

資料-5 要請機材リスト

DEVELOPMENT OF LABORATORIES  
1. DEPARTMENT OF CIVIL ENGINEERING  
a) EQUIPMENT FOR SOIL MECHANICS  
LABORATORY

S.NO.	ITEM DESCRIPTION	PART NO/ SET NO.	QUANTITY REQUIRED	PRICE RS.
1.	Dial Guage	EL 20-150	12	Rs. 5,000.00
2.	Loadings (Proving Ring)			
3.	450 Kg	EL 20-030	2	Rs. 1,000.00
4.	700 Kg	EL 20-040	2	Rs. 1,000.00
5.	1000 Kg	EL 20-050	2	Rs. 1,000.00
6.	1400 Kg	EL 20-060	2	Rs. 1,000.00
7.	2000 Kg	EL 20-070	2	Rs. 1,000.00
8.	2800 Kg	EL 20-080	2	Rs. 1,000.00
9.	General purpose Oven (200 C)	EL 22-102/1	2	Rs. 20,000.00
10.	(250 C)	EL 22-133/1	2	Rs. 20,000.00
11.	(300 C)	EL 22-138/1	2	Rs. 15,000.00
12.	Hot Plate (200 W)	WL 22-310/1	2	Rs. 10,000.00
13.	Kettor Top Loading Balance	EL 22-605/1	2	Rs. 20,000.00
14.	Kettor Top Loading Balance	EL 22-608/1	2	Rs. 20,000.00
15.	Student Balance	EL 22-700	1	Rs. 5,000.00
16.	Field and Laboratory Scale	EL 22-730	2	Rs. 20,000.00
17.	Field and Laboratory Scale	EL 22-745	2	Rs. 20,000.00
18.	Counter Scale (without Wt.Box)	EL 22-770	2	Rs. 15,000.00
19.	Riffing Box ASTM D 421	SET 2310	1	Rs. 25,000.00
20.	Moisture content determination	SET 2330	2	Rs. 20,000.00
21.	Liquid limit determination	SET 2410	2	Rs. 30,000.00
22.	Motorised liquid limit device	EL 24-19/1	2	Rs. 40,000.00
23.	Plastic limit determination.	SET 2420	4	Rs. 30,000.00
24.	Shrinkage limit determination	SET 2430	4	Rs. 30,000.00
25.	Sand Equivalent Value	SET 2435/1	2	Rs. 25,000.00
				<u>Rs. 3,76,000.00</u>

B.F.

3,76,000.00

S.NO.	ITEM DESCRIPTION	PART NO/ SET NO.	QTY	PRICE RS.
26.	Specific Gravity of Soil.	SET 2438	1	Rs. 5,000.00
27.	Grain size analysis	SET 2448/1	2	Rs. 20,000.00
28.	Sulphate content in soil	SET 2466	1	Rs. 10,000.00
29.	Sulphate content in water	SET 2467	1	Rs. 10,000.00
30.	Unconfined compression.	SET 2510/1	2	Rs. 30,000.00
31.	Undrain Triaxial Test.	SET 2515/1	2	Rs. 40,000.00
32.	Undrain Triaxial test.	SET 2600/1	2	Rs. 40,000.00
33.	Direct Shear test.	SET 2805/1	2	Rs. 20,000.00
34.	One Dimension/consolidation	SET 2810	2	Rs. 20,000.00
35.	Permeability of soil/content Head	SET 2815	2	Rs. 10,000.00
36.	Permeability of soil/variable head	SET 2825	2	Rs. 15,000.00
37.	Vacuum pump for permeability	EL 81-070	2	Rs. 10,000.00
38.	Moisture density Relation, of soil	SET 2840	2	Rs. 15,000.00
39.	Proctor Mould	EL 28-600	2	Rs. 10,000.00
40.	Standard compaction Rammer	EL 28-604	2	Rs. 20,000.00
41.	Automatic Compactor	EL 28-629	2	Rs. 10,000.00
42.	C.B.R. test in Laboratory	SET 2910/1	2	Rs. 30,000.00
43.	C.B.R. in field.	SET 2913	2	Rs. 15,000.00
44.	Field Density test	SET 2926	2	Rs. 10,000.00
45.	Sand Cone	EL 29-430	4	Rs. 12,000.00
46.	Plastic container	EL 29-432	4	Rs. 16,000.00
47.	Density Plate	EL 29-434	4	Rs. 16,000.00
48.	Density chisel	EL 29-506	8	Rs. 5,000.00
49.	Extruder	EL 23-425	2	Rs. 10,000.00
50.	Adopter set	EL 23-430	2	Rs. 16,000.00
51.	Hand operated oxtuder	EL 23-459	1	Rs. 5,000.00
52.	38 mm adopter.	EL 23-466	1	Rs. 5,000.00
53.	Adopter.	EL 23-470	1	Rs. 5,000.00
Total				Rs. 8,06,000.00

b) EQUIPMENT FOR PROPOSED CONCRETE LAB:

TECHNOTEST

1.	At 280/4	Capping compound 25 Kg.	Rs.	5,000.00
2.	AP 030	Multiple Amplifier for load cells	Rs.	5,000.00
3.	AP0 030/1	Presetting for the operation of the amplifier (AP 030)	Rs.	5,000.00
4.	AP 028/A	10,000 Lg (100 Kn ) Electronic load cell (Quantity-2 Nos).		
5.	AP 027/A	30,000 Kg (300 KN) Electronic load cell (Quantity - 2 Nos)	Rs.	8,000.00
6.	AP 004	Flexural strength testing apparatus	Rs.	5,000.00
7.	AP 002	Tensile stress testing apparatus.	Rs.	15,000.00
8.	Ap 003	Tensile stress and flexural strength testing apparatus.	Rs.	10,000.00
9.	AT 278	Compressometer.	Rs.	15,000.00
10.	AT 278/S	Compressometer for Cubes.	Rs.	15,000.00
11.	AT 203	Laboratory concrete mixer	Rs.	50,000.00
12.	AT 216/1	Cm 15x15x15 cube molds (Qty 9)	Rs.	3,000.00
13.	AT 221/1	Ø 15x30 Cm cylinder mds (Qty 3)	Rs.	15,000.00
14.	AT 231/E	Electric Portable tip vibrator	Rs.	25,000.00
15.	AT 236	Thermostatic Tank (conforming to ASTLA C-31 specification).	Rs.	25,000.00
16.	AT 239/AM	Single phase accelerated curing tank with micro processor programme.	Rs.	50,000.00
17.	AT 206/S	Electric shaker with timer (220 V , 50 HZ )	Rs.	15,000.00
18.		Sieve at ASTM (Two sets)	Rs.	10,000.00
19.		Sieve set BS (Two sets)	Rs.	10,000.00
20.		<u>Measurements</u> (Mod B 115/1)		
		(Mod B 115/2) Geometers.	Rs.	5,000.00
21.		Blaine air permeability meter Mod C-1	Rs.	10,000.00
22.		Water flow slow device Mod C-3	Rs.	10,000.00
			Rs.	<u>3,11,000.00</u>

	B.F.	Rs.	3,11,000.00
23. Automatic Vicatapparatus Mod C-32		Rs.	20,000.00
24. Heat measurement of Hydration Mod C-42		Rs.	28,000.00
25. Flexural and tensile strength of cement and mortar Mod. C-90			
Mod. C-90/1			
Mod. C-90/2			
Mod. C-90/3		Rs.	20,000.00
			<hr/>
Total		Rs.	3,79,000.00
			<hr/>

c) EQUIPMENT FOR HIGHWAY ENGG: LABORATORY

S.No.	Item Description	Part No/O Set No.	Qty	Price in Rs.
1.	Sieve Analysis sand and aggregate.	SET 4203	4	40,000.00
2.	Clay Lumps in aggregate.	SET 4207	2	16,000.00
3.	Flakness & Elongation.	SET 4210	2	20,000.00
4.	Relative Density & absorption of aggregate.	SET 4215	2	20,000.00
5.	Specific Gravity & absorption of aggregate.	SET 4220	2	20,000.00
6.	Absolute specific gravity of filler.	SET 4222	1	10,000.00
7.	Bulk Density of aggregates.	SET 4226	1	10,000.00
8.	Void content of aggregate.	EL 42-250	1	20,000.00
9.	Soundness of aggregates.	SET 4252/1	1	10,000.00
10.	Aggregate crushing value.	SET 4262	1	10,000.00
11.	Aggregate abrasion value.	SET 4272/1	1	10,000.00
12.	Stripping Test of Bituminous, aggregates.	SET 4511/1	1	10,000.00
13.	Extraction of Bitumen.	SET 4515/1	1	15,000.00
14.	Bulk specific gravity of Bituminous Mixture.	SET 4520	1	15,000.00
15.	Theoretical Maximum specific gravity.	SET 4521/1	1	20,000.00
16.	Marshall stability test.	SET 4225/1	1	16,000.00
17.	Flash point of asphalt.	SET 4620	1	20,000.00
18.	Softening point.	SET 4635/1	1	20,000.00
19.	Asphalt penetration test.	SET 4640/1	1	10,000.00
20.	Viscosity of Asphalt.	SET 4649/1	1	20,000.00
21.	Dial gauge.	EL 20-150	12	12,000.00
22.	General purpose Oven 200 c	EL 22-102/1	2	20,000.00
	250 c	EL 22-133/1	2	20,000.00
	300 c (large size)	EL 22-138/2	2	20,000.00
				Rs. 4,04,000.00

				B.B.F. 4,04,000.00
25.	Hot plate 2000 W.	EL 22-310/1	2	10,000.00
26.	Metter Top loading.	EL 22-605/1	1	20,000.00
27.	Meter Top loading Balance.	EL 22-608/1	1	20,000.00
28.	Student Balance.	EL 22-700	4	20,000.00
29.	Field and laboratory scale.	EL 22-730	2	20,000.00
30.	" " " "	EL 22-745	2	20,000.00
31.	Conter Scale(with weight box)	EL 22-770	2	20,000.00
32.	Riffing box ASTM D 421	SET 2319	1	25,000.00
33.	Moisture content determination.	SET 2320	2	20,000.00
34.	Grain size analysis.	SET 2448/1	2	20,000.00
35.	Moisture density relation of soil.	SET 2840	2	15,000.00
36.	Proctor Mould.	EL 28-600	2	10,000.00
37.	Standard compaction Rammer.	EL 28-604	2	20,000.00
38.	Automatic compactor.	EL 28-629/1	2	10,000.00
39.	C.B.R. Test in laboratory.	SET 2910/1	2	30,000.00
40.	C.B.R. in field.	SET 2913	1	15,000.00
41.	Field Density Test.	SET 2926	1	10,000.00
42.	Sand cone: EL	EL 29-430	4	12,000.00
43.	Plastic container.	EL 29-432	4	16,000.00
44.	Density Plate.	EL 29-434	4	16,000.00
45.	Density Chisel.	EL 29-506	8	5,000.00
46.	Various structures experimental models for undergraduate students in fully functional forms.	Complete set of experimental models.		53,000.00
47.	Software MAP Programmes. Stress, strudle, P-France, V-Framo of other latest version of nstructural software with additional blank diskets.	Compatible with item computer.		53,000.00
		Total Rs.		<u>8,63,000.00</u>

d) EQUIPMENT FOR HYDRAULICS  
LABORATORY IN CIVIL ENGG: DEPTT:

S.NO.	Description of Apparatus	Qty	Cost
1.	Model Reservoir and Surge Tower Apparatus.	1	Rs. 50,000.00
2.	Hydraulic Bench Experiments complete with all the accessories for P 6100.	4	Rs. 8,00,000.00
	i) Centrifugal pump characteristic.		
	ii) Flow in pipes and pipe fittings.		
	iii) Flow through orifices and over weirs.		
	iv) Flow in channels.		
	v) Fluid flow measurement.		
	vi) Bernoulli's experiments.		
	vii) Hydrustatics.		
	viii) Free and forced vortices.		
	ix) Hydraulic Machines.		

---

Total Rs. 8,50,000.00

---

EQUIPMENT FOR SURVEY LABORATORY.

1.	TMIA the one second Micrometer with Tripod.	4	Rs. 4,00,000.00
2.	Automatic Precision Level B1/BIC with Tripod.	4	Rs. 3,00,000.00

---

Total Rs. 7,00,000.00

---

2. DEPARTMENT OF ELECTRICAL ENGINEERING.

(a) EQUIPMENT FOR ELECTRICAL ENGINEERING DEPARTMENT

(ELECTRONICS ENGINEERING)

	<u>Qty</u>	<u>Unit Price</u>	<u>Total Cost</u>
1. Oscilloscopes.	20 Nos	Rs. 25,000/-	Rs. 5,00,000
2. Power supplies.	30 Nos	Rs. 10,000/-	Rs. 3,00,000
3. Meters.	80 "	Rs. 10,000/-	Rs. 8,00,000
4. Experimental Units	40 "	Rs. 1,00,000/-	Rs. 40,00,000
5. Consumable.	04 "	Rs. 1,00,000/-	Rs. 4,00,000
			<hr/>
			Rs. 60,00,000
			<hr/>

(b)

EQUIPMENT FOR COMMUNICATION LABORATORY

<u>S.No.</u>	<u>Items</u>	<u>Total Cost</u>
1.	Experimental Kit for performing Basic and advanced experiments on T.V., such as modulation demodulation, synchronization colour carrier.	US \$ 35,000.00
2.	Experimental Kit for Performing Basic and advanced experiments on Digital Communication and multiplexing techniques such as FDM, TDM, Pulsing etc.	US \$ 15,000.00
3.	Experimental Kit for teaching Telephony and Optical Communications such as Exchanges, Switching, Digital Switching Optical fibers optical sensors and transmitters etc.	US \$ 20,000.00
4.	Equipment Kit for teaching Microwave techniques such as wave guides, microwave sources, antennas transmission properties etc.	US \$ 30,000.00
		<hr/>
Total		US \$ 1,00,000.00
		<hr/>

1 US \$ = @ Rs. 17.80

US \$ 1,00,000 x 17.80 = Rs. 17,80,000.00

(c) EQUIPMENT FOR POWER SYSTEM IN ELECTRICAL ENGINEERING DEPARTMENT.

