

SECTION 2

Pre-Installation

CONTENTS

2.1 Civil Construction & Decoration of the Center	2 - 2
2.2 Power supply & Electrical Requirement	2 - 5
2.3 Lighting Requirement	2 - 8
2.4 Requirement of Civil Construction & Furnishing of the bowling Center	2 - 9
2.5 Requirement of Transportation & Storage of Bowling Equipment (Pin-setter & Lanes)	2 -10
2.6 Information to be Provided by Bowling Center before Installation Of Bowling Equipment	2 -11
2.7 Others	2 -12

2.1 Civil Construction & Decoration of the Center

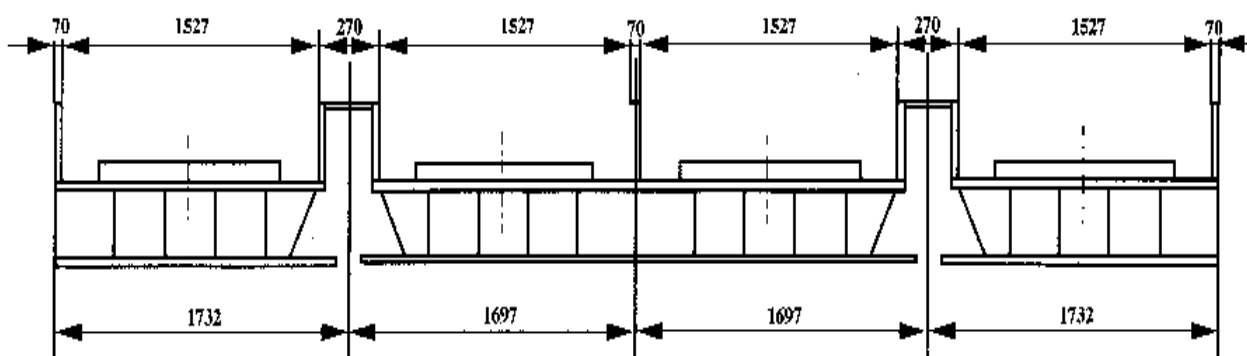
2.1.1 Sizes of center

In order to enable the pin-setter to work normally, the size of the bowling center must meet the following requirements:

- Size in width (in accordance with ABC/WIBC standards of USA)

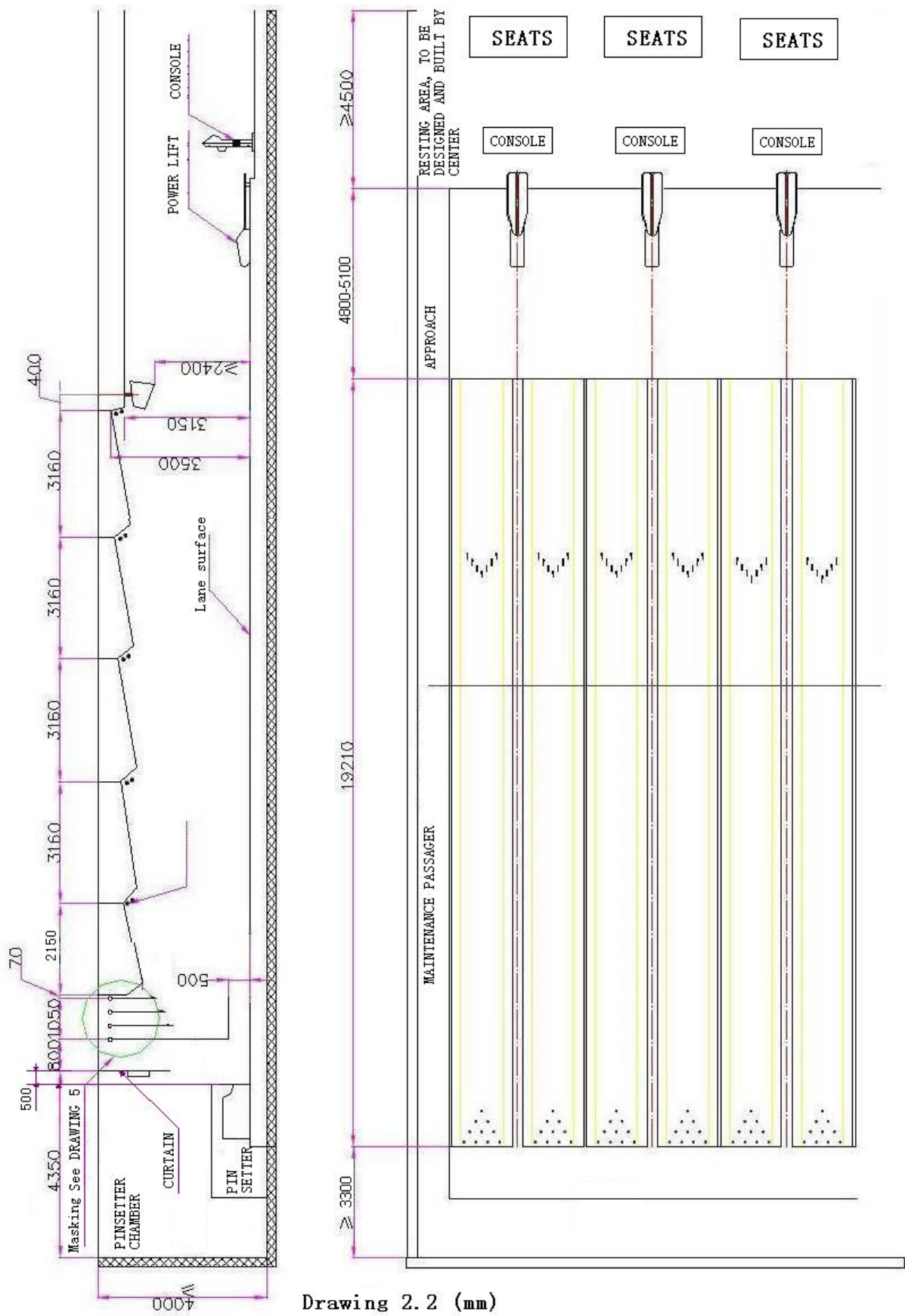
Qty. Of Lanes	Width (mm)	Qty. Of Lanes	Width (mm)
1	1867	21	35807
2	3464	22	37404
3	5261	23	39201
4	6858	24	40798
5	8655	25	42595
6	10252	26	44192
7	12049	27	45989
8	13646	28	47586
9	15443	29	49383
10	17040	30	50980
11	18837	31	52777
12	20434	32	54374
13	22231	33	56171
14	23828	34	57768
15	25625	35	59565
16	27222	36	61162
17	29019	37	62959
18	30616	38	64556
19	32413	39	66353
20	34010	40	67950

