 2240$). On the gear shaft there is a sprocket wheel ($z = 12$, $d_o = 490$), by which a chain (14×64) is driven. The chain speed amounts to $v = 2.058 \text{ m/sec}$. The cars are hauled up the lift stretch at this speed. For this purpose there are attached to the carcogs which hook into the chain, and when the top point of the track is reached they drop free independently. The chain consists of several parts and is connected up by means of chain-locks to form a continuous piece.

Safety brake

The track is subdivided by the safety brakes into several segments. In each section, that is to say, after a safety brake, there can be only one car. This is accounted for by the starting lapse of 17 sec., i.e. a car can be started within a period of 17 sec.

The time it takes to run over a section, however, is less than the starting lapse. The safety brakes are released by:

- a) an Emergency - Stop
- b) switching off via activation of the recoil engaging-levers (cf. 3.7)

For releasing the brakes, beginning with No. 4, No. 3 etc. the car must be moved out of the engaging-lever. The engaging-lever is drawn back into this initial position by a tension spring and thus operations can be recommenced.

Attention: The personnel engaged in releasing cars from engaging-levers or brakes must stand only behind the car to be released.

3.8 Station brake.

In the approach to the station, in the zone of sections 113-116, there is a two-part manual brake. This brake is always closed. The function of the brake is as follows: The car when entering the closed brake, has a speed of approx. 10.0 m/sec. This speed is reduced by the brake to approx. 2.0 m/sec.

3.9 Starting and transport motors:

For the prompt transport of the cars from the starting-point (boarding point) to the lift chain as well as from station brake (exit point) back to the boarding point, several friction wheel drive units are necessary. The individual drive units are in the following sections:

Starting-motor = Section 2
Transport motor 1 = Section 121
Transport motor 2 = Section 127

3.10 Turntable and siding:

Between station supports 112 and 113 there is a stretch of track that can be swung about: the turntable. The turntable is needed for getting a car as quickly as possible from the siding onto the track (more capacity) or moving a defective car from the track onto the siding. For this purpose, the car is held on the turntable, the turntable unlocked and swung by approx. 90 degrees. Then the car is pushed onto the siding, and the turntable is swung back into its initial position and once again locked in place. Cars can be put on or taken off the line only when the installation is at a standstill. The siding accommodates 4 cars.

3.12 Car

The installation is equipped with 8 cars. Each car can take three persons. The essential components of the car are as follows: Two axles with two trunnion bearings each, car frame with seat. Fiberglass cabin with handrail. The front axle is flexibly mounted, the rear axle is longitudinally movable. There are on the bearing plate two trolleys and one steel roller. The understructure of the vehicle, of steel, is connected with the axles. The cog, the stopper and the breakgear are attached to the understructure.

III. CHECK LIST

1. General:

- 1.1 The following procedures and checks are to be carried out at the prescribed intervals with the utmost attentiveness and care.
- 1.2 The jobs are to be supervised by a "resonsible person" designated by the management.
- 1.3 All work and inspections are to be entered in a check-boook.
- 1.4 Defective parts are to be exchanged at once, any faults that appear are to be remedied without delay.
- 1.5 IMPORTANT: After initial settlement of the material the pretension on all bolts will need to be checked. Duration in between checks: 1 week

Further random checks are to be made in accordance with control - and maintenance-lists.

There are situated in the installation five safety brakes, the last one being a double brake. The position of the individual brakes is as follows:

No. 1 in Section 23 - 24 (Code 13.289 - 13.219)
No. 2 in Section 39 - 40 (Code 11.712 - 11.565)
No. 3 in Section 59 - 60 (Code 10.205 - 10.101)
No. 4 in Section 85 - 86 (Code 8.883 - 8.868)

The safety brakes in the installation are at all times open during operation. The compressed air cylinders, in each of which there is a tension spring, under a pressure of approx. 9 at, hold the brake open. If switching off takes place, i.e. if braking is initiated, the air escapes via instant valves and the tension springs become fully operative and close the brake. A brake-gear attached to the bottom of the car now engages in the closed brake (friction) and brings the car to a standstill.