<u>Item</u>	<u>Qty</u>	<u>Cost per Unit</u>	<u>Estimated Cost</u>
1) <u>Protection System Simulator consisting of:</u>		Rs. 6,00,000.00	Rs. 6,00,000.00
a. Directional earth fault relay.	1		
b. Differential relay.	1		
c. Inverse time over current relay.	1		
d. Current time relay.	1		
e. Over current relay.	1		
f. Simulating panel with circuit breaker.	1		
g. 3 -Single phase transformer.	1		
h. Digital trainer.	1		
i. Static relay trainer.	1		
j. Protective relay installation kit.	1		
k. Relay test set.	1		
l. Power pack.	1		
m. Load resistor.	1		
n. Transformer single phase.	1		
o. Ammeter 0-2 A	4		
p. Ammeter 0-12 A	1		
q. Rheostat 150 Ohms	1		
r. Rheostat 500 Ohms	1		
s. Current transformer.	6		
t. Load Switch.	1		
u. Line model.	2		
v. Second meter.	1		
w. Simulator pannel.	1		
x. Multi Meter.	3		
y. Volt meter.	1		

---

Rs. 6,00,000.00

---

3. DEPARTMENT OF MECHANICAL ENGG:  
 (a) EQUIPMENT FOR DEPARTMENT OF MECHANICAL  
ENGINEERING

AUTOMOBILE ENGINEERING

S.No.	Description of Equipment	Quantity	Cost
1.	<u>THEPRA-Erehtnomess:</u> Hydraulic dynamometer for OTTO and Diesel engines. The compact setting up allows rapid change from one engine to another.	1	Rs. 1,50,000/-
2.	<u>THEPRA-Air/Fuel Measuring.</u> An ideal instrument to measure air and fuel consumption on engine under test.	2	Rs. 45,000/-
3.	<u>Measuring and checking of Wear in cylinder:</u> Wear can be measured at all positions of cylinder.	1	Rs. 25,000/-
4.	<u>University Brake Test-Stand.</u> Brake-forces in drum and disc brakes, friction valves of brake-pads, effect of dry and wet braking.	1	Rs. 1,00,000/-
5.	<u>Automotive Clutch Testing:</u> Contact force, transferable torque, dependable on the state of clutch parts (220 volts-50 cycles electric supply)	1	Rs. 1,00,000/-
6.	<u>Diesel Injection Pump test stand:</u> Start of injection, end of injection, change and measurement of injection. Volume, injection. Volume, injection nozzle, (Centrifugal governor).	1	Rs. 1,00,000/-
7.	<u>Front Axle Measuring stand with Wishbone Suspension:-</u> Adjustment and measuring of: Track, Camber, Caster, Kingpin inclination, steering trapezoid and measurement of electric forces.	1	Rs. 73,000/-
			Rs. <u>5,95,000/-</u>

B.P. Rs. 5,95,000/-

S.No.	Description of Equipment	Qty	Cost
8.	<u>Transparent Hydraulic Brakes:</u> Function of master cylinder, wheel brake cylinder, warning upto brake fluid, compensation chambers: trapped-air.	1	Rs. 52,500/-
9.	<u>Test stand for electric systems:</u> Complete lighting equipment, ignitions systems, diesel preheating systems (with voltage regulator 6-12-16 V ) and 30/70 A.	1	Rs. 50,000/-
10.	<u>Test stand for the electric/electronic system</u> Diode testing (polarity), rectification through diods, alternator, starter with battery, ignition distributor.	1	Rs. 1,00,000/-
11.	<u>K-JEPRONIC:</u> Mechanical-fuel injection, measurement of air volume, mixture governor, measurement of injection volume, Warm-up governor.	1	Rs. 1,00,000/-
12.	<u>Shock Absorber.</u> Plotting of diagrams of wheel and body vibrations, exchangeable shock absorbers	1	Rs. 80,000/-
13.	Diesel Injection Element.	4	Rs. 4,000/-
14.	Hydraulic unit Main brake cylinder with power booster attachment unit for Sr: No. 4 & 5.	1	Rs. 50,000/-
15.	Transistorized ignition coil system with HALL tranemitter	1	Rs. 25,000/-
16.	Instruction Model Two stroke Engine, Model No. Best Nr. 4042.		Rs. 20,000/-
17.	Instruction Model Wankal Engine, Model No. Best Nr. 4045		Rs. 20,000/-
			Rs. 10,96,500/-

		B.F.	Rs. 10,96,500/-
S.No.	Description of Equipment	Qty	Cost
18.	Original Automatic Gear Box. Model No. Best Nr. 4440.		Rs. 20,000/-
19.	Instruction Model Automatic Transmission. Model No. Best Nr. 4024.		Rs. 30,000/-
20.	Instruction Model Turbo Jet. Model No. Best Nr. 4715.		Rs. 20,000/-
21.	Air and Steam Nozzle Demonstration App. Fase 210 Model No. TD-203.		Rs. 30,000/-
22.	Gilkes-Rollab-GA-10 Supersonic-Wind-Tunnel ( Complet - Set ) ( with 220 volts and 50 cycles ).	1	Rs. 1,50,000/-
23.	Gilkes-GT 117 Turbojet-Engine Test-set ( complete set ) ( with 220 volts and 50 cycles )	1	Rs. 2,00,000/-
		Total	Rs. 15,46,500/-

(b) EQUIPMENT FOR HEAT TRANSFER LAB: IN MECHANICAL ENGG: DEPARTMENT.

Sr. No.	Description Equipment	Qty	Total Cost in Rs.
1.	THERMO-FLUID TUTOR GILKES-GT-106 (complete unit with 220 volts and 50 cycles electric supply).	1	1,00,000.00
2.	Flow Visualisation Wind-Tunnel GILKES GA-9.	1	20,000.00
3.	Two-shaft Gas Turbine GILKES GT 82-2 (with 220 volts supply).	1	60,000.00
4.	"Combustion Laboratory Unit" C 491.	1	50,000.00
5.	"Electronic, fire, analytical balance" "Digital-Display."	3	80,000.00
6.	Tool-maker's Digital Measuring Micro-scope WMM 100/50.	1	50,000.00
7.	Universal Tensile Testing machine for Tensile, compression and bending etc: 30 ton capacity (with 220 volt and 50 cycles).	1	2,50,000.00
8.	Open-front Power PRESS" (small size) with puch and Dies of all kinds) (220 volts and 50 cycles).	1	1,00,000.00
9.	Fluidisation and Fluid V Bed Heat-transfer- unit. Cat No. 692 (Edition II P.A. Hilton Ltd). England.	1	87,500.00
10.	Heat conduction unit Cat. No. 940.	1	17,500.00
11.	Boiling Heat Transfer unit Cat No. 653.	1	35,000.00
12.	Water/Water Turbulent-Flow Heat Transfer Unit Cat No. 950.	1	52,500.00
13.	Unit Cat No. 910.	1	52,500.00
14.	Thermal Radiation Unit. Cat No. 960.	1	35,000.00
15.	Temperature Measurement Unit.	1	17,500.00
16.	Conductive Heat Transfer Experimental and Research Unit.	1	1,75,000.00
17.	Mechanical Engg: Water cooling Tower.	1	52,500.00
18.	Instruction Model two Stroke Engine, Model No. Best No. 4042 W.Germany.	1	7,000.00
19.	Inst: Model Epicylic gear Model No. Best Nr. 4029, W.Germany.	1	12,000.00
Total Rs.			12,51,000.00

(c) PRODUCTION ENGINEERING

S.No.	Description of Equipment	Qty.		Cost
1.	Sigma Mechanical Comparator	1	Rs.	25,000/-
2.	Talymin Electrical Comparator	1	Rs.	25,000/-
3.	Horizontal Optical Computer.	1	Rs.	25,000/-
4.	Microptic Auto-Collimator.	1	Rs.	50,000/-
5.	Flatness Interferometer.	1	Rs.	50,000/-
6.	Set of Slip-gauges.	1	Rs.	15,000/-
7.	Set of Plug and ring gauges.	1	Rs.	15,000/-
8.	Profile-Projector	1	Rs.	35,000/-
9.	Laser, Centre detector, and readout meters.	1	Rs.	30,000/-
10.	PNEUMATIC-Comparator	1	Rs.	25,000/-
11.	Talysurf Instrument.	1	Rs.	30,000/-
12.	Laser-Beam Machining.	1	Rs.	1,60,000/-
		Total	Rs.	<u>4,85,000/-</u>

(d) FUEL-LABORATORY/METALLURGY  
LABORATORY

S.No.	Description of Equipment	Qty	Cost
1.	Micro-Hardness Tester O.S.K. 2278 2nd Edition,	1	Rs. 30,000/-
2.	Automatic Densimeter O.S.K. 1894 2nd Edition	1	Rs. 30,000/-
3.	Saybolt-Viscometer, O.S.K. 2872	1	Rs. 20,000/-
4.	Gas-Calorimeter, O.S.K. 2911 (complete set).	1	Rs. 25,000/-
5.	Bomb-Calorimeter O.S.K. 2912 (complete set) with 220 volt & 50 cycles Elect. supply).	1	Rs. 30,000/-
6.	Oxygen-Bomb-Calorimeter (Digital type) O.S.K: 2914 (complete set)	1	Rs. 30,000/-
7.	Cone-Penetration for Greases O.S.K.2951	1	Rs. 15,000/-
8.	Metallographic-Microscope, O.S.K.5900 (MR) (with 220 volts & 50 cycles electric supply).	1	Rs. 55,000/-
9.	Metallographic Microscope, O.S.K. 5898 (220 volts and 50 cycles)	1	Rs. 55,000/-
10.	Optical- Pyrometer, O.S.K. 4829	1	Rs. 30,000/-
11.	Digital Thermo-meter, O.S. K.4827	2	Rs. 10,000/-
12.	Digital strobo scope, O.S.K. 4794 (with 220 volts and 50 cycles)	2	Rs. 10,000/-
13.	Precision - Balance O.S.K. 4725	2	Rs. 30,000/-
14.	Specimen mount press Model 5909 with accessories	1	Rs. 30,000/-
15.	High speed precision cut off Machine Model O.S.K. 5908, with accessories	1	Rs. 30,000/-
16.	Specimen Dryer Model O.S.K. 5913 with accessories.	1	Rs. 15,000/-
17.	Hardness tester Model 436881 "Frankokop" for brinell Vickers and Rockwell Hardness test equipped with projection device.	1	Rs. 2,00,000/-
Total			Rs. 6,45,000.00

(o) GEOMETRICAL DRAWING MODELS

G. Cussions Ltd: 102 Great Clowes Street Manchester M 7-9 RH England				
Product Number	Description	Product Group	UEP REF	Price F.O.B. in £
P-1002	Simple Bearing Housing (37mm)	23	G-2	106
P-1003	Split Bearing with separate Shells.	23	G-2	127
P-1005	Assembly Key & Slotted Keyway.	23	G-2	189
P-1006	Assembly with Saddle Key.	23	G-2	81
P-1008	Taper Pin to allow rotation.	23	G-2	95
P-1012	Foundation Bolt.	23	G-2	81
P-1014	Gib and Cotter Joint in Section.	23	G-2	120
P-1017	Pist-on with Rings and Part Piston Rod and Nut.	23	G-2	145
P-1025	Single Rivetted Lap Joint.	2	G-2	59
P-1026	Double Rivetted Lap Joint.	23	G-2	72
P-1027	Angle Iron Joint.	23	G-2	72
P-1029	Wall Bracket (for P-1005).	23	G-2	143
P-1030	Ragbolt (25mm) with Nuts.	23	G-2	127
P-1032	Knuckle Joint.	23	G-2	170
P-1033	Rivetted Joint with 6 Rivet Forms.	23	G-2	143
P-1034	Thread Form Isometric.	23	G-2	72
P-1035	Thread Form Buttress	23	G-2	72
P-1036	Thread Form Square	23	G-2	72
P-1037	Bolt, Nut and Washer.	23	G-2	72
P-1040	Pulley	23	G-2	127
P-1043	Connecting Rod End with Gibs and Cotter.	23	G-2	170
P-1044	Double Rivetted Butt Joint.	23	G-2	85
P-1046	Belt Pulley Grooved.	23	G-2	143
P-1051	Big Eng Assembly.	23	G-2	262
P-1066	Bearing Shello with Location.	23	G-2	120
P-1073	Box Spanner.	23	G-2	72
P-1113	Complete Set of 22 models in a Box.	23	G-1	2606
P-1138	Set of models P-1121 to P-1137 inclusive.	23	G-1	1723

R 1 £ = Ru. 33.30

G. Total: £ 7324

£ 7324.00 x 33.30 =

Ru. 2,43,889.00

4. EQUIPMENT FOR AGRICULTURAL ENGINEERING DEPARTMENT  
 (a) AGRICULTURAL MACHINERY AND POWER TESTING LABORATORY.

<u>S.No.</u>	<u>Items</u>	<u>Quantity</u>	<u>Total Cost in Rs.</u>
1.	Implement testing bed with Automatic Motorised crane on Girders for Tillage equipment.	One	90,000.00
2.	Milling Machine.	One	2,00,000.00
3.	Heavy Duty Lathe Machine.	One	24,000.00
4. a.	Suzuki Engine of 3.5 H.P. (Six in Numbers) Single Cylinder, Two Stroke.	One	80,000.00
b.	Dongfin 15-20 H.P. (Three in Numbers) Two Cylinder, Two or Four Stroke.		
5.	Shearing Machine.	One	1,00,000.00
6.	Press Brake or Bending Machine.	One	1,50,000.00
7.	Rolling Machine.	One	1,00,000.00
8.	Photostato Machine with all accessories.	One	1,00,000.00
9.	Camera.	One	8,000.00
10.	Slide Projector.	One	10,000.00

Rs. 8,62,000.00

			<u>US Dollar</u>
11.	Demonstration Model Carburetor.	One	500.00
12.	Carburettor Experimental and Demonstration Device for pressure and flow Experiments.	One	600.00
13.	Demonstration Panel K-Jetronic.	One	400.00
14.	Training Stand Motoronic System.	One	400.00
15.	Demonstration Model Lambda Probe (exhaust Pipe).	One	400.00
16.	Instruction Model Diesel Engine.	One	500.00
17.	Instruction Model Original Diesel Engine.	One	500.00
18.	Cylinder Head Pre Chamber.	One	200.00
19.	" " Direct Injection.	One	200.00
20.	" " Whirl Chamber.	One	200.00
21.	Vacuum Regulator.	One	200.00
22.	Nozzle Holder with Injection.	One	300.00
23.	" " " Pintle Nozzle.	One	200.00

↓ 1,500

Sr. No.	Items	B.B.F.	\$	4600.00
		Qty	US Dollar	
24.	Injection Timing Gear.	One		250.00
25.	Diesel Engine piston pump for direct Injection.	One		350.00
26.	Plunger and Barrel assembly.	One		300.00
27.	Fuel supply pump/diesel	One		200.00
28.	Instruction model Wankel Engine.	One		200.00
29.	Instruction model four stroke petrol engine.	One		300.00
30.	Lubrication Pump.	One		200.00
31.	" Colling	One		200.00
32.	Training stand K-Jetronic	One		200.00
33.	Instruction model diesel Pump.	One		300.00
34.	" " " Injection.	One		200.00
35.	Diesel In-line pump with fly weight Governor	One		200.00
36.	Wall model of diesel Injection system.	One		1000.00
37.	Diesel In-line Pump with fly weight Pneumatic Governor	One		600.00
38.	Instruction model Diesel Injection Pump distributor			570.00
39.	Instruction model distributor fuel injection Pump.	One		800.00
40.	Instruction model distributor fuel injection pump type boasch	One		900.00
41.	Diaphragm spring clutch.	One		500.00
42.	Distributor Injection Pump Roasum-Master	One		900.00
43.	Double Disc clutch	One		500.00
44.	Instruction model clutch coupling	One		400.00
45.	Torque Converter.	One		400.00
46.	Hydraulic clutch	One		300.00
47.	Instruction model Gear box with clutch (Large model)	One		500.00
48.	Instruction model original synchronised gearing with clutch.	One		600.00
49.	Instruction model Epicyclic gear	One		300.00
50.	Instruction model automatic transmission with torque Converter.	One		500.00
			\$	<u>16270.00</u>