- Drawing of Transverse Section of Bowling Lanes (4 lanes)



Drawing 2.1

● Required Length & Height of Bowling Center (e.g. 6 lanes)



Drawing 2.2 (mm)

- Passage: in-house passages (including the minimum 500mm wide maintenance path beside lane)and, in-house service facilities (including pin-setter maintenance, customer service facilities, etc) must be taken into consideration for overall arrangements by the design & construction organization of the bowling Center.
- 2.1.2 The Water-Proof of the floor and the wall must be taken into consideration during the design of the Center.
 - 2.1.3 Safety passage must be taken into consideration during the design of the Center.
 - 2.1.4 The side door to the pin-setter chamber must be at least 2200mm in width and 2400 mm in height so that there is sufficient room for moving the pin-setter and the lane materials of 4500 mm long into the installation area.
 - 2.1.5 The overall size of the pin-setter is 2850 mm in length, 1560 mm in Width and 1780 mm in height, it is 865 Kg in weight. The lane plate weighs 70 Kg/m².
 - 2.1.6 Effective acoustic materials must be used for the inside wall and the ceiling of the pin-setter chamber .
 - 2.1.7 Ventilation of the chamber must be taken into consideration.
 - 2.1.8 Fire-proofing materials must be used for decoration.(Design & installation must be in accordance with local safety regulations)
 - 2.1.9 The pin-setter chamber must be equipped with fire extinguishers.
 - 2.1.10 Air conditioning
 - Room temperature of the bowling Center must be kept at 22°C-24°C, and the relative humidity must be kept at 40% -50%.
 - Room temperature of the pin-setter chamber must be kept at 22°C-28°C
 - The heat generation of each pin-setter is 1000Kcal/H.
 - Air-conditioning must be started 15 days prior to the installation of the lanes in order to guarantee the quality of installation.
 - 2.1.11 Wire pipes and other necessary pre-embedded parts must be embedded in advance according to the electrical requirements.
 - 2.1.12 Equipment (especially lane plates, lane wood, lane frame, etc) must be stored in bowling Center of qualified conditions. They should stay there for 2 weeks before being installed.
 - 2.1.13 This equipment works under 1000 meters above sea level.

2.2 Power supply & Electrical Requirement

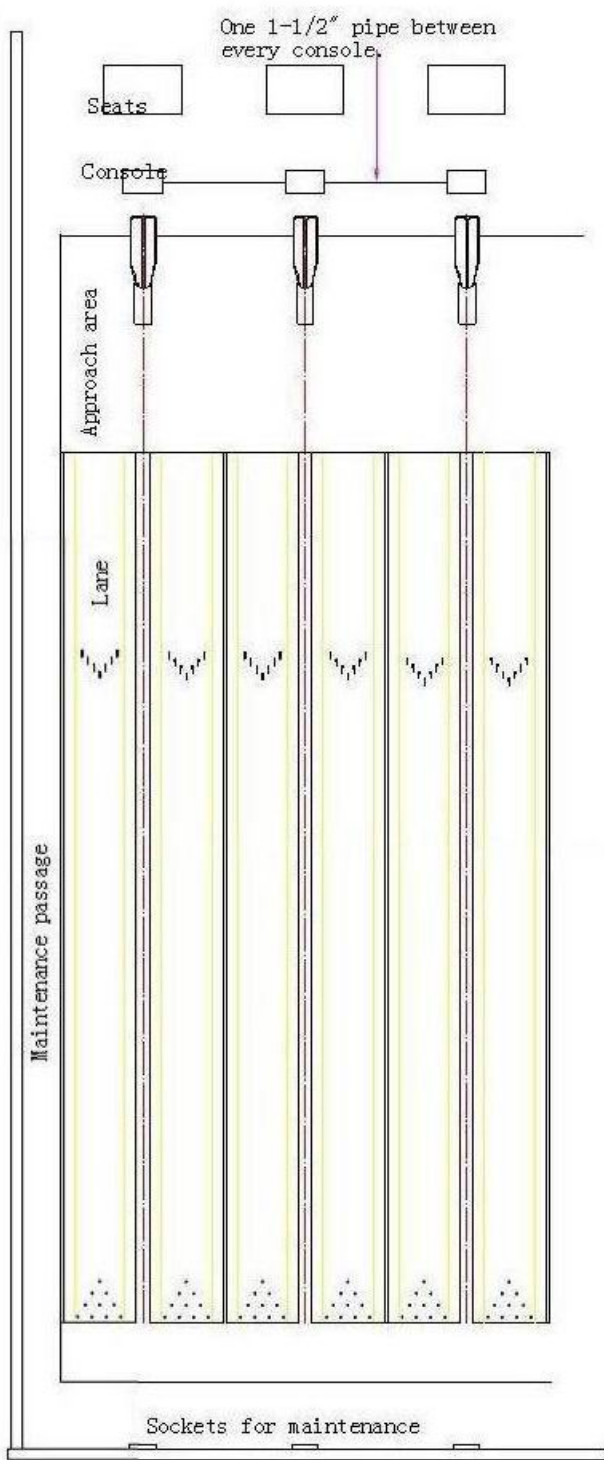
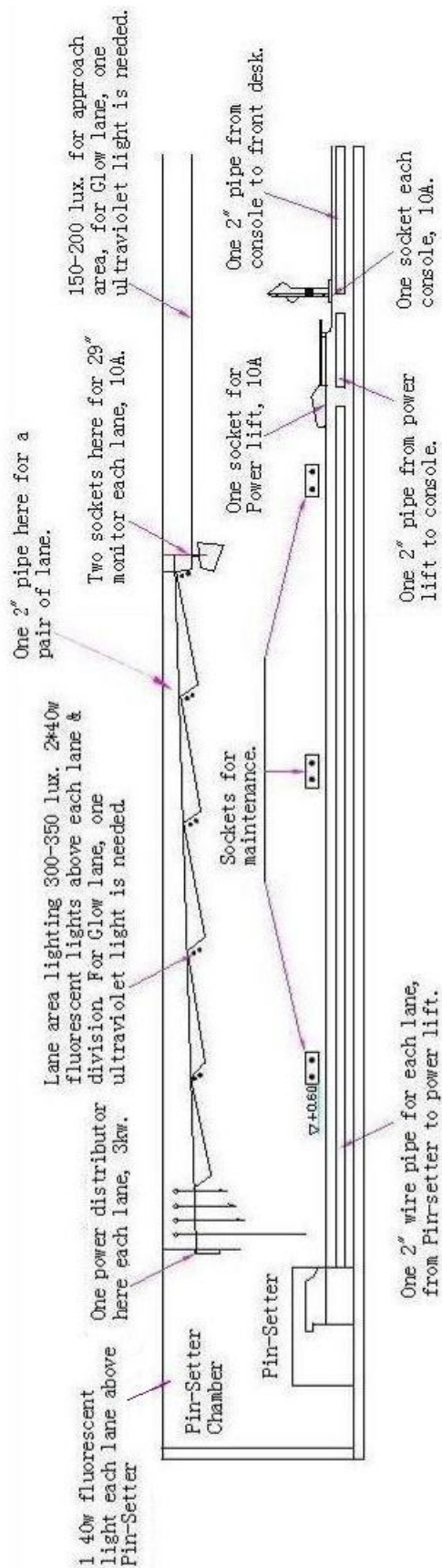
2.2.1 The power distributor is shown in Drawing 2.3, the layout plan of the operation desk and the seat system is shown in Drawing 2.4