3.7 Recoil engaging-lever:

Recoil engaging-levers are attached at several rises in the installation. These engaging-levers are a safety element, which prevent the cars from rolling backwards. Should a car, for reason whatsoever, after a descent, not be able to get over a rise and then begin to roll backwards, this will be prevented by recoil engaging-levers. For this purpose, "stoppers," as they are called, are attached to the car, which engage in the toothed engaging element and thus prevent any backward motion.

This operation at the same time switches off the track. This happens in the following way: The engaging-lever, resting on slide-plates, is shoved, owing to the weight of the car, against a stop, in reverse direction (downhill). This process releases a contact and effects the switching off of the installation, i.e. all safety brakes close, and the chain comes to a standstill. Another car cannot possibly move up, and thus there is no risk of a collision. Recoil engaging-levers are attached at 4 segments, they are located as follows:

No. 1 in Section 17 - 18 (ascent)
No. 2 in Section 31 - 32 (Code 8.900 - 12.182)
No. 3 in Section 52 - 53 (Code 8.749 - 10.593)
No. 4 in Section (Code 7.112 - 8.883)

3.12 Car

The installation is equipped with 8 cars. Each car can take three persons. The essential components of the car are as follows: Two axles with two trunnion bearings each, car frame with seat. Fiberglass cabin with handrail. The front axle is flexibly mounted, the rear axle is longitudinally movable. There are on the bearing plate two trolleys and one steel roller. The understructure of the vehicle, of steel, is connected with the axles. The cog, the stopper and the breakgear are attached to the understructure.

III. CHECK LIST

1. General:
 - 1.1 The following procedures and checks are to be carried out at the prescribed intervals with the utmost attentiveness and care.
 - 1.2 The jobs are to be supervised by a "resonsible person" designated by the management.
 - 1.3 All work and inspections are to be entered in a check-boook.
 - 1.4 Defective parts are to be exchanged at once, any faults that appear are to be remedied without delay.
 - 1.5 IMPORTANT: After initial settlement of the material the pretension on all bolts will need to be checked. Duration in between checks: 1 week
Further random checks are to be made in accordance with control - and maintenance-lists.

| 2. <u>Bottom:</u> | Daily | Weekly | Monthly | Annually |
|--|-------|--------|---------|----------|
| 2.1 Individual connections of the bottoms part are to be checked at random. If such random checks show deficiencies (loose bolts) <u>all connections will have to be re-tightened at once.</u> | | X | | |
| 2.2 All bolts on the bottom are to be checked at the beginning of the season. Tighten if necessary. | | | | X |
| 2.3 The underpinning is to be thoroughly checked. | X | | | |
| 3. <u>Track supports</u> | | | | |
| 3.1 The connection bottom/support is to be inspected. | | X | | |
| 3.2 The interconnections among the supports are to be checked. | | | X | |
| 3.3 All bolts on the connections are to be checked at the beginning of the season. | | | | X |
| 4. <u>Bracing:</u> | | | | |
| 4.1 The connection bracing/track supports are to be checked. | | X | | |
| 4.2 All connections of the bracing are to be checked at the beginning of the season. | | | | X |
| 4.3 All plugs resp. cotter pins are to be provided with safety pins. This is valid also for the bottom part and track supports. | | | | |

5. Rail

Daily Weekly

- 5.1 The joint connection at the rail (bolt) is to be checked at 10 places at least, particularly in the valleys.
M_{AN} = 22 kpm. Check daily in different place. X
- 5.2 The connection rail/track support (upright section of T-profile) is to be inspected in ten places. X
- 5.3 If inspection of bolted connections reveals any deficiencies all connections will have to be checked at once.
- 5.4 All bolt connections are to be checked at the beginning of the season.
- 5.5 The joints of the rail treads are to be checked to see if they are smooth. If faults appear, the joint is to be dismantled. Seek cause, such as soil subsidence or defect in the underpinning re-level.