<u>Sr. No.</u>	<u>Items</u>	<u>Qty</u>	<u>HS Bill</u>
		B.R.P.	16,70,00
51.	Instruction Model Original Servo Steering Gear (Sectioned made of Original Parts).	One	400.00
52.	Instruction Model Original Steering gear with front axle.	One	500.00
53.	Worm and wheel steering gear(sectioned model made of original parts an metal perestal)	One	600.00
54.	Instruction model original servo brake (sectioned model made of original parts)	One	400.00
55.	Instruction model Disc brake.	One	500.00
56.	Instruction model Hydraulic brake.	One	600.00
57.	Instruction model Hydraulic Dual circuit brake (standard model)	One	500.00
58.	Data Logger.	One	1,000.00
59.	Crow wheel and pinion demonstration with teaching notes.	One	500.00
60.	Dual drum brake system.	One	500.00
61.	Diesel fuel system and turbocharger.	One	800.00
62.	Petrol fuel system.	One	500.00
63.	Ignition system.	One	300.00
64.	Automatic electrical system.	One	300.00
65.	Electric Motors and Instrumentation.	One	1,000.00
66.	Suspension and cooling system.	One	1,000.00
67.	Gear Box.	One	800.00
68.	Rear Axle and Hydraulic Brake.	One	600.00
69.	Tractor electrical system.	One	600.00

C/O

<u>Sr. No.</u>	<u>Items</u>	<u>Qty.</u>	<u>US Dollar.</u>
70.	Pump (Fuel)	One	1,200.00
71.	Farm Tractor Crawler type.	One	6,000.00
72.	Strain Gauge Kit.	One	1,000.00
73.	Whirling of Shafts.	One	500.00
74.	Motor Scope (Oscilloscope Engine Analysis).	One	5,000.00
75.	Auto Mate (Computer Engine Analyser).	One	5,000.00
76.	OSC, Uoscope.	One	800.00
77.	SHM Automatic Slicer for round cans.	One	1,500.00
78.	Automatic Filer.	One	2,000.00
79.	Original Steering Gear.	One	300.00
80.	Instruction Model Ball Steering (Sectioned Model made of Original parts an metal perestal).	One	400.00
81.	Multi Tester.	One	800.00
82.	Four speed Manual synchromesh gear box with teaching notes.	One	500.00
83.	Three speed automatic gear box with teaching notes.	One	500.00
84.	Rear axle unit complete with teaching box.	One	914.00
85.	Set of three steering boxes with teaching notes.	One	700.00
Total US \$			54,034.00

1 US \$ @ Rs. 17.80 Total Rs. 9,73,375.00

(b)

EQUIPMENT FOR AGRICULTURAL ENGINEERING DEPARTMENT

<u>S.No.</u>	<u>Name of Equipments</u>	<u>Quantity</u>	<u>Cost in Rs.</u>
1.	Soil Water Tensiometers.	5	10,000.00
2.	Pressure Membrane Apparatus.	5	10,000.00
3.	Soil Drying Oven.	2	24,000.00
4.	Chemicals for Soil Testing.	-	40,000.00
5.	Constant Head Permeameter.	2	20,000.00
6.	Falling Head Permeameter.	2	30,000.00
7.	Bouyoucos Mixture Meters.	5	80,000.00
8.	Infiltrometers.	5	75,000.00
9.	Portable digital PH Meters.	5	2,00,000.00
10.	Combination Test kit for Soils.	5	70,000.00
11.	Water quality testing Kit.	2	24,000.00
12.	Sprinkler Irrigation Model.	2	1,00,000.00
13.	Drip Irrigation Model.	2	1,40,000.00
14.	Neutron Scattering Apparatus.	2	70,000.00
15.	Thermocouples.	2	50,000.00
16.	Thermal Balances for Moisture Measurement.	5	1,00,000.00
17.	Meteorological Equipments for Field and Laboratory.	2	2,00,000.00
18.	Sieve Analysis Set.	5	50,000.00
19.	Portable Soil Thermometers.	5	40,000.00
20.	Soil Anger Set.	5	50,000.00
21.	NPK Soil Testing Kit.	2	40,000.00
22.	Salinity meters.	5	75,000.00
23.	Electrical Conductivity Probe Kit.	2	20,000.00
24.	Water Level Indicator.	5	1,00,000.00
25.	Liquid Limit Device.	5	20,000.00
26.	Sieve Shaker (Electrical).	2	20,000.00
27.	Analytical Balances.	5	1,00,000.00
28.	Electronic Top-Pan Balance.	2	1,60,000.00

---

Total Rs. 25,98,000.00

---

(5). EQUIPMENT FOR MINING ENGINEERING DEPARTMENT.

(a). (SAFETY AND MINE VENTILATION LAB:)

<u>S.No.</u>	<u>Items</u>	<u>Qty.</u>	<u>Total Cost</u>
1.	Pipe flow and Nozzle apparatus and fan test rig with a set of additional fittings like 90° Bend, right angle elbow, Cascaded corners, radial and backward curved impellers, orifice plates and floor stands etc.	One	£ 4,000.00
2.	Fan Test Set Complete with spring balance, revolution counter etc.	One	£ 3,000.00
3.	Multitube Manometer complete with polythene tubing etc: Size No. 1.	One	£ 650.00
4.	Two stage Centrifugal Pump Test Set.	One	£
5.	Pipe Friction (Tec Equipment Bosall street, Long Eaton, Nottingham NG 10 2AH England).	One	£ 600.00
6.	Losses in Pipe Bends --do--	One	£ 2,000.00
7.	Portable Test Set. (Airflow Developments Ltd: Lancaster Road High Wycombe Bucks England).	One	£ 200.00
			<hr/>
Total			£ 10,450.00
			<hr/>
8.	Self Contained Oxygen Breathing apparatus (BC 17 <sup>h</sup> Drägerwerk Ag Libeck).	One	Rs. 5,000.00
9.	Universal Test Set RZ 25.	One	Rs. 2,000.00
			<hr/>
			Rs. 7,000.00
			<hr/>

$$1 \text{ £} = @ \text{ Rs. } 33.30 \times 10,450.00 = 3,47,985.00$$

Rs. 7,000.00

G. Total Rs. 3,54,985.00

---

(b) EQUIPMENT FOR MINE VENTILATION AND SAFETY LABS:

<u>S.No.</u>	<u>(i) Equipment (Mine Ventilation)</u>	<u>Qty</u>	<u>Price in Rs.</u>
1.	Sets of connecting ducts.		20,000.00
2.	Getger counter.	1 "	20,000.00
3.	Portable dust sampler.	1 "	10,000.00
4.	Radon detector.	1 "	20,000.00
5.	Digital Luxiometer.	1 "	10,000.00
6.	Wind Tunnel, complete with a small fan.	1 "	1,00,000.00
			Total Rs. 1,80,000.00

(ii) EQUIPMENT (MINE SAFETY)

<u>S.No.</u>	<u>Description</u>	<u>Unit/Price</u>	<u>Qty</u>	<u>Price in Rs.</u>
1.	Portable O <sub>2</sub> meter for O <sub>2</sub> measurement in mines.	20,000/-	2	40,000.00
2.	Portable Co Detector for Co measurement in mines.	35,000/-	2	70,000.00
3.	Portable Co <sub>2</sub> Detector for Co <sub>2</sub> measurement in mines.	35,000/-	2	70,000.00
4.	Portable methanometer for measurement of methane in mines.	40,000/-	2	80,000.00
5.	Multi gas detector for measurement different gases in mines.	40,000/-	2	80,000.00
6.	Portable dust sampler for dust sampling in mines.	10,000/-	2	20,000.00
7.	Digital luxiometer for measuring the low intensities of illumination in mines.	10,000/-	2	20,000.00
8.	O <sub>2</sub> Breathing apparatus for rescuing mines workers after an explosion.	20,000/-	1	20,000.00
9.	Self Rescuer for use by mine workers in emergency in coal mines.	15,000/-	4	60,000.00
10.	Oil Flame Safety lamps.	1,250/-	4	5,000.00
11.	Miners safety lamps attachable to hard hats.	250/-	10	2,500.00
12.	Miners safety hard hats (plastic made).	300/-	10	3,000.00
13.	Wet and Dry bulb Hygrometer.	1,500/-	2	3,000.00
14.	Portable Aneroid barometer.	200/-	2	4,000.00
				Total Rs. 4,77,500.00

(c)

EQUIPMENT FOR MINERAL DRESSING LABORATORY.

<u>S.No.</u>	<u>Description</u>	<u>Price in Pak: Rs.</u>
1.	X.R.F. (X-Ray Fluorescence Equipment).	70,00,000.00
2.	U.V. Spectro Photometer (trace elements).	3,00,000.00
3.	Deionised water production apparatus.	20,000.00
4.	Compressor (small).	30,000.00
5.	Filter drum (Pressure).	40,000.00
6.	Balance (1) (readability .01 gram).	25,000.00
7.	Balance (2) (readability .001 gram).	48,000.00
8.	Ball mill (continuous) + classifier.	1,20,000.00
9.	Magnetic stirrer.	5,000.00
10.	P.H. Meter.	18,000.00
11.	Electro static separator.	1,25,000.00
12.	High intensity Magnetic separator.	2,70,000.00
13.	Zeta potential measuring equipment	40,000.00
14.	High speed blander	15,000.00
15.	Crusher (gyratory)	80,000.00
16.	Rolls crusher	38,000.00
17.	Ultra sonic bath	34,000.00
18.	Vibrating grinding Mill	1,48,000.00
19.	S-prials	1,50,000.00
20.	Wet sieve analysis equipment	45,000.00
21.	Two sets of sieves, (ASTM), (BS)	28,000.00
22.	Automatic pointer scale capacity 5 Kg	23,000.00
23.	Automatic capacity 15 Kg	13,000.00
24.	Thermostatic Water bath	67,000.00
25.	Laboratory Furnace	60,000.00
26.	Water Distillation Apparatus	10,000.00
27.	Sedimentation apparatus	1,00,000.00
28.	Mercury Pycnometer	25,000.00
29.	Refracto: meter	45,000.00
30.	Flotation reagents (various)	25,000.00
31.	Flotation cell (Automatic)	1,00,000.00

---

Total Rs. 90,47,000.00

---

(d) EQUIPMENT FOR DRILLING LABORATORY.

<u>S.No.</u>	<u>Instrument Description</u>	<u>Qty</u>	<u>Cost in Rs.</u>
1.	Single tube Core barrel.	1	50,000.00
2.	Double tube rigid type core barrel.	1	60,000.00
3.	Double tube swivel type core barrel.	1	80,000.00
4.	Wire line core barrel.	1	50,000.00
5.	Marsh funnel for measurement of Viscosity.	1	20,000.00
6.	P.H. Meter.	1	10,000.00
7.	Clinometer.	1	15,000.00
8.	Mass compass for surveying shallow holes.	1	5,000.00
9.	Mass compass for surveying deep holes.	1	7,000.00
10.	Trepani drill hole instrument.	1	15,000.00
11.	Multi shot directional survey instrument.	1	50,000.00
			<hr/>
Total Rs.			3,62,000.00

(e) EQUIPMENT FOR ROCK MECHANICS LAB:

1.	Universal Testing Machine (100 Tons capacity) with Data acquisition system complete with monitor and printer.	1	25,00,000.00
2.	Strain gauges and meters.	1	2,00,000.00
3.	Schmidt's Hammers or the like.	2	20,000.00
4.	Direct shear test apparatus (shear box).	1	2,50,000.00
5.	Rock sample grinder & polisher.	1	75,000.00
6.	Digital weighing scale 5/10 Kg capacity.	2	50,000.00
7.	Seismograph (for measurement of blast vibrations).	1	25,000.00
8.	Vernier callipers with dials.	2	2,000.00
9.	Word Processor for reports, Projects, Office work.	2	50,000.00
10.	Hollow Drill barrells with fixed bits in various sizes, 1" to 3".	12	70,000.00
11.	Core Drilling Machine with Bit. of various sizes.	1	2,00,000.00
12.	Rock cutting saw with diamond impregnated Blades.	1	1,00,000.00
			<hr/>
Total Rs.			35,42,000.00

(f) EQUIPMENT FOR SURVEY LABORATORY

<u>S.No.</u>	<u>Name of Equipment</u>	<u>Qty</u>	<u>Cost in Rs.</u>
1.	Automatic routine level with horizontal circle 360/400 g.	1	1,00,000.00
2.	Dumpley level with tilting screw telescopic magnification 30 x	1	52,000.00
3.	Automatic engineers level reading to 1", horizontal circle 360° with erect telescope image.	1	60,000.00
4.	Mining suspension theodolite with high resolution telescope with reading microscope.	1	1,22,000.00
5.	Set of essential accessories with item No.4.	1	9,000.00
6.	Special temperature measuring device battery operated range (55° to 155 C°, with spare batteries.	1	6,000.00
7.	Tachometric staff telescopic made of aluminum tubing.	4	6,000.00
8.	Leveling staff 50 mm wide length 3 m made of wood,	4	6,000.00
9.	Measuring tape stainless steel in metal frame in metric graduations on one sides and feet on other side length 330 ft.	3	9,000.00
10.	Distance meter, for measuring upto 10,000 meters highest accuracy.	1	4,000.00
11.	Geological standar compass with clinometer gradation from ( 90° - 0 -90°) with leather case.	1	11,000.00
12.	Geological stratum compass with declination arc and leather case.	1	13,000.00
13.	Mining compass.	1	14,000.00
14.	Precision pocket altimeter temp. compensated with leather case, with strap and separate whirling thermometer.	1	11,000.00
15.	LASER CONTROLLED THEODOLITE for high precision tunnel surveying with necessary accessories.	1	4,00,000.00
16.	Plane table tachometer with auto reduction device, vertical circle reading to estimation to 1 with four interchangeable plotting rulers, plane table plate ( 420 x 420)mm.	1	60,000.00

---

 Rs. 8,83,000.00

		B.B.F.	Rs.	8,83,000.00
17.	Binoculars highest megnefications.	4	Rs.	60,000.00
18.	Tension handle (spring balance).	4	Rs.	2,000.00
19.	Substance bar (for linear measurement).	2	Rs.	4,000.00
20.	Thermometer for base line measurement.	8	Rs.	2,000.00

---

Total Rs. 9,51,000.00

---

EQUIPMENT FOR DIFFERENT LABORATORY.

(g) TEACHING AIDS.

<u>S.No.</u>	<u>Description of equipment</u>	<u>Qty</u>	<u>Cost</u>
1.	Slide Projectors.	4	Rs. 20,000.00
2.	Overhead Projectors.	4	Rs. 60,000.00
3.	Transparency Maker.	1	Rs. 5,000.00
4.	Projection type video cassette recorder.	1	Rs. 35,000.00
5.	Folding Screens.	4	Rs. 20,000.00
6.	Pointer lights.	2	Rs. 2,000.00
7.	Carasole for slide Projectors.	8	Rs. 2,000.00
<u>Total</u>			<u>Rs. 1,41,000.00</u>

) GEOLOGY LAB:

1.	Collection of 30 rock forming minerals thin sections, corresponding to minerals.	Rs.	7,000.00
2.	Pocket scale of hardness points.	Rs.	11,000.00
3.	Set of 15 glass crystall models.	Rs.	11,000.00
4.	History of the Earth.	Rs.	6,000.00
5.	Mountains models.	Rs.	5,000.00
6.	Set of 28 Gem Stones.	Rs.	7,000.00
7.	Polished or sections set of 80 mineral sections, arranged to different metallic elements.	Rs.	20,000.00
8.	Crystal and Atomic structure models. A set of six models to illustrate. Isometric, Tetragonal, Hexagonal, Orthorhombic and triclinic crystal system. (2 Nos).	Rs.	20,000.00
9.	Wooden Crystal Models. (2 Nos).	Rs.	5,000.00
10.	Micro-scope with Projection screen.	Rs.	9,00,000.00
<u>Total</u>			<u>Rs. 9,92,000.00</u>

(6). EQUIPMENTS FOR BASIC SCIENCE DEPARTMENT.