2.2.2 Power supply of the equipment:

- Capacity: three-phase 400V AC. 3Kw for each lane (excluding lighting and air conditioning), voltage fluctuation not exceeding 5%. If these requirements can't be guaranteed, use a voltage regulator to guarantee the stability of the power supply.
- Power supply to electrical equipment is in five-wire way, that is 4 three-phase wires plus an additional protective earth wire.

2.2.3 Distribution of electrical sockets:

- Electrical sockets for the pin-setter
One modulus switch box for every two lanes on the inner side of the screen wall, with two low voltage & over voltage protection switches, 2 sockets of 400VAC/16A/PH3, 4 sockets of 230VAC/15A/PH1, all with grounding terminal.
- Electrical sockets for ball-returning machine (every machine needs a power of 430W)
Every group of lanes (two lanes) share one ball-returning machine (three lanes need two machines. Note: usually lanes are in pairs, such as 2,4,6,etc. Special arrangements can be proposed by customers). One socket of 230VAC/10A/PH1 is installed at every ball-returning machine. Electricity is supplied in single-phase three-wire method.
- Voltage regulator socket at the operation table (every lane needs a constant voltage power supply of 300W)
Power supply to the operation table must be voltage-regulated. Every lane has one operation table. One socket of 230V/10A must be installed in the 200 x 100 (mm) hole below the operation table, or the power wire that is 1 meter out of the floor has a grounding.
Note: The earth wire here must be an independent grounding, separated from the earth wire of the public power net.
- Socket for the 29" monitor (each monitor needs a power of 150W)
Two 29" monitors are installed above the front side of the ball-returning machine (one monitor for each lane). Above each holder of the monitor, install a socket of 230VAC/5A/PH1.
- Sockets for installation & maintenance
Install several sockets of 230VAC/15A/PH1 on the walls or columns of the bowling Center for the purpose of installation, maintenance & cleaning.
- Sockets for pin-setter chamber
One socket of 230VAC/15A/PH1 must be installed on the wall behind each set of pin-setter for the purpose of installation & maintenance.



Drawing 2.3

- **Sockets for front-desk:**
Install several sockets of 230VAC/15A/PH1 with earth wire at the front-desk.
Note: The grounding here must share the same grounding system of the sockets for voltage regulator, and be separated from the public power net.

2.2.4 Layout of pre-embedded pipe

- Two 2" PVC wire tubes must be placed on the ground of the gutter between the pin-setter to the ball-returning machine (one for each lane)
- Two 1-1/2" PVC wire tubes must be placed between the main operation tables and between the first main operation table and the front-desk (Note 1)
- Two 1-1/2" PVC wire tubes must be placed between every main operation table and the relevant secondary operation table. If the scoring system is Zhonglu 2000 serial, then one 1-1/2" PVC wire tube must be placed between every main operation table and the front-desk. (Note 2)
- One 2" PVC wire tube must be placed between the pin-setter and the 29" monitor (one for every two lanes, going along the ceiling)
- One 2" PVC wire tube must be placed from each side of the ball-returning machine to the operation table (one for each lane). The tube at the operation table must be 10mm-20mm above the floor (entering the table).
- One 1-1/2" PVC tube must be pre-embedded from the main operation table to the front-desk.
The tube of the main operation table side must be 10mm—20mm above the floor (entering the operation table).