| 6. | <u>Lift with drive</u> | Daily | Weekly | Monthly | Annually |
|-----|--|-------|--------|---------|----------|
| 6.1 | Check all boltings on motor, gears and compressor to see if they are tight. | | | X | |
| 6.2 | Inspection of compressor in accordance with "Operating Instructions" for ARA Compressors." | | | | |
| 6.3 | Check tension of V belts, tighten if necessary. | | X | | |
| 6.4 | Check chain tension, tighten if necessary. If retightenings is no longer possible, links must be removed. | | X | | |
| 6.5 | Check chain locks. | | | X | |
| 6.6 | Check functioning of lift brake. | | | X | |
| 6.7 | Check chain and sprocket wheels for wear and tear. | | | | X |
| 7. | <u>Safety brake:</u> | | | | |
| 7.1 | Carry out brake tests. Check all brakes before starting up operations with fully loaded trains (personnel) and make sure they engage. Possibly reset brakes & repeat brake test. | X | | | |
| 7.2 | Check brake lining and parts subject to wear & tear. | | | X | |
| 7.3 | Inspect air connections on the cylinders | | | X | |
| 7.4 | Check all boltings and connections for tightness. | | X | | |

| 8. <u>Recoil engaging-levers:</u> | Daily | Weekly | Monthly | Annually |
|--|-------|--------|---------|----------|
| 8.1 Function check before operation. | X | | | |
| 8.2 Check all connection elements. | | X | | |
| 9. <u>Station brake:</u> | | | | |
| 9.1 Drive up brake before beginning operations and make function check. (cf. 7.1) | X | | | |
| 9.2 Check parts subject to wear and tear.. | | | X | |
| 9.3 Check bolt connections, if need be, tighten. | | X | | |
| 9.4 Check tire pressure (1.50 at/6.40 x 13) and wear. | | | X | |
| 10. <u>Starting & Transport Motors</u> | | | | |
| 10.1 Check bolt connections | | X | | |
| 10.2 Tire pressure (1.7 - 1.90 at/6.40 x 13) and wear and tear on tires to be checked. | | | X | |
| 10.3 Check tire compression: 10-15 mm. | | | X | |
| 11. <u>Turntable and siding:</u> | | | | |
| 11.1 Check bolting | | | X | |
| 11.2 Check for proper functioning | | | X | |

| 12. | <u>Car:</u> | Daily | Weekly | Monthly | Annually |
|------|--|-------|--------|---------|----------|
| 12.1 | The bolt connections on the cars are to be checked and tightened thoroughly after the first 50 hours of operation. The other checks are to be carried out regularly as prescribed. | | | X | |
| 12.2 | Check stopper for looseness and wear and tear. | | X | | |
| 12.3 | Inspect cog for wear and tear. | | | X | |
| 12.4 | Inspect brake gear for wear and tear. | | | | X |
| 12.5 | Inspect safety guard for wear and tear. | | | | X |
| 12.6 | Check rollers for roundness and wear and tear. When wear reaches 5 mm as measured on roller diameter, they are to be replaced. | | | X | |
| 12.7 | Check run times of the individual cars. In case of a deviation of 3 sec. from the normal run time, the car in question is to be inspected and the fault remedied (lack of roller uniformity, faulty track interval, grease in the bearings). | | | X | |
| 13. | <u>Compressed air plant:</u> | | | | |
| 13.1 | Compressor check | | | | |
| 13.2 | Empty water of condensation out of supply tanks and air hoses. | | X | | |

| 14. <u>Electrical equipment</u> (with functions and executions) | Daily | Weekly | Monthly | Annually |
|---|-------|--------|---------|----------|
| 14.1 Activate emergency key (safety brakes close, lift stands still, motors stop). | X | | | |
| 14.2 Check recoil engaging-levers for proper functioning (push lever backwards, downhill, as far as stop, close safety brake, installation is switched off). | | X | | |
| 14.3 Check proper function of starting motor and starting sequence. | | X | | |
| 14.4 Check operation of the turn- table. | | | X | |
| 14.5 Tighten all terminals on the switchboard. | | | | X |
| 14.6 Check all switch contacts of the main contactors on the switchboard for metal waste. | | | | X |
| 14.7 Check all terminal switches for tightness and proper position. | | | | X |
| 14.8 Check chain-break switch (when the switch is depressed the lift must switch off). | | | X | |