(a) PHYSICS LABORATORY

<u>S.No</u>	<u>Items</u>	<u>Quantity</u>	<u>Total Estimated Cost</u>
1.	Microwave Transmitter & Receiver Multimeter, Reflecting Plates and with all other accessories.(Complete Set).	1 Set	Rs. 45,000
2.	Geiger Muller Counter, with GS Tube Source Kit (Co 60), (Complete Set).	1 Set	Rs. 1,00,000
3.	Electric Balance Single Fan.	1 No	Rs. 40,000
4.	V.T.V.M.	3 Nos	Rs. 45,000
5.	Power Supply (0-250V).	2 Nos	Rs. 30,000
6.	H.T.Power Supply (- 5 KV).	1 No	Rs. 20,000
7.	Auto Varia Travormer.	3 Nos	Rs. 8,000
			<hr/>
			Total Rs. 2,88,000
			<hr/>

Appendix 2. List of Equipment required for the proposed department of Chemical Engineering.

a) General Chemistry Laboratory:-

<u>S.No.</u>	<u>Name of Apparatus</u>	<u>No.</u>	<u>Estimated Cost</u>
1	Drying Oven	3	Rs. 10,000/-
2.	Thermostat	1	Rs. 30,000/-
3.	Hot Plate	1	Rs. 5,000/-
4.	Glassware Drier	3	Rs. 20,000/-
5.	Water bath	3	Rs. 20,000/-
6.	Heating Mantle	5	Rs. 15,000/-
7.	Chamber Furnance .	1	Rs. 50,000/-
8.	Magnetic Stirrer	5	Rs. 10,000/-
9.	Rotary Vacum Evaporator	2	Rs. 15,000/-
10.	Flask Shaker	2	Rs. 50,000/-
11.	Calorimeter	1	Rs. 30,000/-
12.	Vacum Pump	2	Rs. 12,000/-
13.	Balance (Rough)	1	Rs. 8,000/-
14.	Flowmeter	2	Rs. 10,000/-
15.	Refrigerator	2	Rs. 16,000/-
16.	Laboratory Centrifuge	2	Rs. 40,000/-
		<b>Total:-</b>	<b>Rs. 3,11,000/-</b>
	Glassware & Chemicals		Rs. 1,00,000/-
		<b>Total:-</b>	<b>Rs. 4,11,000/-</b>

c ) Analytical Chemistry Laboratory:-

<u>S. No.</u>	<u>Name of Apparatus</u>	<u>No.</u>	<u>Estimated Cost</u>
1.	Automic Absorption Spectrophotometer	1	Rs. 3,00,000/-
2.	UV Spectrophotometer	1	Rs. 1,25,000/-
3.	Polarograph	1	Rs. 3,50,000/-
4.	Electrolysis Apparatus	1	Rs. 50,000/-
5.	Gas Analysis Apparatus	1	Rs. 20,000/-
6.	Conductivitymeter	1	Rs. 2,000/-
7.	PH Meter	2	Rs. 15,000/-
Total:-			Rs. 8,62,000/-

.....

d ) Special Laboratory:-

<u>S. No/</u>	<u>Name of Apparatus</u>	<u>No.</u>	<u>Estimated Cost</u>
1.	Automatic Flash point Tester	1	Rs. 40,000/-
2.	Redwood Viscometer	1	Rs. 6,000/-
3.	Distillation apparatus for Fuels	1	Rs. 2,00,000/-
4.	Tar Viscometer	1	Rs. 5,000/-
5.	Carbon Residue Tester	1	Rs. 3,000/-
6.	Vapour Pressure Tester	1	Rs. 10,000/-
7.	Cement setting time tester	1	Rs. 4,000/-
8.	Refractometer	1	Rs. 50,000/-
9.	Polarimeter	1	Rs. 2,00,000/-
10.	Apparatus for determining setting time of the cement	1	Rs. 25,000/-
Total:-			Rs. 5,43,000/-

c) Unit Operation and Pilot Plant Laboratories:-

<u>S. No.</u>	<u>Name of Equipment</u>	<u>No.</u>	<u>Estimated Cost</u>
1.	Filter Press	1	Rs. 1,20,000/-
2.	Distillation Column	1	Rs. 5,00,000/-
3.	Wet and Dry Grinding Pilot Plan	1	Rs. 2,50,000/-
4.	Pilot Plant Shking Machine	1	Rs. 50,000/-
5.	Floatation apparatus	1	Rs. 3,00,000/-
6.	Grystalizer	1	Rs. 3,00,000/-
7.	Jaw Grusher	1	Rs. 2,00,000/-
8.	Majnetic Sparator	1	Rs. 2,50,000/-
9.	Spray Drier	1	Rs. 70,000/-
10.	Misc:	1	Rs. 1,00,000/-
<b>Total:-</b>			<b>Rs. 21,40,000/-</b>

(7). EQUIPMENT FOR UNIVERSITY WORKSHOP

1. Horizontal Broaching Machine, Model RW 1000/2

a) BROACHING TOOLS :-

1. Pc.	Broach No. 4	)		
	Slot Depth 1,8+0,1 mm	)		
	Slot Width 4 mm	)	DM	600.00
	Broaching Length 12-30 mm	)		
	total tool length 600 mm	)		
1. Pc.	Broach No. 13	)		
	Slot Depth 2,8+0,1 mm	)		
	Slot Width 6 mm	)	DM	750.00
	Broaching Length 20-60 mm	)		
	Total tool Length 1000 mm	)		
1. Pc.	Broach No. 17	)		
	Slot depth 3,3+0,2 mm	)		
	Slot width 8 mm	)	DM	800.00
	Broaching Length 24-60 mm	)		
	Total tool Length 1000 mm	)		

b) BROACH GUIDING ARBORS :

1 No. Arbor				
	Diam. 12 g <sup>6</sup> x 5 (4) x 90 mm		DM	400.00
	long for slot width 4 mm			
1 No. Arbor				
	Diam. 20 g <sup>6</sup> x 6 x 130 mm		DM	400.00
	long for slot width 6 mm			
1 No. Arbor				
	Diam. 25 g <sup>6</sup> x 8 x 130 mm		DM	450.00
	long for slot width 8 mm			

2. CENTRIFUGAL CASTING MACHINE MODEL-A.

Accessories required :-

a) Timer for preselecting centrifugal time.	DM	500.00
b) Vulcanising Form 230 ø	DM	800.00
c) Gum Plates 230 ø - 9 inch = 1 Set.	DM	60.00

---

Total DM 4,760.00

---

1 DM at the rate of = Rs. 10.80

Total in Pak Rs. 51,408.00

(8).

EQUIPMENT FOR RESEARCH

(a). DEPARTMENT OF CIVIL ENGINEERING

- Name of Project :- a) Model analysis of an integrated thin section Wall/roof structural system.
- b) Development of Structural sandwich type integral structural system for lower cost housing.
- c) Exploring this possibility of fiber reinforced concrete alone or in conjunction with M.S. reinforcement/ferrocement for developing a low cost structural system for houses.

Sr: No.	Specification/Description	Quantity required	Total cost in Rupees
1.	<u>Tensile Test accessory</u> For Unitester universal testing machine cat No.C-21 complete with assorted gripping jaws for tensile testing of wire/thin dia rods/flats.	One complete set of tensile Test accessory	Rs. 5,000.00
2.	<u>With Double Portal Fram Model</u> LFDBix2 complete structural lab: testing system with two actuators Model EPZ(S-15)nominal static load 1000 KN nominal dynamic load (500 KN) with piston stroke 250 mm. System must be completed in all respects to test specimen static as well as dynamic loads, complete with concrete strong floor. All accessories, inserts, complete with control systems for application & recording of static as well as dynamic loads. Fully operational.		Rs.18,50,000.00
3.	DEMEC Strain gauges WF 52919, 50 mm length with ref rod setting bar and case.	One	Rs. 2,500.00
	WF 52920 -do- 100mm length	One	Rs. 2,500.00
	WF 52921 -do- 150mm length	One	Rs. 3,000.00
	WF 52930 -do- 200mm length	One	Rs. 3,000.00

CIVIL ENGINEERING DEPARTMENT

Sr: No.	Specification/Description	Quantity required	Total Cost Rs.
	WF 52932 -do- 250mm length	One	Rs. 3,000.00
	WF 52935 Stainless steel locating discs Box of 100	4 Boxes	Rs. 2,000.00
4.	Sieve Set 1482 (BS812 standard)	One	Rs. 5,000.00
	Sieve Set 1483 (BS 812 standard)	One	Rs. 5,000.00
	Sieve Set 1485 (ASTAM Standard)	One	Rs. 5,000.00
5.	WF 62020 Sieve shaker	One	Rs. 10,000.00
6.	Laboratory concrete mixer with drum WF 61200	One	Rs. 25,000.00
7.	Load test program controller 158 with cycle timer 158. 1 for use with MP 146 and 200 KN Jack 186.20	One	Rs. 25,000.00
8.	Interfaces and accessories for logging data from load cells straingauges, and liveair displacement stransducers DT-50-A etc: For Digital measuring system UCAM-5BT		Rs. 10,000.00
9.	Portable strain Indicator P-3500 200 Volts Ac 50 HZ	One	Rs. 15,000.00
10.	Ten channel switch and balance unit SB-IK for use with P-3500	One	Rs. 8,000.00
11.	Electrical Resistance Strain gauges type EA-06-500 BH-120	10 Pkts	Rs. 6,500.00
	Type EA-06-250 BG-120	20 Pkts	Rs. 7,000.00
	Type Ea-06-125 AD-120	10 Pkts	Rs. 3,800.00
12.	Gauge Installation Kit MAK-1 complete with all items.	One	Rs. 2,000.00
13.	Gauge Installation test model 1300	One	Rs. 2,000.00
14.	Theodolites, Model TM-6	8	Rs. 5,60,000.00
<b>Total</b>			<b>Rs. 25,60,300.00</b>

(b) ELECTRICAL ENGINEERING DEPARTMENT

Name of Project:- To study various signal processing methods.

Sr: No.	Specification/Discription	Quantity required	Total Cost Rs.	
1.	Audio Analyser W.G. Model NFA-1	1	Rs.	5,000.00
2.	Universal Network and Filter W.G. Model UN-1	1	Rs.	6,000.00
3.	Noise Generator W.G. Model SMA-1	1	Rs.	6,000.00
4.	Spectrum and Network Analyser W.G. Model SAN-1	1	Rs.	10,000.00
5.	100 MEZ Oscilloscope Philips Model PM 3267	1	Rs.	20,000.00
6.	Probes for Item 5 PM 8922	4	Rs.	1,000.00
7.	RCL Bridge Philips Model PM 6303	1	Rs.	10,000.00
8.	Service Manual of Item 7	1	Rs.	500.00
9. a)	TERCO Equipment for Studying Singals T 10	1	Rs.	1,00,000.00
b)	TERCO Equipment for Studying Microwave, system T 20		Total Rs.	1,58,500.00
c)	TERCO Equipment for Studying Telephone system T 30			

(c) DEPARTMENT OF MECHANICAL ENGINEERING

Name of Project:- Design and Construction of adiabatic water cooler with dehumidifier.

Sr: No.	Specification/Description	Quantity required	Total Cost Rs.
1.	THT-730-P Dial Thermometer	Nos. 2	Rs. 1,584.00
2.	THT-650-030A Dial Thermometer.	Nos. 2	Rs. 1,320.00
3.	BDF-384-J Balance, Precision-electronic Mettler PC 400 weighing rang 400 gm readability: 0.01 gm precision + 0.005 gm volt. 240 V, 50 cycles.	No. 1	Rs. 30,000.00
4.	Digital relative humidity meter.	Nos. 2	Rs. 24,000.00
5.	Digital hand Thermometer.	Nos. 2	Rs. 24,000.00
6.	Aqua - Boy (KFM) Type EN a	Nos. 2	Rs. 18,000.00
7.	Guitan Tastootherm D 1200 Ni cr - Ni A1 50 c <sup>o</sup> - 1200 c <sup>o</sup>	Nos. 3	Rs. 30,000.00
Total Rs.			1,28,904.00

Name of Project:- Design and mass production of efficient various capacities natural gas burners

Sr: No.	Specification/Description	Quantity required	Total Cost in Rupees
1.	<u>Orsat gas analyser</u> Gas-310-F Gas Analyser 3 Vessel.	Nos. 2	Rs. 10,560.00
2.	Gas cylinder accessories: GGM-460-C pressure regulator-2 stage as GM-440-Q but for oxygen.	No. 1	Rs. 2,640.00
3.	GAS-330-X Gas analyser 4-vessel.	No. 1	Rs. 7,920.00
4.	Gas cylinder stand and Trolley GGM-700-gas cylinder Trolley type No. 070 W.	No. 1	Rs. 2,112.00
5.	GGM-760-gas cylinder stand-070 D.	No. 1	Rs. 660.00
6.	THR-600-8 Thermometer, max. & minimum patterns.	Nos. 5	Rs. 1,320.00
7.	High performance digital thermometer Temp range (-50 c <sup>o</sup> -to-999 c <sup>o</sup> ) (3412-03)	Nos. 2	Rs. 42,000.00
Total Rs.			67,212.00

Name of Project:- Low cost solar water heater for rural Areas in particular and in Urban Areas in General.

Sr# No.	Specification/Description	Quantity required	Total cost in Rupees
1.	XHE-700-A Solar panel .	Nos. 2	Rs. 1,320.00
2.	Solar Minilaboratory.	No. 1	Rs. 34,000.00
3.	Air-cooled-Argon Ion Laser-model 162A Scientific.	No. 1	Rs. 2,52,000.00
Total			Rs. 2,87,320.00

Name of Project:- Noise measurement and analysis.

1.9	Broad spectrum frequency analyser) with accessories.	No. 1	Rs. 5,00,000.00
Total			Rs. 5,00,000.00

(d) DEPARTMENT OF AGRICULTURAL ENGINEERING

Name of Project:- Development of small self propelled sugar cane harvester for small and medium land holders of Pakistan.

Sr. No.	Specification/Description	Quantity required	Total cost in Rupees
1.	Tachometer Digital	Three	Rs. 8,000.00
2.	Petrol Engine	One	Rs. 15,000.00
3.	" "	One	Rs. 20,000.00
4.	" "	One	Rs. 25,000.00
5.	Diesel Engine	One	Rs. 20,000.00
6.	" "	One	Rs. 25,000.00
7.	" "	One	Rs. 30,000.00
Total			Rs. 1,43,000.00

Name of Project:- Evaluation of Draftability as affected by soil types & type of implement to improve tillage practices in North West Frontier Province.

Sr. No.	Specification/Description	Quantity required	Total cost in Rupees
1.	Test Bed.	One	Rs. 1,00,000.00
2.	Trolley Dynamometer.	One	Rs. 1,20,000.00
3.	Draft Dynamometer 20 Kg	One	Rs. 5,000.00
4.	" " 50 Kg	One	Rs. 10,000.00
5.	" " 75 Kg	One	Rs. 15,000.00
6.	" " 125 Kg	One	Rs. 25,000.00
Total			Rs. 2,75,000.00

(c) DEPARTMENT OF MINING ENGINEERING

Name of Project:- Processing of lead-zinc ore in Hazara District by new processes.

(a) Selective flocculation/flotation.

(b) Gravity separation using slime tables.