Remarks: 1) The PVC wire tubes shall be provided by the owner of the bowling Center and will be used when installing the lane is. Each lane is 40 meters long.
2) Main operation platform: when one scoring system controls 2 lanes (as in QUBICA & Zhonglu 2000 serial), the left lane of the pair is the main lane, the operation table here is the main one (computer is installed inside this table), and the other is called the secondary operation table; when one scoring system controls only one lane, the relevant operation table is called the main operation table.

2.2.5 Requirements of grounding

The section area of the earth wire mustn't be smaller than 4 mm^2 , the grounding resistor mustn't be over 4Ω .

2.3 LIGHTING REQUIREMENTS

- 2.3.1 The lighting brightness of the lane area must reach 300LUX – 350 LUX.
- 2.3.2 The lighting in the area of players and spectators must be 150LUX-200LUX
- 2.3.3 Two 40 W fluorescent lamps must be installed over the center line of every two pin-setters in the pin-setter chamber.
- 2.3.4 The above-mentioned electrical devices must be taken into consideration during the design, construction, installation & furnishing of the bowling Center. They must be finished and supplied with power before the installation of the bowling equipment and meet the above-mentioned requirements. All sockets must be equipped with plugs. When pre-embedding the wire tubes, try to avoid bending of the tube, and iron wires must be put inside the tubes for drawing wires.

2.4. REQUIREMENTS OF THE CIVIL CONSTRUCTION & FURNISHING OF THE BOWLING CENTER

- 2.4.1 Because concrete nails are sometimes used during installation, the distance between the water-proof layer and the surface of the concrete (the thickness of the concrete layer) mustn't be less than 60 mm in order to avoid any damage to the water-proof layer. The flatness deviation of the concrete surface mustn't be over ± 6 mm. The grade number of the cement must be over No. 600, and the surface of the concrete mustn't be sandy.
- 2.4.2 Load bearing requirement of installation area:
- Pin-setter chamber (installing area of pin-setter) not less than 450 Kg/m²
 - Lane area: not less than 300 Kg/m²
- 2.4.3 Installation of pin-setter & lanes must be started two weeks after the completion of the civil construction & furnishing of the bowling Center.
- 2.4.4 Installation of monitor: hanging rails must be installed according to Drawing 2.2 & Drawing 2.4 (sizes are only for reference, can differ according to different conditions of different bowling Centers). The hanging rails must be able to bear the weight of the monitor (60 Kg each), without any deformation or bending.
- 2.4.5 Installation of operation tables and seats must be started after finishing the installation of the floor of the area of players and spectators.
- 2.4.6 The parquet of the seat area and the spectators' area can be installed directly on the concrete surface. Otherwise, use a middle layer of wood board between the concrete surface and the parquet.
- 2.4.7 The power supply to the pin-setter, all kinds of sockets, pre-embedded wiring tubes and in-house lighting must be finished to the requirements before the bowling equipment is moved into the bowling Center for installation.
- 2.4.8 Except for the installation of the lane and the bowling equipment, all other works will be designed and done by the owner of the bowling Center.
- 2.4.9 The installation requirements & the size of the multi-layer hanging screen are shown in Drawing 2.6

2.5 Requirements of transportation & storage of bowling equipment (pin-setter & lane)

- 2.5.1 Width & load bearing capacity of the road on which the truck (8-15 tons) carrying the bowling equipment passes must be taken into consideration
- 2.5.2 Space & passage necessary for the forklift, crane, the installation work & the transportation should be taken into consideration.
- 2.5.3 After the equipment is moved into the installation area, it must be placed in order, kept form direct sunlight or rain and in good ventilation.
- 2.5.4 The passages (including the doors) for transportation of equipment to the installation site must be sufficient for the easy pass of the pin-setter in the sizes of 1350 x 1700 x 2000 (mm)
- 2.5.5 Transportation of the bowling equipment including the moving during installation must be performed by the user, and the relevant cost is to be borne by the user.
- 2.5.6 Tools & expensive parts must be kept properly to avoid possible loss.
- 2.5.7 The storage temperature of the equipment mustn't exceed 70°C.
- 2.5.8 The temperature during transportation of the equipment must be kept at -25°C. - 55°C.