IV. PUTTING IN OPERATION

1. The installation is to be operated only by duly qualified personnel.
2. The starting point (boarding), exit, and the station brake are to be manned. The control desk should be installed at the boarding point.
3. Daily operations are to be initiated as follows:
 - 3.1 Throw switch in machinery room.
 - 3.2 Release control voltage (with key switch at the control desk). Pilot lamp lights up, compressor starts.
 - 3.3 Release safety brakes in this sequence: 4, 3, 2, 1. The individual brakes can be released after delay of 20 sec.
 - 3.4 Turn on the lift motor with the key "lift on".
 - 3.5 Start up transport motors.
 - 3.6 Allow passengers to board.
 - 3.7 Start the car by activating the foot key.
 - 3.8 After the start of the first car, the next (following) car can be started after a distance of 17 sec. (safety distance) was attained. During this period the following car is loaded.
 - 3.9 The started car is taken to the lift chain by transport motors, after the cog engages in the chain, the car is pulled up the slope, disengages at the top end of the chain and begins the descent.
 - 3.10 When the exit is reached, unload car quickly and move it on to the boarding point.

4. Explanation of different procedures:

4.1 Starting sequence

After the car is started, it crosses a limit switch set up immediately behind the starting motor and blocks the starting motor.

4.2 Station brake

After going through the installation, the carriage reaches the station brake. The station brake remains closed until a speed of approx. 2m/sec has been reached. After that the brake opens manually. Each time the brakes are applied, take care that normal opening and closing of the brakes takes place.

5. The control desk is to be set up at the boarding station.

6. Causes for switch-offs

6.1 Power failure

6.2 Emergency-stop released by service personnel in emergency.

6.3 Release by recoil engaging-levers (car remains engaged in lever).

7. Resumption of operations:

7.1 Clear station - and arresting brakes.

7.2 Release car from safety brake or recoil engaging-lever.

Attention: The service personnel must approach a blocked car from behind only.

7.3 Every time a car is released from the safety brake, the station must be cleared.

7.4 Release of cars from the safety brake (in case of power failure) is to be affected by reattaching the compressed air hoses to direct air connection.

7.5 Release cars always in reverse sequence, i.e. starting with safety brake 4, then brake 3, etc.

- 7.6 Each time a car is released, the station brake must be closed again.
- 7.7 After clearance of all safety brakes the compressed air hoses are to be changed around and the stop valve must be turned to its operating position.
- 8. For emergencies or for maneuvering a key switch and a press key for releasing the station brake is installed in the control board.

V. LUBRICATION

1. General

- 1.1 Lubrication conditions are to be complied with precisely, using high-quality branded lubricants.
- 1.2 The sequence in which the lubricants are listed constitutes no indication of their quality. Other lubricants of equal grade from reputable manufacturers can also be used. A blending of different products should be avoided.
- 1.3 Relubrication is necessary after the installation has been closed down for a considerable period.
- 1.4 When bearings, gears, etc., are cleaned, no foreign particles or traces of rinsing agent must remain.
- 1.5 Ball or roller bearings should be cleaned only with cleansing agent.

2. Lubricants

Table 2A (Grease)

| <u>Product</u> | <u>Type</u> |
|----------------|-----------------|
| Aral | HL 2 |
| BP | Energrease LS 2 |
| Castrol | Spheerol AP 2 |
| Esso | Beacon 2 |
| Shell | Retinac C |
| Texaco | Multifak EPO |
| Molykote | Longerm 2 |

Table 2B (Roller bearing grease)

| <u>Product</u> | <u>Type</u> |
|----------------|-----------------|
| Aveanol | BL 110 |
| Castrol | Spheerol AT 2 |
| Esso | Beacon 2 |
| Gasolin | Peganol LW 2 |
| Shell | Alvania 2 |
| Molykote | BR 2 |
| Texaco | Glissando FI 23 |

Table 2C (Lubricating oil)

| <u>Product</u> | <u>Type</u> | <u>Environmental/temperature</u> | |
|----------------|-------------|----------------------------------|-------------------|
| | | <u>10 - 40° C</u> | <u>50 - 90° C</u> |
| Aral | Aral oil | E 100 | HTU x |
| BP | Energol | HL 65 x | CS 125 |
| Castrol | Hyspin | 55 | 100 x |
| Esso | Esstic | 42 | 50 |
| Shell | Tegula | 27 x | 31 |
| Texaco | Rondo oil | B | -- |