Sri No.	Specification/Description	Quantity required	Total cost in Rupees
1.	Lamps for Atomic Absorption Spectrometer for analysis of mineral elements Model-Alpha-1.	10	Rs. 50,000.00
2.	Muffle furnace 1200 C° Model H4	1	Rs. 20,000.00
3.	Distilled water equipment T+H Stripaction still wall bracket.	1	Rs. 1,000.00
4.	T+H Strirrer hot plate, Cat No.0900317	1	Rs. 2,000.00
5.	Therostatic water bath Jb 2 Cat No. 05400234.	1	Rs. 12,000.00
6.	Dual range electronic balance Model 36 BH/CO standard Cat No.0520731.	1	Rs. 15,000.00
7.	Dual range electronic balance Standard 22 CH/02	1	Rs. 10,000.00
8.	Plastic beakers Cat. No.03000179	1 Dozen	Rs. 300.00
9.	Stirrer R&R 50 Cat. No.06309987	1	Rs. 1,000.00
10.	PH meter model 7045	1	Rs. 10,000.00
11.	Pressure filter drum	1	Rs. 20,000.00
12.	Mozley table.	1	Rs. 60,000.00
13.	Miscellaneous chemicals.	Various	Rs. 10,000.00
i)	K-othy xanthate		
ii)	Sodium silicate		
iii)	Carboxy methy cellulose.		
iv)	Formaldyhido.		
v)	Carbon disulphide.		
vi)	Anion nonionic polyacrylamides.		
vii)	Polyacrylate		
viii)	Poly phosphaten		
ix)	Sodium hydroxide.		
x)	Polyethylenoxide.		
Total			Rs. 2,11,300.00



## The List of Existing Equipment

## (1) Department of Electrical Engineering

## 1) Electronics Engineering Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Audio Oscillator different types	20			1959 - 60	Working Condition
2	Signal Generator different types	9			"	"
3	Frequency Counter	1			"	"
4	Oscilloscope different model	9			"	"
5	Power supply different range	12			"	"
6	Battery Charger	1			"	"
7	T.V. Philips	1			"	"
8	T.Vs Sony	2			"	"
9	T.V test pattern Generator	1			"	"
10	V.C.R's National G/300	2			"	"
11	Projector	3			"	"
12	Projector Screens	5			"	"
13	Variac	4			"	"
14	Rheostate	2			"	"
15	Impedance Bridge	2			"	"
16	Tube Tester	2			"	"
17	Amplifier	2			"	"
18	Tap Recorder	3			"	"
19	Receivers & Experiment Board	3			"	"

## 2) Communication Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Marconi's Micro Wave Branch	1	England		1980 - 81	Working Condition

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
2	Marconi's Antenna Branch	1	- ditto -		"	"
3	Feed backs antenna Demonstrator	1	- ditto -		"	"
4	Feed backs Communications Experiment Set	1	- ditto -		"	"
5	G.R. slotted-line with accessories	1	U.S.A.		"	"
6	Oscilloscopes varous Trockenwood	4			"	"
7	DC Power supplies	2	Japan		"	"
8	Electronic Counters	4	Japan		"	"
9	Audio Generators	4	Japan		"	"
10	Heath kits Microprocessor Learning kit	2	U.S.A.		"	"

3) High Voltage Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Electrolyte Tank	1	Poland		1978-79	Working Condition
2	Oil testing set	1	- ditto -		"	"
3	Drying Oven	1	- ditto -		"	"
4	Model of Long Transmission Line	1	- ditto -		"	"
5	D.C. (H.V) Generator 50KV	1	Milano		"	"
6	Control Panel for HVDC gen 50 KV	1	- ditto -		"	"
7	HVAC testing transformer 5 KVA	1	England		"	"
8	HVAC testing kit 30 KV	1	Japan		"	"
9	HVDC testing kit 30 KV	1	- ditto -		"	"
10	Schering bridge with CRO	1	- ditto -		"	"
11	Van-de-Graff Generator	1	England		"	"
12	Impulse generator 400 KV	1	- ditto -		"	"
13	Voltage doubler (HVDC) kit 400 KV	1	- ditto -		"	"
14	Power factor test set	1	- ditto -		"	"
15	Partical Discharge detector	1	U.S.A.		"	"
16	Single beam impulse oscilloscopes with Transient Analyzer	1	Holland England		"	"

4) Machine Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	D.C. Compound Motor	1	U.S.A.	110 V, 1450 r.p.m. 6.75H	1955	Working Condition
2	D.C. Generator Shunt Wound	1	U.S.A.	100 V, 4-KW, 1450 r.p.m.	"	"
3	Motor/Generator Set	1	U.S.A.	-	"	"
4	D.C. Motor Shunt Wound	1	U.S.A.	110 V, 1450 r.p.m. 18.2 Amp.	"	"
5	D.C. Generator Shunt Wound	1	U.S.A.	2 KW, 1450 r.p.m. 18.2 Amp.	"	"
6	Motor/Generator Set	1	U.S.A.	-	"	"
7	D.C. Motor Shunt Wound	1	U.S.A.	4 H.P, 35 Amp.	"	"
8	D.C. Shunt Generator Compound	1	U.S.A.	110 V, 2.5 KW, 1450 r.p.m.	"	"
9	D.C. Motor Shunt Wound	1	U.S.A.	110 V, 2 H.P, 1450 r.p.m.	"	"
10	Motor/Generator Set	1	U.S.A.	-	"	"
11	A.C. Motor	1	U.S.A.	135 V, 1450 r.p.m., 31 Amp.	"	"
12	D.C Generator Shunt Wound	1	U.S.A.	220 V, 4 KW, 1440 r.p.m.	"	"
13	A.C. Motor & Generator Set	1	U.S.A.	-	"	"
14	Induction Motor	1	U.S.A.	1-Phase, 135 V, 1450 r.p.m., 50 Amp.	"	"
15	D.C. Generator Shunt Wound	1	U.S.A.	220 V, 4KW, 18.2 Amps.	"	"
16	Induction Motor	1	England	1-phase, 135V, 5 H.P Commutator type	"	"
17	Induction Motor with Regulator	1	England	-	"	"
18	Induction Motor 3-phase	1	England	3 phase, 135 V, 5/1-67 H.P, 1980/660 r.p.m.	"	"
19	Induction Regulator	1	England	3 phase, 135 V, 7.6 Amps., 1.6 KVA	"	"
20	A.C. Synchronous Motor/Generator	1	England	12 H.P 10 KVA, 1-3-6 Phase	"	"
21	Synchronous motor	1	England	15 H.P 400 V, 19.2 Amps. 3-phase,	"	"
				1500 r.p.m.	"	"
22	Model of three phase network load Reactor	1	England	TB41	"	"
23	Rectifier	1	England	400/440 V, 50 HZ, 3-phase, 40 Amps	"	"
24	Transformer	1	England	3-phase, 10 KVA, 400/35 V 50 HZ	"	"
25	Transformer 3-phase	1	England	3-phase, 10KVA, 400/110V, 14.4/52.5A	"	"
26	Electronic Wattmeters	1	Poland	-	"	"
27	APG Set	1	Germany	Combined AC/DC Experimental desk, 220V	"	"

5) Measurement Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Low Load wheat Stone Bridge	1	England	Model RM 196 No. 7835	1956-57	Working Condition
2	Universal impedance bridge	2	England	Model UB 202 MKTV S.No. 8800	"	"
3	Oscillograph	1	England	Model 1049 MKIV S.No. 5577	"	"
4	A.C. Potentionsetter	3	England	D.C. Galls-Coordinator type 3073	"	"
5	Shearing Bridge Consist of ; a. Bridge CA 161 A, b. 1000 Cycles Amplifier L-68, c. Oscillator L.O 66 D.	1	England	-	"	"
6	Galvanometer	1	England	Type S.S.I 50 with shunt	"	"
7	Kelven Double bridge type	1	England	1122	"	"
8	Resistance Box	2	England	Type 4231-6-LF3	"	"
9	Non Inductive bridge Ratio Box	3	England	Type 4065	"	"
10	Capacitance bridge	2	England	Type 3392 S.E. 25	"	"
11	Attenuator	1	England	Type 4617	"	"
12	Phase shifting transformer	2	England	Type 4340	"	"
13	Phase shifting transformer	1	England	Type 4341	"	"
14	Capacitance substitution	1	England	-	"	"
15	Strobo Scope	1	England	-	"	"
16	Power Supply	6	England	S.No. 30305	"	"
17	Variac	15	England		"	"
18	Artificial Transmission Line	1	England	-	"	"
19	Sine, Spure Oscillator	1	England	Model LF 1	"	"
20	R.F. Generator	1	Taiwan	GRG 450	"	"
21	Capacitance substitution Box	6	England	(1-10) NF	"	"

6) Computer Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	80286 PC	1				Working Condition
2	Logic Analyzer PC Based	1				"

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
3	Logic Lab. Kits	1				"
4	LCR Meter	1				"
5	Stabilizer SVC-1000N	1				"
6	Eprom Writer	1				"
7	Consumable IC Chips	1				"
8	Eprom Erase	1				"
9	Data book for IC'S	1				"

## (2) Department of Mechanical Engineering

## 1) Automobile Engineering Lab.

S.No.	Name of Equipment	Number / Qty	Make & Model	Short Specification	Year of Installation	Present Status
1	Crankcase with crankshaft	1	U.S.A.	For demonstration	1960	In working order
2	Gear box (Sliding gear type)	1	"	"	"	Not in working order
3	Petrol engine (sectional)	1	"	"	"	In working order
4	Diesel engine (sectional)	1	"	"	"	Not in working order
5	Various parts of engine	-	"	"	"	"
6	Gear box (Front wheel drive)	1	Japan	"	1972	In working order
7	Honda G-42 (sectional)	1	"	"	1975	"
8	Yamaha engine (sectional)	1	"	"	"	"
9	Fiat car chassis (complete)	1	Italy	"	1985	"
10	Four stroke model	1	U.S.A.	"	1960	Not in working order
11	Two stroke model	1	U.K.	"	1986	In working order
12	Opposed cylinder type engine	1	U.S.A.	"	1960	"

A - 1

## 2) Refrigeration and Air conditioning Lab.

S.No.	Name of Equipment	Number / Qty	Make & Model	Short Specification	Year of Installation	Present Status
1	Recirculating Aid conditioning Unit	1	P.A. Hilton Ltd. (U.K.)	Experiments on Psychrometry can be conducted.	1985	In working order
2	Vapour Compression Refrigeration Unit	1	P.A. Hilton Ltd. (U.K.)	Measurement of C.O.P. of Machine	"	In working order
3	Technovate Vapour Compression Refrigeration Unit	1	Technovate (U.S.A.)	Can be used for refrigeration and pump.	1977	In working order
4	Free and Forced Convection heat transfer	1	Scott. Eng. Sciences (U.S.A.)	"	1963	Not in working order
5	All-year Air conditioning Unit	1	Buffalo Forge Co. (U.S.A.)	Summer and Winter air conditioning	1962	In working condition

C - 1

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
6	Double pipe heat exchanger	1	Scott. Engg. Siences (U.S.A.)	Heat transfer through heat exchanger	1978	In working condition

3) Metallurgy Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Projection type metallurgical microscope with camera	1	Leitz (Ger.)	To examine the micro structure of metals.	1960	In working order
2	- ditto -	1	Unimet (USA)	- ditto -	1984	
3	Micro Vickers hardness tester	1	Torse (Jap)	To find out the hardness number.	1984	In working order
4	Specimen polisher	1	Buehler (USA)	Specimen preparation for micro examination	1984	- ditto -
5	Metallurgical microscope	2	American Optical Co. (USA)	To study micro structure	1960	Not in working order
6	Binocular microscope	1	Bino Max Beck London (UK)	For micro structure Examination	1960	In working order
7	Standard specimen polisher	1	Buehler Ltd. (USA)	Sample preparation	1960	In working order
8	Four spindle grinding and polishing m/c	1	E.Leitz (Ger)	- ditto -	1960	Not in working order
9	Universal hardness testing machine	1	Wolpert (Ger)	For finding hardness No.	1960	Not in working order
10	Three spindle grinding and polishing m/c		Buehler Ltd. (USA)	Specimen preparation	1984	
11	Electric Furnace	2	Heraeus/Gebrs Ruhstat	Temp. 1150-1400°C for heat treatment	1960	In working order
12	Magnetic Crack detector	1	Mitropolitan Vickers Co. (UK)	To find the surface cracks in metals	1960	In working order
13	Dynamic Fatigue testing m/c	1	Avery	To draw S-N curve and finding the fatigue ltd.	1960	Not in working order

4) Production Engineering Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
		Nil				

5) Theory of Machines Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Gear Train Apparatus	1	Norwood Instruments (U.K.)	Demonstration of simple and compound gear train and epicyclic gear train	1968	
2	Rotary balancing apparatus	1	- ditto -	Explaining the principle of revolving masses.	1970	
3	Whirling shaft apparatus	1	- ditto -		1968	Not in working order
4	Cam and Tappet Mechanism	1	- ditto -	Construct of cam profile	1965	
5	Quick return motion mechanism	1	- ditto -	Demonstration of ratio of return to cutting strokes of shaping m/c	1965	
6	Nortness Governor	1	Norwood Instruments (U.K.)	Calculation of equilibrium speed	1970	
7	Gear Kinematics apparatus	1	MT 240	Explanation of Kinematics of gears	1968	
8	Scotch Yoke mechanism	1	Norwood Instruments	Explanation of double slider crank chain	1965	
9	Free and Forced Vibration apparatus	1	Cussons (UK)		1977	Not in working order

6) Heat Engine Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Knock Testing Machine	1	Hermann (Ger)	Fuel Knock Value determination	1970	In working order
2	Stewart Diesel Engine with Electronic Dynamometer	1	Stewart Turner (U.K.)	I.H.P., B.H.P. and Heat Balance sheet calculation	1968	In working order

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
3	Diesel Generator Set	1	Aggregate		1961	In working order
4	Two stage Air compressor	1	Plint and Partners Ltd (U.K.)	Air Compression in two stages	1987	In working order
5	Herford Diesel Engine	1	U.K.	I.H.P. and B.H.P. calculation	1961	In working order
6	Crossley Diesel Engine	2	U.K.	I.H.P. and B.H.P.	1960	In working order
7	Buke Petrol Engine with Generator/ Dymometer	1	Dynamation Corp. (USA)		1963	Not in working order
8	Gas turbine unit	1	Cusons (U.K.)	Study of Joule cycle	1979	
9	Sub Sonic Ram Jet	1	P.A. Hilton Ltd. (U.K.)	Study of Ram Jet	1988	In working order
10	Car Demonstration Model	1	(Italy)	Demonstration	1987	In working order

7) Fuel Laboratory

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Bomb Calorimeter	1	England	Experiments	1960	Not in working order
2	Oscilloscope	1	Germany	Experiments	1960	Not in working order
3	Analog Fluid Circuit	1	U.K.	Experiments	1960	Not in working order
4	Emersion Fuel Calorimeter	1	U.K.	Experiments	1960	Not in working order
5	Microscope	1	Germany	Experiments	1960	Not in working order
6	Orset Gas Analyser	2	U.K.	Experiments	1960	Not in working order
7	Secol Viscometer	1	U.K.	Experiments	1960	Not in working order
8	Emersion Fuel calorimeter (Bomb)	1	U.K.	Experiments	1960	Not in working order
9	Distillation Appt.	1	U.K.	Experiments	1960	Not in working order
10	Cloud and Pour Test Appt.	1	U.K.	Experiments	1960	Not in working order

8) Power Plant Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Steam Boiler	1	John Thomson (U.K.) (1962)	Fire Tube Boiler with 100 P.s.i. working pressure, Heating surface 466 ft2	1964	In working order
2	Steam Engine	2	John Thomson (U.K.) (1962)	Reciprocating Steam engine compound type	1964	In working order
3	Steam Turbine Generator set	1	John Thomson (U.K.) (1962)	Impulse type of steam turbine with electric generation	1964	In workig order

(3) Department of Civil Engineering

1) Structural Engineering Lab.