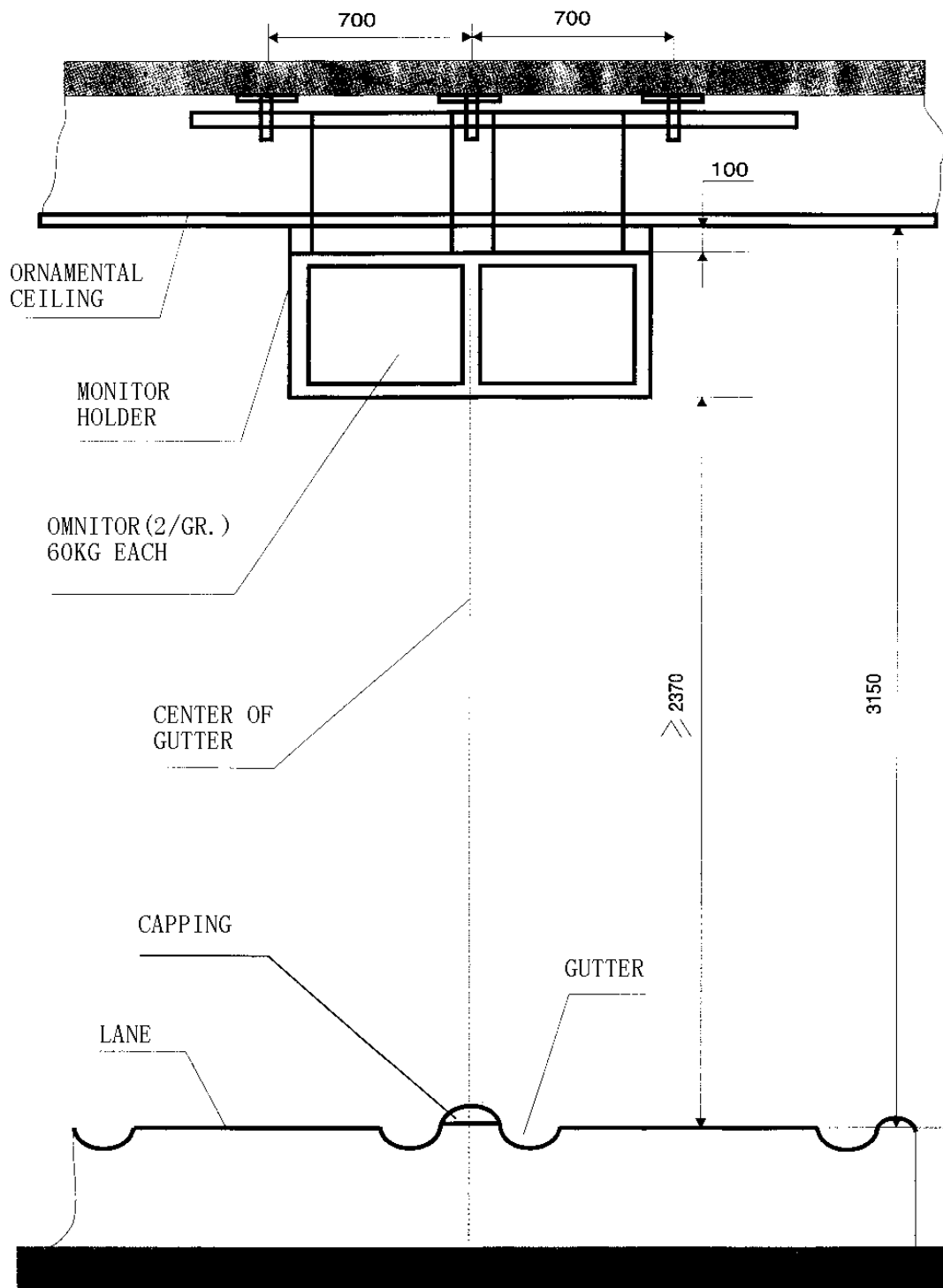
2.6 Information to be provided by the owner of the bowling Center before installation of the equipment

The following information must be provided by the owner of the bowling Center one month prior to the installation of the bowling equipment:

- Layout plan of the bowling Center
- The plane figure & the side elevation drawing of the bowling Center
- Schedule of the in-house civil work and the furnishing
- Schedule of the installation of electrical devices
- The user must provide the plane figure of the bowling Center one and a half months prior to the installation if the user has special requirement on the lanes.