X = for TURBO coupling

Table 2D (Gear grease)

| <u>Product</u> | <u>Type</u> |
|----------------|-----------------|
| Aral | Fett FDD |
| BP | Fliessfett No |
| Esso | Fibrax EP 370 |
| Shell | Simnia Grease 0 |
| Texaco | Marfak 00 |
| Molykote | Longterm 00 |

Table 2E

| <u>Product</u> | <u>Type</u> |
|----------------|--------------|
| Molykote | 1221 / 1231 |
| Molykote | MKL / MKL 32 |

Alternative:

Chain Spray

| <u>Product</u> | <u>Type</u> |
|----------------|--------------|
| Optimol | Viskogen EPL |
| Optimol | KL 300 |

3. Rail

The rail can be lightly greased near the trolleys. Lubrication makes for greater speed. It may be used only when the cars have difficulties getting over rises.

4. Chain Drive

- 4.1 The motor should be dismantled every 10,000 operating hours. The bearings are to be checked and, if need be, replaced by new ones. Grease load for the bearings ought to amount to approx. 35% of the volume.

Lubricant: cf. Table 2 B
Interval: 10,000 operating hours

- 4.2 The turbo-coupling entails no lubrication problems. The oil quantity ought to be checked regularly and the oil changed after 10,000 operating hours. The load for the built-in coupling "366 Tri" amounts to 5.4 liters.

Lubricant: cf. Table 2 C
Interval: 10,000 operating hours

- 4.3 The oil in the gears ought to be changed the first time after approximately 200 operating hours. The load amounts to 6.8 liters. Additional oil changes are to be made regularly. The oil level must be checked frequently.

Lubricant: Shell - Vitrea 75 (SAE 90)
Oil change: 5,000 operating hours (or annually)

5. Chain and sprocket wheels

- 5.1 Before putting the equipment into operation sprocket wheels and chain (when relaxed) are to be lubricated.

Lubricant: cf. Table 2 E

It is important that the same kind of lubricant is adhered to (either chain grease or chain spray). The kind of lubricant may only be changed after thorough cleansing of the chain.

- 5.2 The sprocket wheels and the chain are to be lubricated weekly. The chain is to undergo thorough cleaning once a year.

Lubricant: cf. Table 2 E
Interval: 50 - 60 operating hours

- 5.3 The built-in bearing housings are sealed and require no relubrication. A thorough annual cleaning is sufficient. For this purpose the roller bearings must be dismantled, clean bearing and housing and put in grease load (approx. 35% of bearing volume).

Defective parts such as washers and the like are to be replaced.

Lubricant: cf. Table 2 B
Interval: 5,000 operating hours (or annually)

6. Safety brake

All joints and guide-surfaces in the safety brake are to be lubricated regularly. (Brake lever bearings, bearings or rods)

Lubricant: cf. Table 2 A
Interval: weekly

7. Recoil engaging-lever

All movable parts as well as guide-surfaces are to be lubricated at regular intervals.

Lubricant: cf. Table 2 A
Interval: weekly

8. Station brake

- 8.1 For lubrication of the station brake-proceed as under 6.

- 8.2 The joint shafts are to be pressed, at regular intervals, on their lubrication nipples, until new grease appears on the toothing. The remnants of oil grease are to be removed.

Lubricant: cf. Table 2 A
Interval: weekly.

- 8.3 Lubricant exchange on the angular gears ought to be carried out the first time after one year (=approx. 200 operating hours on gears). The load for Type L25 amounts to 1.8 liters. The oil level is to be checked regularly. Further oil changes are made at regular intervals.

Lubricant: cf. Table 2 D
Interval: 15,000 operating hours (on the track)

9. Turntable

One single lubrication per season on the guide-flange of the turntable is sufficient. Press in grease at all lubricating nipples until grease begins to appear all around the flange. Remnants of old grease are to be removed.