S.No.	Name of Equipment	No. /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	200 KN Straining Frame with Single Acting Jack for Static Load with Dynamometer Mp 146	1	Maurice Perrier France	5 M Bed, Used for Flexure Tests on Beams with single Point Load or Line Load	1982/83	In working order
2	30 Ton Compression machine	1	Controls Model C 21 Milano, Italy 1983	Used for Compression Tests on Small Specimen.	1984/85	In working order
3	Profometer	1	Maurice Perrier France	With Spot Probe and Depth Probe	1984	In working order
4	Linear Voltage Differential Transducers	16	KYOWA, DT-50A	Sensitivity 1.5mV/V $\pm$ 20%	1984	Incomplete
5	Data Logger	1	KYOWA, UCAM-5BT	Digital Measuring Instrument 10 Point Scanner	1984	Not Used
6	Portable Strain Indicator P-350A	1	Micro Measurement USA P-350A	For Measuring Strains using Electrical Resistance Strain Gauges	1984	In working order
7	Portable Strain Indicator P-3500	1	Perrier France P-3500	For Measuring Strain using Electrical Strain Gauges	1985/86	In working order
8	Ten Channel Switching & Balancing Unit SB-1	1	Micro Measurement USA SB-1	10 Channel Switching Unit	1984	In working order
9	Schmidt Hammer with Anvil	1	Perrier France	with Recording Device	1984	In working order
10	Portable Ultrasonic Non-destructive Digital Measuring Tester (PUNDIT)	1	Perrier France	For Non-Destructive Tests using Ultrasonic Pulse	1984	Unreliable Performance, not satisfactory, not working
11	Dial Indicators	6	EL 25-814	50 mm. travel	1984/85	In working order
12	Dial Indicator	6	EL 29-074	2 in. travel	1984/85	In working order

2) Public Health Engineering Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Floc Tester	2	HACH R15075	-	1989	Functioning

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
2	Auto Clave	1	Basildon	-	- ditto -	- ditto -
3	PH Meter	3	HACH R43800	-	- ditto -	- ditto -
4	Hot Box	1	Cat No. OVB 305 England	-	- ditto -	- ditto -
5	Economy Incubator	2	Cat No. INA 305 England	-	- ditto -	- ditto -
6	Bacteriological Kit	1	US R.No.6665- 0-682-4765	-	- ditto -	- ditto -
7	B.C.D. Apparatus	2	HACH R21738	-	- ditto -	- ditto -
8	Vacuum Pump	1	US R5522050	-	- ditto -	- ditto -
9	Analytical Balance	1	Germany Type A200S	-	- ditto -	- ditto -
10	C.O.D. Reactor	2	HACH R1650	-	- ditto -	- ditto -
11	Water Bath	2	Cat No. 900, 300 England	-	- ditto -	- ditto -
12	Portable Dissolved Oxygen	2	HACH R16046	-	- ditto -	- ditto -
13	Portable Turbidity Meter	2	HACH R16800 HACH R2100P	-	- ditto -	- ditto -
14	Furnace	1	CAT No FSE285 England	-	- ditto -	- ditto -
15	Colony Counter	2	HACH R3325	-	- ditto -	- ditto -
16	DR/3 Spectrophotometer	2	HACH R41700 HACH R2000	-	- ditto -	- ditto -
17	Microscope	1	OLYMPUS BH-2	-	- ditto -	- ditto -
18	Distillator	1	TYPE L4 England	-	- ditto -	- ditto -
19	Drier	1	TYPE 3SS Eng.	-	- ditto -	- ditto -
20	Dissicator	1	-	-	- ditto -	- ditto -
21	Magnetic Stirrer	2	CAT No.SWT 315 England	-	- ditto -	- ditto -

3) Soil Mechanics Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Sieve Analysis Set	2	US Standard Sieves Set	Fine Sieves	1953	Functioning
2	Liquid Limit Set	1	Soil Test USA	-	- ditto -	- ditto -
3	Plastic Limit Set	1	- ditto -	-	- ditto -	- ditto -
4	Shrinkage Limit Set	1	- ditto -	-	- ditto -	- ditto -
5	CBR Apparatus	2	- ditto -	-	- ditto -	- ditto -
6	Field Density Kit	2	- ditto -	-	- ditto -	- ditto -
7	Proctor Penetrometer	2	- ditto -	-	- ditto -	- ditto -
8	Consolidation (Fixed Type)	2	- ditto -	-	- ditto -	- ditto -
9	Consolidation Specimen Trimmer	1	- ditto -	-	- ditto -	- ditto -
10	Auger Set	1	- ditto -	-	- ditto -	- ditto -
11	Improved ASTM Hydrometer	2	- ditto -	-	- ditto -	- ditto -
12	Mechanical Stirrer	1	- ditto -	-	- ditto -	- ditto -
13	Sample Splitter	1	- ditto -	-	- ditto -	Broken
14	Oven	2	-	-	- ditto -	Damaged
15	Hydraulic Sample Ejector	2	-	-	- ditto -	Functioning
16	Triple Beam Balance	1	-	-	- ditto -	- ditto -
17	Solution Balance	1	-	-	- ditto -	- ditto -
18	Portable Sieve Shaker	1	-	-	- ditto -	- ditto -
19	Los Angeles Abrasion Machine	1	-	-	- ditto -	- ditto -
20	Unconfined Compression Apparatus	2	-	-	- ditto -	- ditto -
21	Direct Shear Hard Apparatus	2	-	-	- ditto -	- ditto -
22	Sand Absorption Cone & Tamper	1	-	-	- ditto -	- ditto -
23	Pycnometer	1	-	-	- ditto -	- ditto -
24	Density Basket	1	-	-	- ditto -	- ditto -
25	High Temperature Burners	1	-	-	- ditto -	- ditto -
26	Softening Point Apparatus	1	-	-	- ditto -	- ditto -
27	Flash Point Tester	1	-	-	- ditto -	- ditto -
28	Viscosimeter	1	-	-	- ditto -	- ditto -
29	Penetrometer Universal	1	-	-	- ditto -	- ditto -
30	Extractor (Hand Driven)	1	-	-	- ditto -	- ditto -

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
31	Distillation Apparatus	1	-	-	- ditto -	- ditto -
32	Tripod with Concentric Rings Set	1	-	-	- ditto -	- ditto -
33	Sieve Set (8" Dia.)	1 set	US Std. Sieve	Coarse Sieves	- ditto -	- ditto -
34	Electric Hot Plate	1	-	-	- ditto -	- ditto -
35	Gas Hot Plate	1	-	-	- ditto -	- ditto -
36	Specific Gravity Bottle	1	-	-	- ditto -	- ditto -
37	Balances	1	-	-	- ditto -	- ditto -
38	Sieve Shaker	1	-	-	- ditto -	- ditto -
39	Microscope	1	-	-	- ditto -	- ditto -
40	Yield Bucket (0.5 cft)	1	-	-	- ditto -	- ditto -
41	Speedy Moisture Tester	1	-	-	- ditto -	- ditto -
42	Proctor Penetrometer	2	-	-	- ditto -	- ditto -
43	Tri-Axial Test Set	1	-	-	- ditto -	- ditto -
44	Plate Bearing Capacity Apparatus	1	-	-	- ditto -	- ditto -
45	Versa Tester	1	-	-	- ditto -	- ditto -
46	Field Vane Apparatus	1	-	-	- ditto -	- ditto -
47	Pocket Penetrometer	1	-	-	- ditto -	- ditto -
48	VP Value Set	1	-	-	- ditto -	- ditto -
49	Terra Scout Set	1	-	-	- ditto -	- ditto -
50	Kango Electric Hammer	1	-	-	- ditto -	- ditto -
51	Permeability Apparatus	1	-	-	- ditto -	- ditto -
52	Darrel Machine	1	Perrier France	-	- ditto -	- ditto -
53	Ultra Sonic Concrete Test Apparatus	1	-	-	- ditto -	- ditto -
54	Centrifuge	1	-	-	- ditto -	- ditto -
55	Oven (Large Size)	1	-	-	- ditto -	- ditto -
56	Concrete Core Driller	1	ELE England	-	- ditto -	- ditto -
57	Aggregate Crushing apparatus	1	-	-	- ditto -	- ditto -
58	Triple Beam Balance	1	-	-	- ditto -	- ditto -
59	Auto Compaction Machine	1	Farnell	-	- ditto -	- ditto -

4) Hydraulics & Fluid Mechanics Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Single Stage Centrifugal Pump (Self Contained Unit)	1	Pling & Partner England	For Characteristic Study	1960	In Working Order
2	Flow Visualisation Tank	1	Armfield	To study the flow around Models of Structures	1966	In Working Order
3	Tilting Flume - 16 M long with accessories	1	Plint	To study flow over weirs, hydraulic jump etc.	1987	In Working Order
4	Water Hammer Apparatus	1	Armfield	To study Waer Hammer Pressure in pipes	1960	In Working Order
5	Flow Through Orifice	1	CSU Hydraulic Lab. Shop	To find the Coe		
6	Airflow Venturimeter	1	Airflow Development (High Wycombe)	To measure the Air Discharge	1966	Not in Working Order
7	Pelton Wheel	1	Escher Wyss Zurich	To determine the Characteristics of Turbine	1960	In Working Order
8	Double Stage Centrifugal Pump	1	Escher Wyss Zurich	To determine the Characteristics of Double Stage Centrifugal Pump	1960	In Working Order
9	Propeller Pump	1	Overtikon Engg. Pump	To determine the Characteristic of Axialflow Pump	1960	In Working Order
10	Glass Flume Non-Tilting	1	CSE Hyd. Lab. Shop	Hydraulic Jump Exp.	1960	In Working Order
11	Hydraulic Bench with accessories	1	Techquipment Ltd.	-	1967	In Working Order

5) Concrete Technology Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Autoclave Machine	1	Sr. No. 668/195T	350 psi Capacity	-	Functioning
2	Compression testing Machine 110T	1	Maruto, Japan	for Comp. Test on Conc.	-	Out of Order

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
3	Compression Testing Machine 150MT	1	Kadeer Bros. Pakistan	- ditto -	-	Out of Order
4	Flexure Testing Machine 10 KN	1	Ferrier, USA	For Bending Tests on Small Beams etc. 10 KV Capacity	-	Functioning
5	Compression Testing Machine	1	Soil Test, USA	200 Kips Capacity	-	Out of Order
6	Compaction Factor Appratus	1	Farnell, England	-	-	Functioning
7	Concrete Vibrator	1	-	-	-	Functioning
8	Cylinder Capping Jig	1	Central Scientific Co., USA	Used for Capping of Concrete cylinders	-	Functioning
9	Compressometer	1	-	-	-	Functioning
10	Air Entraining Appratus	1	Soil Test, USA	Used for making air entrained concrete	-	Functioning
11	Electrical Oven Cupboard	1	-	-	-	Functioning
12	Soil Cement Block Making Machine	1	-	-	-	Functioning
13	Sieve Analysis Set (Fine Agg.)	1	Local made	For Sieve analysis of fine aggregate (BSS)	-	Sieve #200 is missing.
14	Sieve Analysis Set (Coarse Agg.)	1	Local made	For Sieve analysis of coarse aggregate (BSS)	-	Functioning
15	Vicat Needle Apparatus	10	-	-	-	Functioning
16	Concrete Mixer Electric	1	-	-	-	Functioning
17	Shrinkage Apparatus	1	-	-	-	Functioning
18	Turbidity Meter	1	-	-	-	Functioning
19	Sieve analysis set	1	Local made	For Sieve analysis of fine aggregate (ASTM)	-	Sieve #200 is damaged.
20	Sieve analysis set	1	Endecotts Ltd. Eng.	For coarse aggregate sieve analysis (US std.)	-	Functioning
21	Conc. Cube Moulds (6"x6"x6")	12	-	-	-	Functioning
22	Mortar Cube Moulds (2"x2"x2")	6	-	-	-	Functioning
23	Conc. Cylinder Moulds (6"x12")	10	-	-	-	Functioning

## 6) Survey Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Theodolite (Vernier)	4	-	One Minute Accuracy with Standard Accessories, Graduated on Degree System	1955	Functioning
2	Theodolite (Micro-Optic)	6	Ti-A	10 Seconds Accuracy Graduated on Grade System	1961	- ditto -
3	Theodolite (Micro-Optic)	6	T2	One Second Accuracy, Graduated on Grade System	1961	- ditto -
4	Theodolite (Compass)	4	To	One Second Accuracy, with magnetized scale	1961	- ditto -
5	Theodolite (Electronic Digital)	6	Th-E10D, Pentax Japan	One Second Accuracy, graduated both in Degrees & Grades	1988	- ditto -
6	Level (Dumpy)	4	Wild NK-01S	-	1961	- ditto -
7	Level	1	Wild N-2	-	1961	- ditto -
8	Level (Quick Set)	3	Meopta	-	1963	- ditto -
9	Level (Quick Set)	4	Meopta	-	1963	- ditto -
10	Levels (Tilting)	6	Wild N-10	-	1961	- ditto -
11	Levels (Precise)	1	Wild N-3	-	1961	- ditto -
12	Level (Hand)	9	Keuffel & Erserco	-	1963	- ditto -
13	Engineers Chain	34	-	100 ft. Length	1963	- ditto -
14	Prismatic Compass	39	-	Graduated in Degrees, 15' accuracy	1963	- ditto -
15	Surveyor's Compass	1	-	15 ft. Length	1963	- ditto -
16	Steel Band	35	-	100 m Length	1963	- ditto -
17	Plane Tables	21	Pak Made	With standard accessories	1963	- ditto -
18	Planimeters	10	K&E, Germany	Accuracy 0.01 in2	1963	- ditto -
19	Stereoscopes	6	Pak Made	-	1963	- ditto -
20	Radial Line Plotter	1	Hilger & Watts	-	1963	- ditto -
21	Substems Bars	2	Wild, 1964	-	1963	- ditto -
22	Reduction Meter	2	Wild-RDS	Graduated on Grade system	1963	- ditto -
23	Altimeter	6	Sweden, 1963	-	1963	- ditto -
24	Binoculars	11	USA, 1963	-	1963	- ditto -

7) Material Testing Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	10 Ton Wolper Universal Testing Machine	1	Otto-Wolpert GmbH	For Tensile, Shear, Comp. & Flexure (small beams) Tests. Max. Force 10,000 Kg	1953	Very old with worn out parts but still working
2	100 Ton Wolpert Universal Testing Machine	1	-ditto-	Same as above but with Max. Force 100,000 Kg	1953	Very old with worn out parts but still working (small Piston not working)
3	Wolpert Pendulum Impact Testing Machine	1	-ditto-	For Charpy and Izod Tests	1953	In working order
4	Torsion Testing Machine	1	Avery, Birmingham, England	For Torsion Tests	1963	In working order
5	Gauge Length Marker	1	Otto-W. GmbH	For Marking on Metal Samples	1953	Not in working order