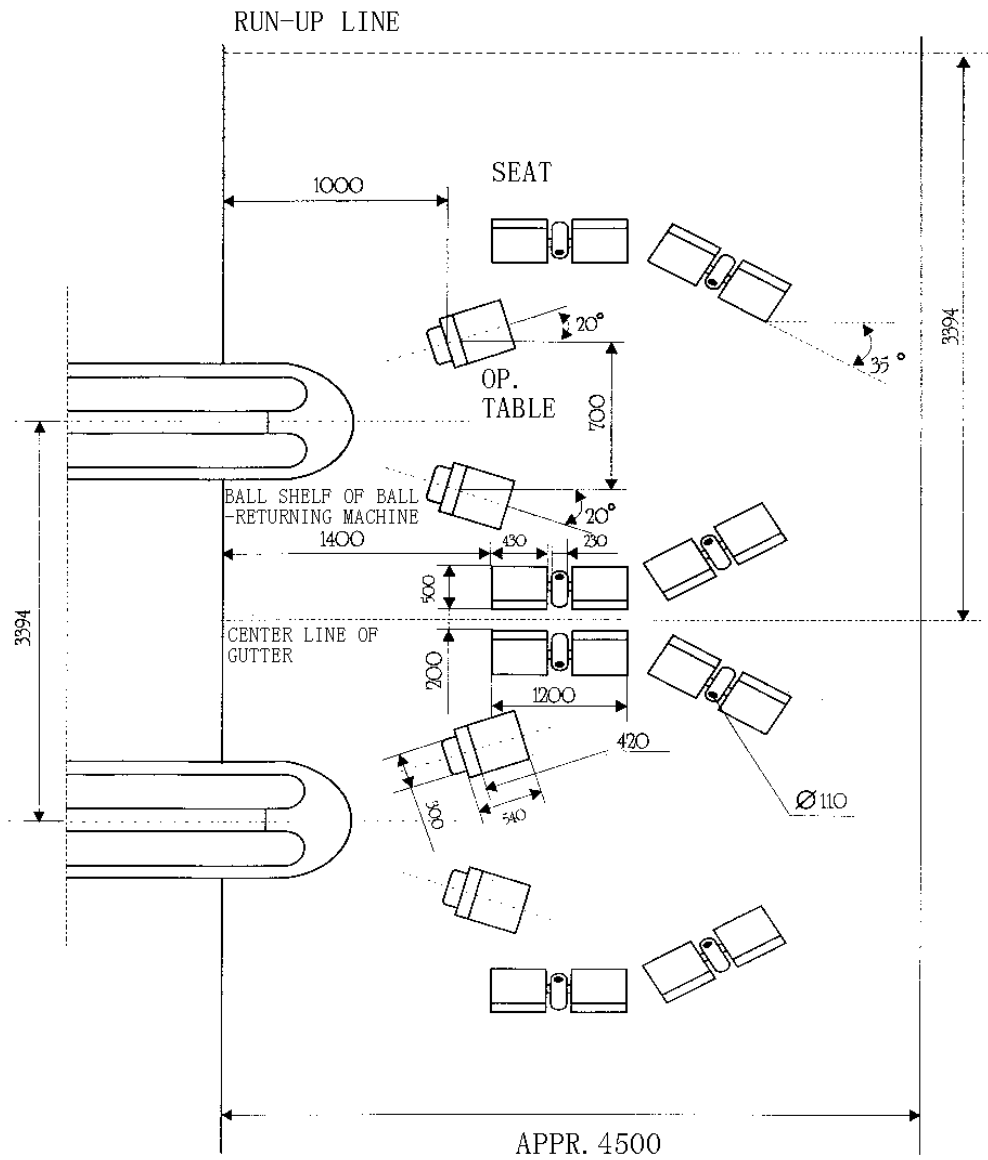
2.7 Others

- 2.7.1 The owner of the bowling Center is responsible for such safety measures as the guard, the fire-protection, & the anti-burglary work
- 2.7.2 If wood lane is to be installed, one warehouse for dangerous goods (paint for the lane) must be provided.
- 2.7.3 Arrange staff according to the contract.
- 2.7.4 The installation condition of the bowling Center must be in accordance with the local requirements.
- 2.7.5 Before installation of the lanes, the maintenance people of the bowling Center must be trained and be certified as qualified operator by our company.
- 2.7.6 Other work that requires co-operation