Lubricant: cf. Table 2 B
Interval: annually

10. Starting and transport motors

After running-in time (=200 operating hours) the first lubricating oil exchange ought to be made. The oil level should be checked at least once a month. When the oil is changed, all old lubricants must be rinsed out, remnants of rinsing agents must be removed.

Identification of the individual stoppers:

Oil level screw = red
Ventilation screw = blue
Oil drainage screw = black

Prior to putting equipment in operation, the gasket on the ventilation screw is to be removed.

Lubricant: cf. Table 2 D
Interval: 10,000 operating hours

The loads for the individual types are as follows:

Type R 70 D 100 = 1.3 liters

Type R 80 D 100 = 2.8 liters

11. Compressed air plant

The compressor in the compressed air plant is to be lubricated and serviced in accordance with the "Operating Instructions for ARA Compressors."

12. Car

- 12.1 The trolley bearings need lubrication once a year at the most. However, relubrication can also wait until trolleys are exchanged. The bearings are to be cleaned, and their condition is to be checked. Re-lubricate (to approx. 35% of volume) and assembly correctly.

Lubricant: cf. Table 2 B

Interval: annually (when trolleys are exchanged)

- 12.2 The bearings of the wheel plates are to be lubricated regularly. Remnants of old grease are to be removed.

Lubricant: cf. Table 2 A

Interval: monthly

- 12.3 The safety rollers on the bearing plates are to be lubricated at regular intervals, old grease remnants are to be removed.

Lubricant: cf. Table 2 A

Interval: monthly

- 12.4 The jointed bearings on the front and rear axles are to be lubricated regularly, old grease remnants are to be removed.

Lubricant: cf. Table 2 B

Interval: monthly

- 12.5 The guide-plates on the rear axle are to be lubricated regularly.

Lubricant: cf. Table 2 A

Interval: weekly

- 12.6 The bearings of the stopper are to be lubricated regularly.

Lubricant: cf. Table 2 C
Interval: monthly

- 12.7 The bearings of the chain cog are to be lubricated regularly.

Lubricant: cf. Table 2 C
Interval: monthly

VI. FAULT DETECTION CHART - ELECTRICAL

Defect: The installation cannot be started up.

Cause:

1. Main switch g1 is switched off.
2. Fuses e1 or e17, e18 are defective.
3. One of the "Emergency-Off" keys is pressed.

Remedy:

1. Switch on the main switch.
2. Check fuses, replace, measure current.
3. Release the "Emergency-Off" key.

Defect: Safety brake (brakes) cannot be released.

Cause:

1. One or more fuses, e19, e20, e21, e22, e23 are defective.
2. The solenoid valve is defective.
3. One of the time relays d4, d5, d6, d7 d8 is defective.
4. One of the limit switches in the track does not switch.
5. One of the back stops is pushed back.

Remedy:

1. Check resp. replace fuses.
2. Check resp. replace solenoid valve.
3. Check resp. replace time relay.
4. Check resp. replace limit switch.
5. Bring back stop into operation position.

Defect: The lift cannot be taken into operation.

Cause: 1. Fuses e3, e6, are defective.
2. Bi-relay e5 has released.
3. The chain-break switch in machine room is pressed.

Remedy: 1. Replace fuses.
2. Release bi-relay.
3. Line-up resp. replace the chain break switch.

Defect: Air pressure is missing.

Cause: 1. The fuses e2 of the compressor are defective.
2. Bi-relay e4 has released.

Remedy: 1. Check fuses.
2. Unlock bi-relay.

Defect: The start motor does not run.

Cause: 1. Fuses e7 are defective.
2. Bi-relay e8 has released.
3. Air pressure less than 6 atü.
4. The shutoff valve for direct air connection is not in operating position.

Remedy: 1. Replace fuses.
2. Unlock bi-relay.
3. Wait for 6 atü pressure.
4. Put the shutoff valve into operation position.

Defect: The transport motors do not run.

Cause:

1. One of the e9, e11, e13, e15 is defective.
2. One of the bi-relays e10, e12, e14, e16 has released.
3. By the motor at the exit:
 - a) The limit switch to the belonging brake does not switch.

Remedy:

1. Replace fuses.
2. Unlock bi-relay.
3. a) Line-up resp. replace limit switch at the brake.