8) Computer Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	IBM Personal Computer	1	IBM PS/2 Model 80	8086-8MHz Processor, 640 Kb RAM, with VGA Monochrome Monitor, 2-3.5" Drives and 20 Mb Hard Card	1988	Functioning
2	NEC Personal Computer	1	NEC PowerMate 2	80386DX-25 MHz Processor with 80387 Math-Coprocessor, 4 Mb RAM, Super VGA Colour Monitor, 1-3.5" HD & 1-5.5" HD Drives, 130 Mb Hard Drive	1990	Functioning
3	Dot Matrix Printer	1	IBM Proprinter IIXL	24 Pins Printer Head electric generation	1988	Functioning

## (4) Department of Agricultural Engineering

## 1) Agricultural Machinery and Farm Power Lab.

S.No.	Name of Equipment	No. /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Pump design evaluation set	1	Kendal Cumbria England		1985/86	Working Order
2	Air Conditioning Refrigeration test Bed	1	U.S.A./7088		1983/84	- ditto -
3	Lathe Machine	1	Pakistan Made	6' Bed Length	1985	- ditto -
4	Shapper Machine	1	Pakistan Made	24" with motor	1985	- ditto -
5	Welding Set	1	Japen Made		1985	- ditto -
6	Drilling Machine	1	Pakistan Made	1" dia	1985	- ditto -
7	Hydraulic Dynamometer	1	Jap-SF 30 set		1983/84	- ditto -
8	Hydraulic Controls Test Bed	1	Eng-TPU-1431-III		1984/85	- ditto -
9	Diesel Fuel Injector Test Bed	1	Eng-HA 551		1983/84	- ditto -
10	Sectional Tractor	1	Eng-VB 250	For Non-Destructive Tests using	1984/85	- ditto -
11	Mold Board Plow	1	A 1-41-Aust		1970	- ditto -
12	Dic Plow	1	- ditto -		1970	- ditto -
13	Cheisel Plow		U.S.A.		1970	- ditto -
14	Cultivator		G.B.		1969	- ditto -
15	Disc Harow		Austraria		1968	- ditto -
16	Rotavator		France		1985	- ditto -
17	Rear Blade		Canada		1975	- ditto -
18	Row Crop Planter				1984/85	- ditto -

2) Soil and Water Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Soil Drying Oven	1	W.Germany Shutzart Din 40050-IP 20		1982	Working order
2	Soil Drying Oven	2	U.S.A./Cenco		1964	Not in Proper Working Condition
3	Water Distiller	1	U.S.A.		1964	Working Order
4	Sieve Shaker	1	U.S.A./CENCO	220 Volts	1964	- ditto -
5	Permiameter for compacted Soils	1			1985	- ditto -
6	Centrifuge Machine	1	U.S.A./SS 1696M		1964	- ditto -

(5) Department of Mining Engineering

1) Mine Ventilation Lab.

S.No.	Name of Equipment	No. /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Round hygrometer	1	MAS/U.S.A.	Portable		Working
2	Barometers	2	-ditto-	-ditto-		- ditto -
3	Manometers	1	-ditto-	-ditto-		- ditto -
4	Dust Sampling Kit	1	-ditto-	-ditto-		- ditto -

2) Mine Safety Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Oxygen meter	1		Portable		Working
2	First Aid kit	1		-ditto-		Expired
3	Gas detectors	1		-ditto-		-ditto-
4	Safety equipments (clothings)			-ditto-		Working

3) Rock Mechanics Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Tri axial Testing Machine	1	ELE England	Laboratory Small Size	1978	Out of order
2	Rock cutting and Polishing Machine	1	-ditto-	-ditto-	1978	Working
3	Core drilling Machine	1	-ditto-	-ditto-	1978	-ditto-
4	Rock toughness tester	1	-ditto-	-ditto-	1978	-ditto-
5	Strength testing Machine	1	-ditto-	-ditto-	1978	-ditto-
6	Photoelastic Machine	1	Japan	-ditto-	1978	Not working order

4) Mineral Processing Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Mortar Mill	1	K.H.D. Germany	Lab. Size (Small) 275 mm	1977	Working
2	Jaw crusher	1	Soil Test(USA)	Lab. Size	1978	-ditto-
3	Shaking Table (for coarse material)	1	K.H.D.(Germany)	-ditto-	1978	-ditto-
4	Vibration Sieve analysis Machine (Drf)	1	-ditto-	-ditto-	1977	-ditto-
5	Lab. flotation cell	2	-ditto-	with agitator 50, 70, 90 mm	1977	One out of order One Working
6	Jar rolling Machine	1	-ditto-	Lab. Size	1978	-ditto-
7	Hammer crusher	1	-ditto-	-ditto-	1984	-ditto-
8	Magnetic separator	2	BOX MAG RAPID	Two Disc	1984	-ditto-
9	Dise Mill	1	-ditto-	Lab. Size	1978	-ditto-
10	Lab. Electric Jig	1	-ditto-	-ditto-	1978	-ditto-
11	Vibrating Screen	1	K.H.D.(Germany)	-ditto-	1978	-ditto-

5) Mine Survey Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Micro meter theodolite	1	TM 20 ES Ogawa Seiki Co., Ltd.	10 See	1982	Working
2	Transit theodolite	1	World BC-8 Japan	30 See	1985	-ditto-
3	Topson Transit Theodolite	1	AG-20-B Japan	20 Se	1985	-ditto-
4	Tilting Level	1	OSK 20 SL-5 Japan		1982	-ditto-
5	Dampy Level	1	OSK-200 dl-8 Japan		1982	-ditto-
6	Allibrit Level	1	No. 183318/74 London U.K.		1985	-ditto-

6) Drilling Technology Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
		Nil				

7) Geology Lab.

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Various model for demourtration					Working
2	Microscope	1				Out of order

## (6) Department of Basic Sciences &amp; Islamiyat

## 1) Physics Lab.

S.No.	Name of Equipment	No. /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Audio Frequency generator	2	Trio		1985	Working
2	Ballistic Galvanometer	2	mitohne (Germ.)		1977	- ditto -
3	Digital frequency counter	1	Leybold He racus 575-20		1985	- ditto -
4	Mechanical equivalent of heat	1	England (Pye)			- ditto -
5	Sextant	2	Cat No. 52B500A		1983	- ditto -
6	Travelling microscope	1	PTI 7826			- ditto -
7	Oscilloscope	1	Kikusui		1984	- ditto -
8	Spectrometer	1	Germany		1977	- ditto -
9	Microwave Generator & Receiver	1	Cat No. XFB 350-D		1983	- ditto -
10	D.C. Power Supply 0-16V	1	OSK 3576		1985	- ditto -
11	Lee's disk appt for thermal conductivity	3	XHB 760L		1983	- ditto -
12	Earth inductor	3	XXD 430D		1983	- ditto -

## 2) General Chemistry Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
	The laboratory does not contain any worth-mentioning equipment. It only contains the usual glass ware and chemicals for routine qualitative and quantitative chemical analysis using the so-called "Wet Methods".					

3) Analytical & Special Chemistry Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
	The laboratory does not contain any worth-mentioning equipment. It only contains the usual glass ware and chemicals for routine qualitative and quantitative chemical analysis using the so called "Wet Methods"					

4) Unit Operation & Pilot Plant Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
	Nothing worth-mentioning					

5) Computer Lab.

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Computer	5	IBM PS2-30	UK made	1987	Working
2	Computer	7	IBM Compatible	Taiwan made	1987	-ditto-
3	Computer	1	CAF/IBM Compati.	Taiwan made	1989	-ditto-
4	Computer	1	Fujtec/IBM Compatible	Korean made	1991	-ditto-
5	Printer	2	IBM/XL	Netherland made	1987	-ditto-
6	Printer	3	STAR NX 10	Japan made	1987	-ditto-

## (7) University Workshops

## 1) Fitting Shop

S.No.	Name of Equipment	No. /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Drill Machine Pillar type	1	Pak	Chuck 1", 1 H.P., Single Phase	1985	Properly working
2	Grinding Machine	1	Pak	1/2 H.P. single phase	1977	- ditto -
3	Press Machine	1	Pak	2 H.P. 5 Ton Capacity	1985	- ditto -
4	Press Machine	1	Pak	1 H.P. 3 Ton Capacity		- ditto -
5	Sheet Metal Cutting Machine	2	Germany Type AV 75B	Cutting size 105 cm	1983	- ditto -

## 2) Project Shop

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Drill Machine Pillar Type	1	Pak PD-20 PECO No. 1502	Speed 2450, 1470, 900, 550, 360 chuck size 13 mm	1985	Properly working
2	Grinding Machine	1	Pak	1 H.P. 3 phase R.P.M. 3000	1986	-ditto-
3	Grinding Machine	1	Germany D-17-1	volt 280/400	1955	-ditto-
4	Lathe Machine	1	Germany Model 280	Bs 110 Ch 12cm spindle bore 23mm	1955	-ditto-
5	Power Hacksaw Machine	1	Pak	single phase 1/2 H.P. Blade size 12"	1987	-ditto-

## 3) Welding Shop

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Electric Arc Welding Machine	1	Germany Type K 7288-1 Nr-408297	Motor LSR 772-2H 15 KV 3 Phase Generator LE 108	1955	Properly working

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
2	Gas Welding Plant	1	Germany	for Cutting & welding	1955	-ditto-
3	Arc welding Plant	1	Pak	3 Phase Portable	1983	-ditto-
4	Arc welding Plant	1	Pak	Single Phase portable	1985	-ditto-
5	Spot welding Machine	1	U.K. type PM 21 V Sr No 0760	Foot Padle control, 230V single phase 10 KVA with water cooling and Tuner control	1968	-ditto-
6	Drill Machine Piller Type	1	Pak	1/2 H.P. Motor, Chuck 3/8" speed 485, 328, 214, 132	1988	-ditto-
7	Bench Grinding Machine	1	Pak	1/2 H.P. Motor	1988	-ditto-

#### 4) Foundry Shop

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Cupola	1	Germany B.D.M.	Motor Blower GVB, 3 Phase 2800 R.P.M. Capacity 1/2 ton, Internal dia. of cupola 1 ft	1968	Properly working
2	Oil Tilting Furnace	1	Germany Fulmina type KOA 10 No. 10888 1962	Capacity 20 kg	1968	-ditto-
3	Jolt Squeeze and Pin lifting Moulding Machine	1	Germany type UGRO Model 168557	Shockless anvil jolter oil lifting device	1979	-ditto-
4	Electric Oven	1	Germany Model 100 A	280 volts Ac, 1 phase 2 KW, 100 Litres, Temperature 40-250°C	1987	-ditto-
5	Smith Hearth	1	Germany	for Melting of lead and Aluminium	1968	-ditto-
6	Centrifugal Casting Machine	1	Austria No: 1768 37 type 48 1985	incoming line 380 V	1985	parts missing

## 5) Smith Shop

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Power spring Hammer	1	Germany Type O/54 H B F	To forge square and round upto 50 mm/2" Height of Stroke 225/335, mm 13" W. Hammer 20 kg, 190 R.P.M. A.C. 400/440 V	1955	Properly working
2	Grinding Machine	1	England TG 6D 80162	1/2 H.P. Motor	1968	-ditto-
3	Drill Machine Pillar Type	1	Pak	speed 485, 328, 214, 132 1/2 H.P. Chuck upto 1/2"	1988	-ditto-
4	Cut off Machine	1	Japan MGC-305 EX	stone size 12"	1992	-ditto-

## 6) Advance Machine Shop

S.No.	Name of Equipment	Number /Q' ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Drill Machine Pillar Type	1	Germany Dr.G O/4 Model B-16	R.P.M. 200, 400, 1000, 1500, 2000 TSB Morse 2 swing 95 mm	1955	Properly working
2	Drill Machine Pillar Type	1	Germany Model B 23/28-11 Type TR 75/4	R.P.M. 180, 270, 500, 800 Morse 2 swing 95 mm	1955	-ditto-
3	Grinding Machine for twist drill and cutters	1	England Type tefo T-234038-Z	3 phase R.P.M. 1420	1955	-ditto-
4	Surface Grinding Machine	1	Japan NAGASE W-6	MBC 385MCT 350 MLT 710 mm Grinding wheel 305 x 50 x 127 mm Grinding speed 1700 R.P.M.	1984	Fault in hydraulic system
5	Grinding Machine	1	GRIEF GR 11 FD-20-2 No 70169	8" x 1 1/8" x 7/8"	1955	Properly working
6	Universal Grinding Machine	1	England 1314	MWD 8" ABC 24" WCH 4" GWS 8" X 3/4" X 1 3/4"	1955	-ditto-

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
7	Lathe Machine Heavy Duty	1	Germany M III 200 x 750 type 9367/1952	BL 142 cm, HC 16.5 SB 3.5 cm	1955	-ditto-
8	Capstan Lathe Machine	1	England ward 2ds	LB 134 HC 16.5 SB 3.5 cm	1960	-ditto-
9	Lathe Machine Central Type	2	Germany Model LZ 280 N	BL 110 CH 12 SB 2.3 cm	1955	-ditto-
10	Lathe Machine	1	Pak PECO Cl 250	BL 235 CH 28 SB 7.2 cm	1975	-ditto-
11	Milling Machine Simple Knee type	1	RUMAG Model REE-A U.RHE-A	HC 150 TL 300 VH 400 mm	1955	-ditto-
12	Universal Milling Machine	1	England ELLIOT Model U 2	HC 125 TL 482 Vh 280 mm	1955	-ditto-
13	Planer Machine	1	Germany E-1208	IS 36" TH 12" RCM 20"	1955	-ditto-
14	Shaper Machine	1	Germany Model H.20 Type KRD 314	LS 7" VM 8" CM 11"	1955	-ditto-
15	Shaper Machine Heavy Duty	1	Germany Type R 63/7 No 2239 Model SH 360	IS 14" VM 10" CM 16"	1955	-ditto-
16	Slotting Machine	1	Japan Model M Y 300-S	Max Stroke 310mm Stroke speed Range 18, 29, 47, 76 SPM Vertical Adjustment of Ram MAX 325 Diameter 550 mm, L.P. 460 C.P. 455 mm Feed 0.05-0.5mm/stroke Tool shank size 55mm	1984	-ditto-

7) Elementary Machine Shop

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Drill Machine	1	Germany type TB-5 1951	Chuck size 1/2"	1955	Properly working
2	Grinding Machine	1	U.S.A. Model B 77-3816 C	1/4 H.P. Motor	1968	-ditto-
3	Lathe Machine	10	England Model TDS/1/1PCS/L	Bed size 20"	1964	Poorly working
4	Lathe Machine	1	Germany D/L 361/1/52	Bed size 20 1/2"	1955	Properly working
5	Lathe Machine	1	Germany model UBR 9000	Bed size 19"	1955	-ditto-
6	Power Hacksaw Machine	1	Germany	Blade size 12"	1955	-ditto-
7	Power Hacksaw Machine	1	Pak Hs 160	Blade size 13"	1955	-ditto-
8	Shaper Machine	1	Germany H.185	Stroke 7"	1955	-ditto-
9	Shaper Machine	1	Germany H.20	Stroke 7"	1955	-ditto-

8) Pattern Making Shop

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Circular Saw	1	-	-	-	Properly working
2	Band Saw	2	-	-	-	-ditto-
3	Drill Machine	1	-	-	-	-ditto-
4	Grinding Machine	1	-	-	-	-ditto-
5	Grinding Machine	1	-	-	-	-ditto-
6	Lathe for wood turning	2	Germany K A 1 Type EHD-F s	H C 300 B1 200 L B 2500 D B C to C 1800 mm	1955	-ditto-
7	Lathe Machine	1	Pak	B S 22"	1964	-ditto-
8	Pattern Miller	1	England Model WX	S.N: WX 375 Test No 67816 phase 3 cycle 50; T.S. 35" x 35"	1960	-ditto-