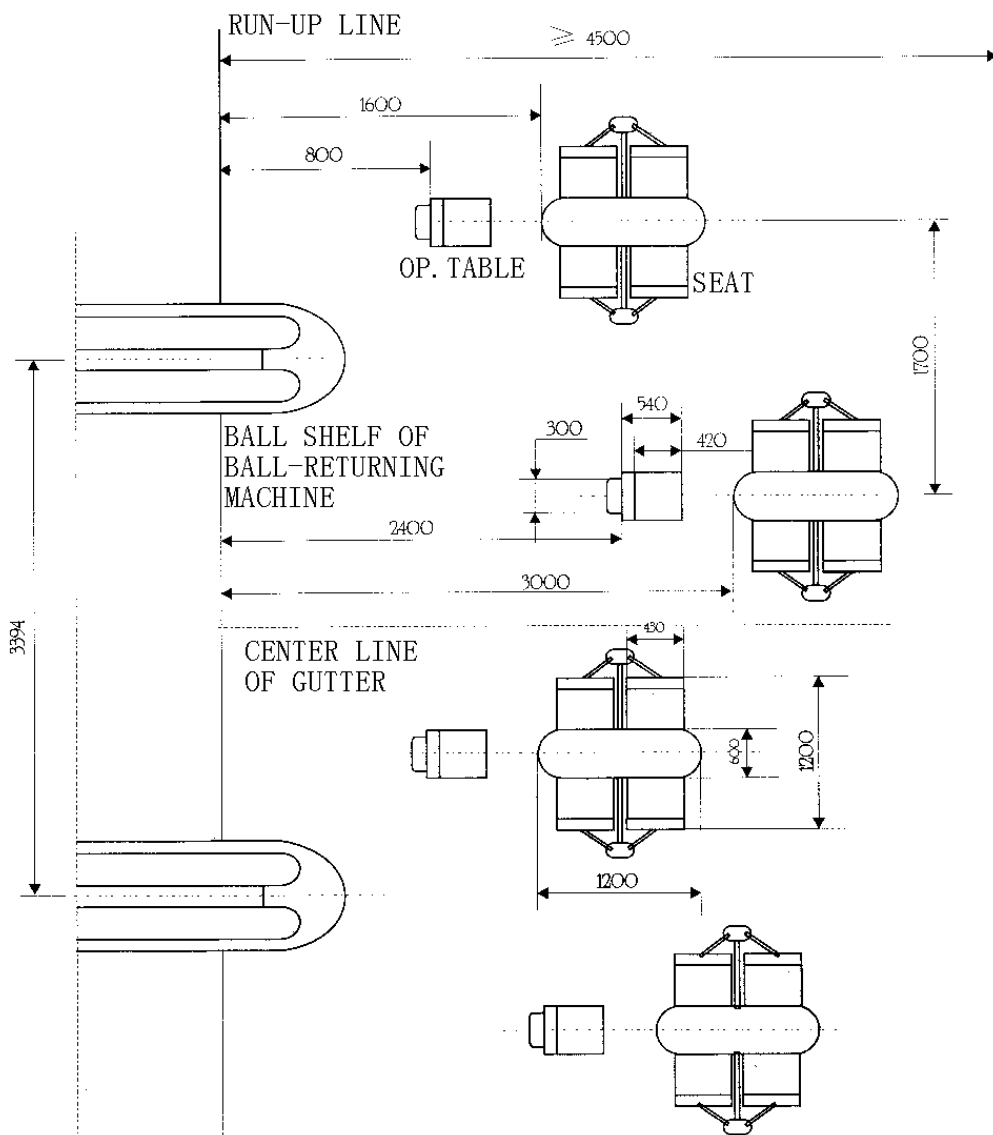
Drawing 2.4

ZL2000-Z2 Seat System Layout



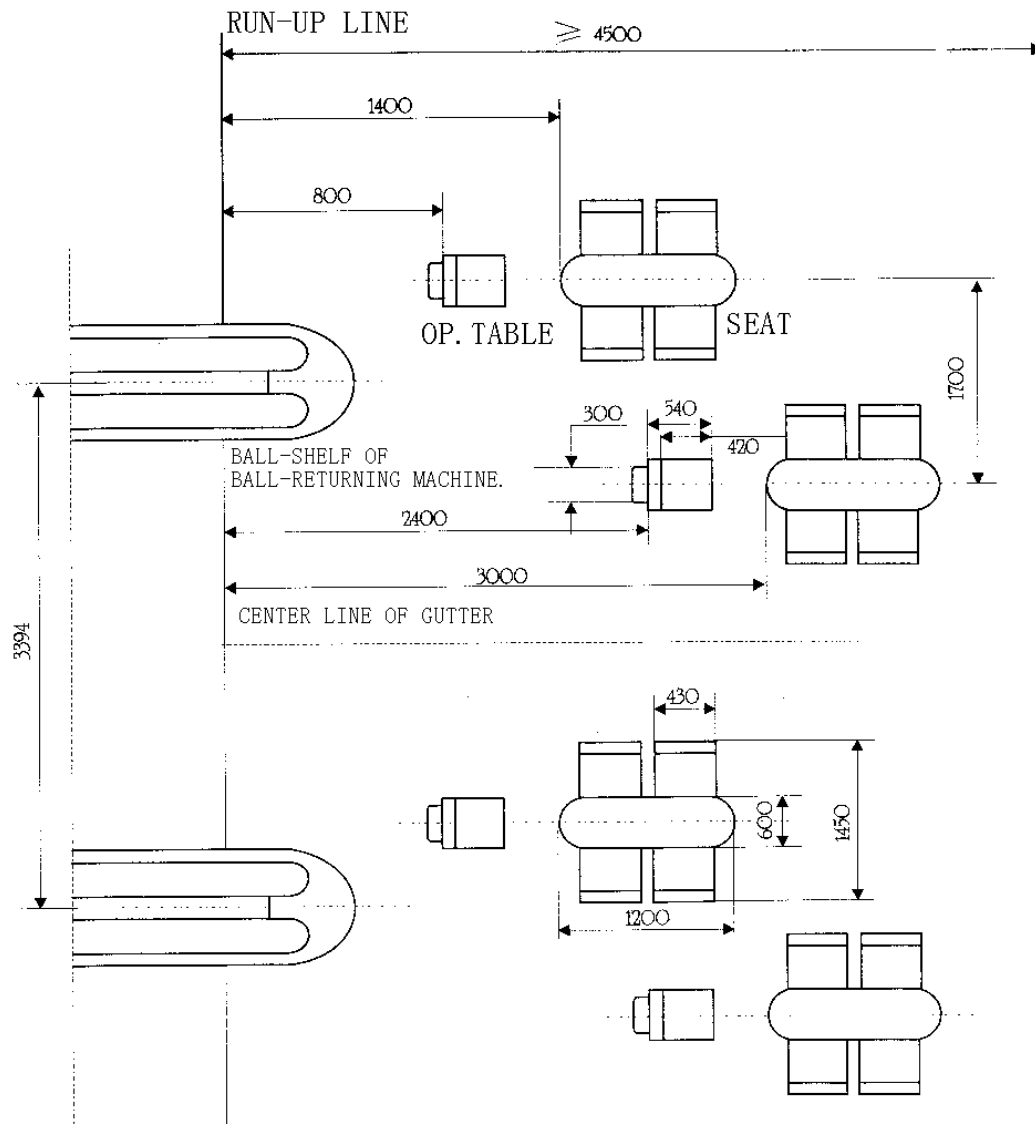
Drawing 2.5.1

ZL2000-Z3 Seat System Layout



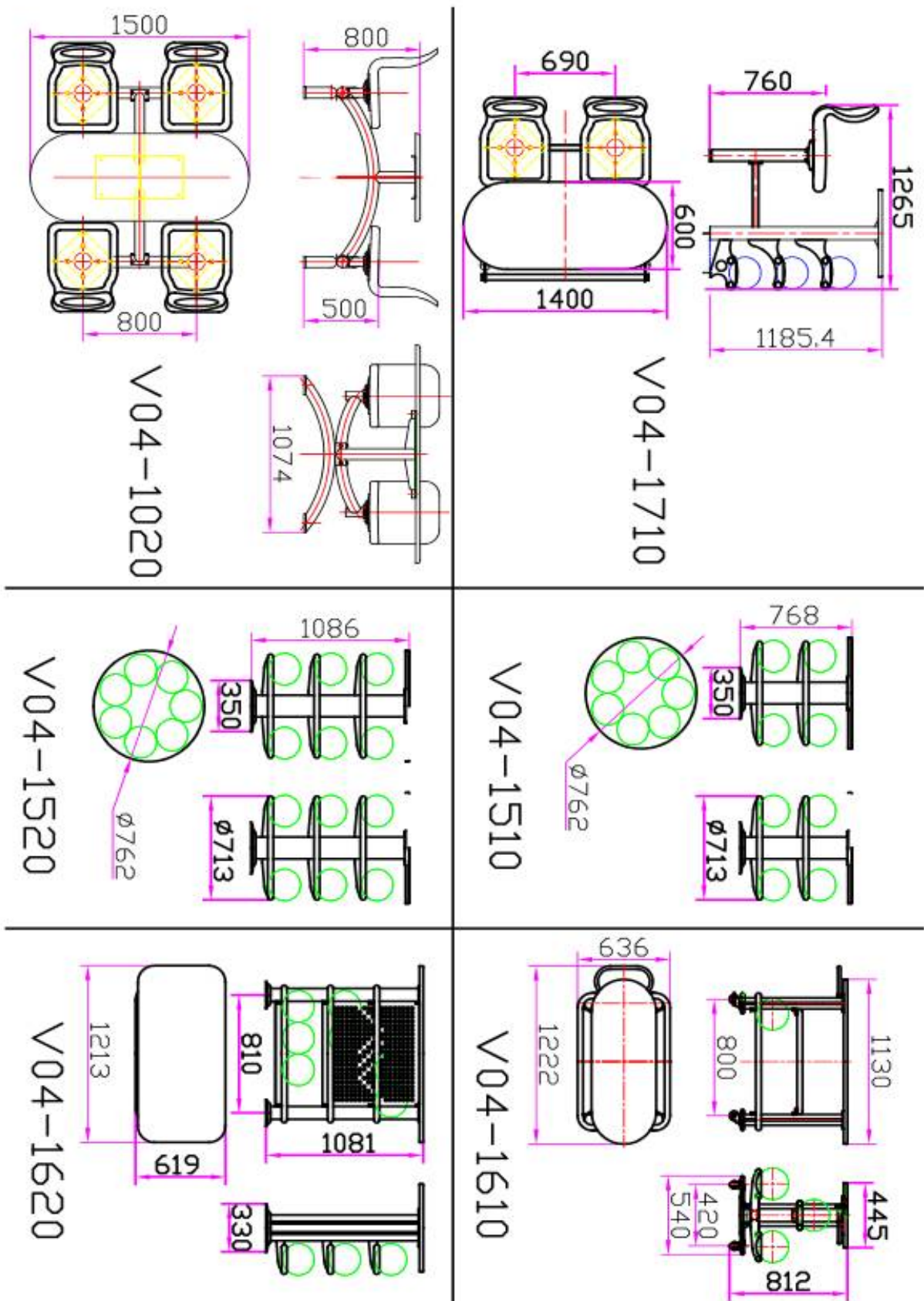
Drawing 2.5.2

ZL2000-Z4 Seat System Layout



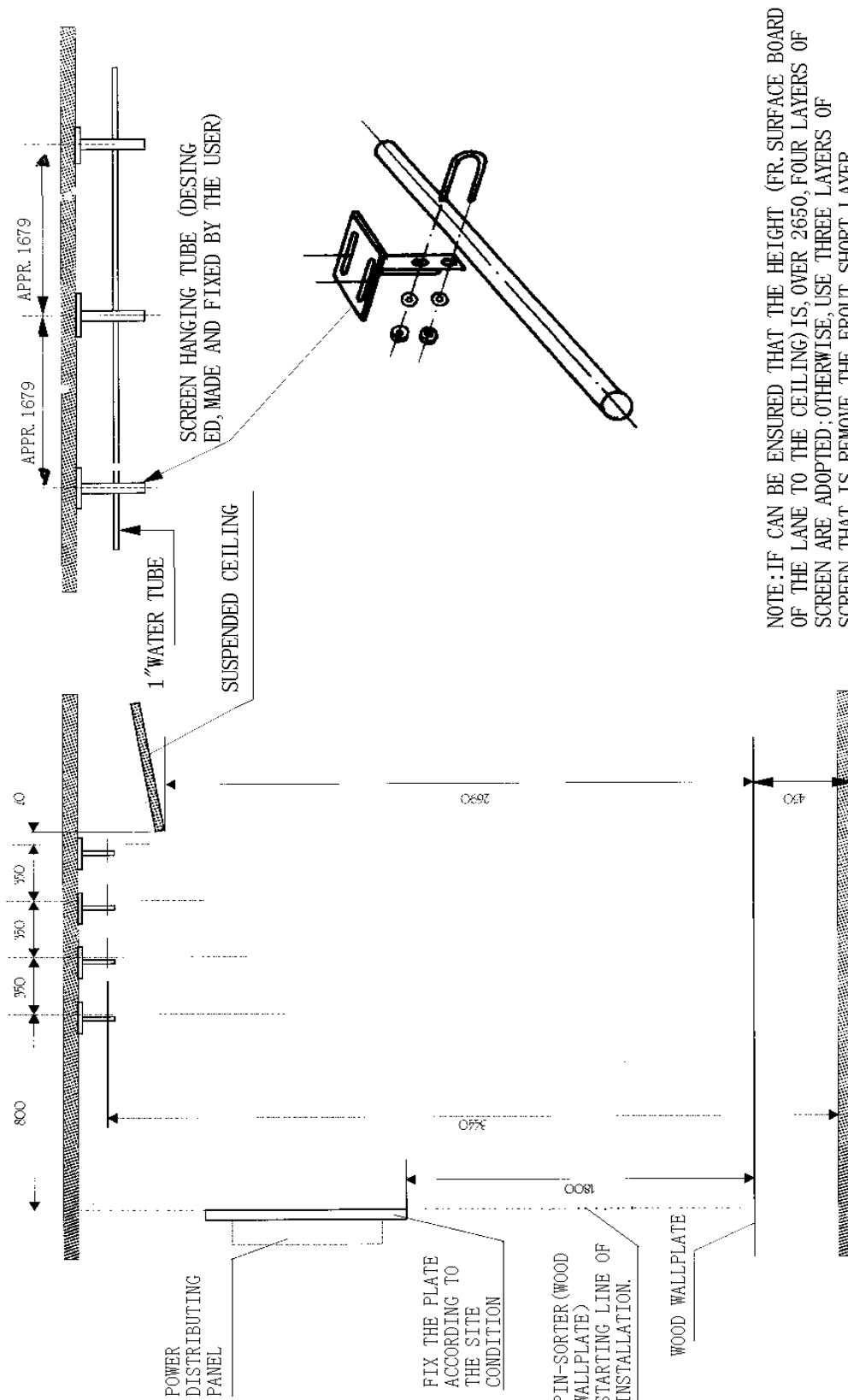
Drawing 2.5.3

VIA EVOLUTION ON-LANE SEATING SYSTEM



Drawing 2.5.4

Multi-layer MASKING



NOTE: IF CAN BE ENSURED THAT THE HEIGHT (FR. SURFACE BOARD OF THE LANE TO THE CEILING) IS, OVER 2650, FOUR LAYERS OF SCREEN ARE ADOPTED; OTHERWISE, USE THREE LAYERS OF SCREEN, THAT IS, REMOVE THE FRONT SHORT LAYER.

Drawing 2.6