9) Electric Shop

S.No.	Name of Equipment	Number /Q'ty	Make & Model	Short Specification	Year of Installation	Present Status
1	Armature winding Machine	1	England Type 3	Quick way heavy duty single phase volts 220/240 cycles 50	1955	Properly working
2	Drill Machine Piller Type	1	Pak Type ss 200	Single phase; 1 H.P. Motor chuck 1/2"	1987	-ditto-
3	Bench Grinding Machine	1	U.S.A. Model B 77-3816	Single phase 1/4 H.P. RPM 3450	1968	-ditto-

資料-7 北西辺境州企業一覽

1. 既存企業数

業種	地区名	ハッシャール	アホタハート	ハンヌ	チャルサタ	D.I.カーン	デイル	コハート	カラク	マルタマン	マンセーラ	スリビ	スワート	ハッショール	カイハール	マラカント	ワジリスタン	チトラル	クワラム	合計
A. 一般企業		658	157	141	45	164	14	74	13	162	26	84	314	0	93	22	9	27	0	2,003
食糧・飲料・煙草		81	36	31	19	51	10	30	9	29	13	21	20	0	1	15	9	4	0	379
繊維・衣料・皮革		27	4	2	1	2	0	3	0	2	0	0	207	0	89	1	0	1	0	339
材木・木製品		23	6	0	0	5	3	1	0	2	2	0	1	0	0	0	0	2	0	45
紙・紙製品		51	16	10	1	10	0	5	2	14	4	0	15	0	0	0	0	0	0	128
化学品・ゴム・プラスチック製品		32	14	3	1	7	0	2	1	10	0	1	15	0	0	1	0	0	0	87
非金属鉱産物		41	10	0	2	3	0	4	0	14	0	8	2	0	1	1	0	2	0	88
金属・金属製品		41	11	2	0	6	0	1	0	11	1	0	0	0	1	0	0	0	0	74
その他製造業(武器等)		12	0	3	0	0	0	4	1	2	1	0	0	0	0	0	0	0	0	23
大理石(チップ)		192	0	0	0	0	0	0	0	2	0	15	5	0	1	0	0	0	0	215
砕石業		27	34	0	1	8	1	10	0	1	0	3	2	0	0	0	0	0	0	87
煉瓦窯		110	19	83	18	65	0	5	0	66	0	36	21	0	0	4	0	0	0	427
ホテル業		21	7	7	2	7	0	9	0	9	5	0	26	0	0	0	0	18	0	111
B. 小企業開発委員会傘下企業		10	2	3	1	2	3	3	1	2	5	1	3	0	0	2	0	4	1	43
C. 店舗・会社令(1969)登録企業		200	89	72	66	48	0	74	0	135	26	0	135	0	0	0	0	19	0	864
食糧・飲料		55	27	7	18	13	0	12	0	20	7	0	20	0	0	0	0	0	0	179
繊維・衣料・皮革		0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3
材木・木製品		78	33	33	46	11	0	23	0	43	11	0	44	0	0	0	0	19	0	341
金属・金属製品		67	29	31	2	22	0	39	0	71	8	0	71	0	0	0	0	0	0	340
ゴム・プラスチック製品		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D. 建設中の企業		36	18	1	4	15	0	3	1	18	1	22	11	1	0	0	0	0	0	131
合計		904	266	217	116	229	17	154	15	317	58	107	463	1	93	24	9	50	1	3,041

2. 既存企業被雇用者数 (単位:人)

業種	地区名	ハッシャール	アホタハート	ハンヌ	チャルサタ	D.I.カーン	デイル	コハート	カラク	マルタマン	マンセーラ	スリビ	スワート	ハッショール	カイハール	マラカント	ワジリスタン	チトラル	クワラム	合計
A. 一般企業		20,366	11,950	2,838	3,967	1,610	694	4,291	83	5,327	376	3,776	3,427	0	2,532	592	69	118	0	62,016
食糧・飲料・煙草		4,383	712	1,314	2,470	491	65	305	73	3,534	257	3,124	223	0	250	550	69	9	0	17,829
繊維・衣料・皮革		3,396	1,806	1,016	15	450	0	2,606	0	948	0	0	2,497	0	2,105	4	0	9	0	14,852
材木・木製品		381	156	0	0	44	626	6	0	18	32	0	30	0	0	0	0	11	0	1,304
紙・紙製品		2,128	82	33	1,200	26	0	26	4	78	12	0	29	0	0	0	0	0	0	3,618
化学品・ゴム・プラスチック製品		1,405	1,454	12	98	17	0	6	4	70	0	300	91	0	0	4	0	0	0	3,461
非金属鉱産物		1,968	3,002	0	31	6	0	1,049	0	63	0	53	170	0	159	20	0	6	0	6,527
金属・金属製品		2,003	4,265	36	0	133	0	104	0	164	24	0	0	0	13	0	0	0	0	6,742
その他製造業(武器等)		515	0	14	0	0	0	32	2	24	4	0	0	0	0	0	0	0	0	591
大理石(チップ)		1,411	0	0	0	0	0	0	0	11	0	84	34	0	5	0	0	0	0	1,545
砕石業		292	146	0	4	31	3	37	0	5	0	17	9	0	0	0	0	0	0	544
煉瓦窯		1,810	262	395	141	353	0	69	0	373	0	198	71	0	0	14	0	0	0	3,686
ホテル業		674	65	18	8	59	0	51	0	39	47	0	273	0	0	0	0	83	0	1,317
B. 小企業開発委員会傘下企業		346	9	55	5	24	18	32	10	54	28	5	25	0	0	40	0	42	5	698
C. 店舗・会社令(1969)登録企業		946	354	162	260	85	0	223	0	409	91	0	383	0	0	0	0	81	0	2,994
食糧・飲料		252	103	14	61	25	0	45	0	52	25	0	90	0	0	0	0	0	0	667
繊維・衣料・皮革		0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	4
材木・木製品		323	121	87	184	19	0	74	0	119	40	0	119	0	0	0	0	81	0	1,167
金属・金属製品		371	130	58	15	39	0	104	0	236	26	0	174	0	0	0	0	0	0	1,153
ゴム・プラスチック製品		0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
合計		21,658	12,313	3,055	4,232	1,719	712	4,546	93	5,790	495	3,781	3,835	0	2,532	632	69	241	5	65,708

(出所: INDUSTRIAL INVESTMENT IN N.W.F.P., 1989より作成)

3. 1989年12月-1992年7月期間中に新たに設立された企業

項目	地区名	ハッシャール	アホタハート	ハンヌ	チャルサタ	D.I.カーン	デイル	コハート	カラク	マルタマン	マンセーラ	スリビ	スワート	ハッショール	カイハール	マラカント	ワジリスタン	チトラル	クワラム	合計
企業数		45	38	1	4	8	1	3	0	15	3	119	25	0	1	0	0	0	0	263
被雇用者数		1,547	1,854	8	96	825	8	54	0	440	70	7,802	358	0	5	0	0	0	0	13,067



## 資料-8 パキスタンの概要

### 1. 自然

パキスタン・イスラム共和国は北緯23度から37度、東経61度から76度に位置し、総面積は796,095平方キロメートルである（北西辺境州：74,521平方キロメートル）。

パキスタンの主要都市における1990年の気象は次表のとおりである。

#### 自然条件

	海拔 (m)	気温 (°C)		年間降水量 (mm)
		平均最高	平均最低	
イスラマバード	511	28.3	15.1	1,530
<u>パンジャブ州</u>				
ラホール	214	30.6	18.4	955
<u>シンド州</u>				
カラチ	22	31.8	19.9	137
<u>北西辺境州</u>				
ペシャワール	359	29.9	16.5	454
<u>バルチスタン州</u>				
クウェッタ	1,589	25.1	8.9	313

(出所：パキスタン統計年鑑 1991年版)

地形的には以下の4地域から成っている。

- 1) パキスタン北部及び北西部のヒマラヤ山脈の支脈（北西辺境州、他北方地域）
- 2) バルチスタン台地（バルチスタン州）
- 3) ポトハル台地及びソルト・レンジ（パンジャブ州北部）
- 4) インダス平原（パンジャブ州、シンド州）

### 2. 人口

パキスタンの人口は1981年人口センサスでは8,425万人で、1992年1月の推定人口は1億1,732万人である。このうち北西辺境州は約13%を占める。

### 3・社会

パキスタンの公用語はウルドゥ語及び英語であるが、この他にパンジャビ、シンディ、パシュトゥ、バルチ等各地域ごとの言葉が使用されている。宗教は総人口の97%がイスラム教徒、キリスト教徒 2%、その他 1%となっている。

### 4. 経済

近年のパキスタン国内総生産(GDP)の成長率は次表のとおりである。

	GDP成長率		1991-92	
	1989-90年	1990-91年	目 標	実績見込
<u>財貨産業部門</u>	4.7	5.9	6.9	6.8
農業	3.0	5.1	4.3	6.4
製造業	5.7	6.3	10.3	7.7
(大規模工業)	( 4.7)	( 5.5)	(11.0)	( 7.4)
(小規模工業)	( 8.4)	( 8.4)	( 8.4)	( 8.4)
鉱業	9.6	10.8	9.0	4.4
建設業	3.1	5.7	6.5	5.9
電気・ガス	14.6	10.4	9.5	7.1
<u>サービス産業部門</u>	4.6	5.2	6.5	5.9
卸・小売業	3.5	5.6	8.2	7.6
運輸・倉庫・通信	6.5	5.5	6.5	6.9
その他	4.7	4.9	4.7	4.2
GDP (要素費用)	4.7	5.6	6.7	6.4
GNP (要素費用)	5.0	4.2	-	5.5

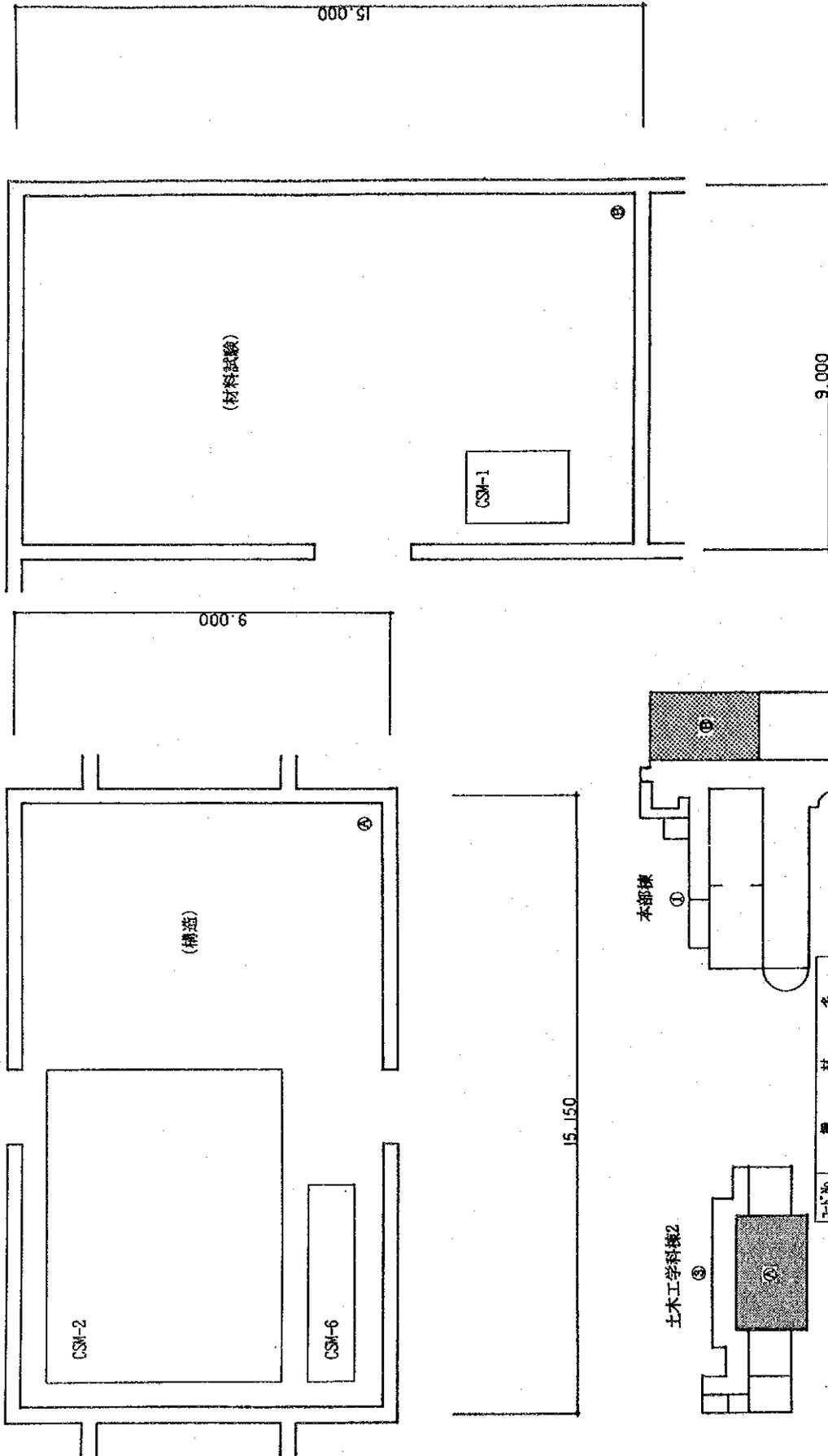
(出所：Economic Survey 1991-92)

## 資料－9 実験室平面図

計画機材が配置される実験室の平面図は以下のとおりである。（カッコ内は機材コードを示す。）

- 図－1 構造・材料実験室(CSM)
- 図－2 土質力学及び道路工学実験室(CSH)、コンクリート実験室(CCL)
- 図－3 水理及び流体力学実験室(CHF)
- 図－4 衛生工学実験室(CPH)、測量実験室(CSL)、流体力学実験室(CHF)
- 図－5 基礎エレクトロニクス実験室(EBL)、デジタルエレクトロニクス実験室(EDE)、パワーエレクトロニクス実験室(EPE)、通信実験室(ECL)、電力システム実験室(EPS)
- 図－6 機械力学実験室(MTM)、冶金工学実験室(MML)
- 図－7 自動車工学実験室(MAE)、伝熱工学実験室(MIT)、燃料工学実験室(MFL)
- 図－8 生産工学実験室(MPE)、機械製図・設計実験室(MMD)、パワープラント実験室(MPP)
- 図－9 農業機械実験室(AMF)
- 図－10 土壌及び水管理工学実験室(ASW)
- 図－11 選鉱実験室(NMP)、岩石力学実験室(NRM)、穿孔技術実験室(NDT)、鉱山測量実験室(NSV)
- 図－12 鉱山通気実験室(NMV)、鉱山保安実験室(NMS)、地質実験室(NGL)
- 図－13 物理実験室(BPL)
- 図－14 一般化学実験室(BGC)、分析化学実験室(BAC)、特別実験室(BSL)
- 図－15 コンピュータ実習室(BCC)
- 図－16 ワークショップ(UWL)

構造・材料試験実験室



コードNo.	機 材 名
CSN-1	万能試験機
CSN-2	ジャッキシステム搬送試験機
CSN-3	多点圧計
CSN-4	ふるいセット
CSN-5	型指示計用マルチチャププライヤースイッチ
CSN-6	プレストレスト用コーン付き校正ジャッキ
CSN-7	クラック検出用顕微鏡

17,400

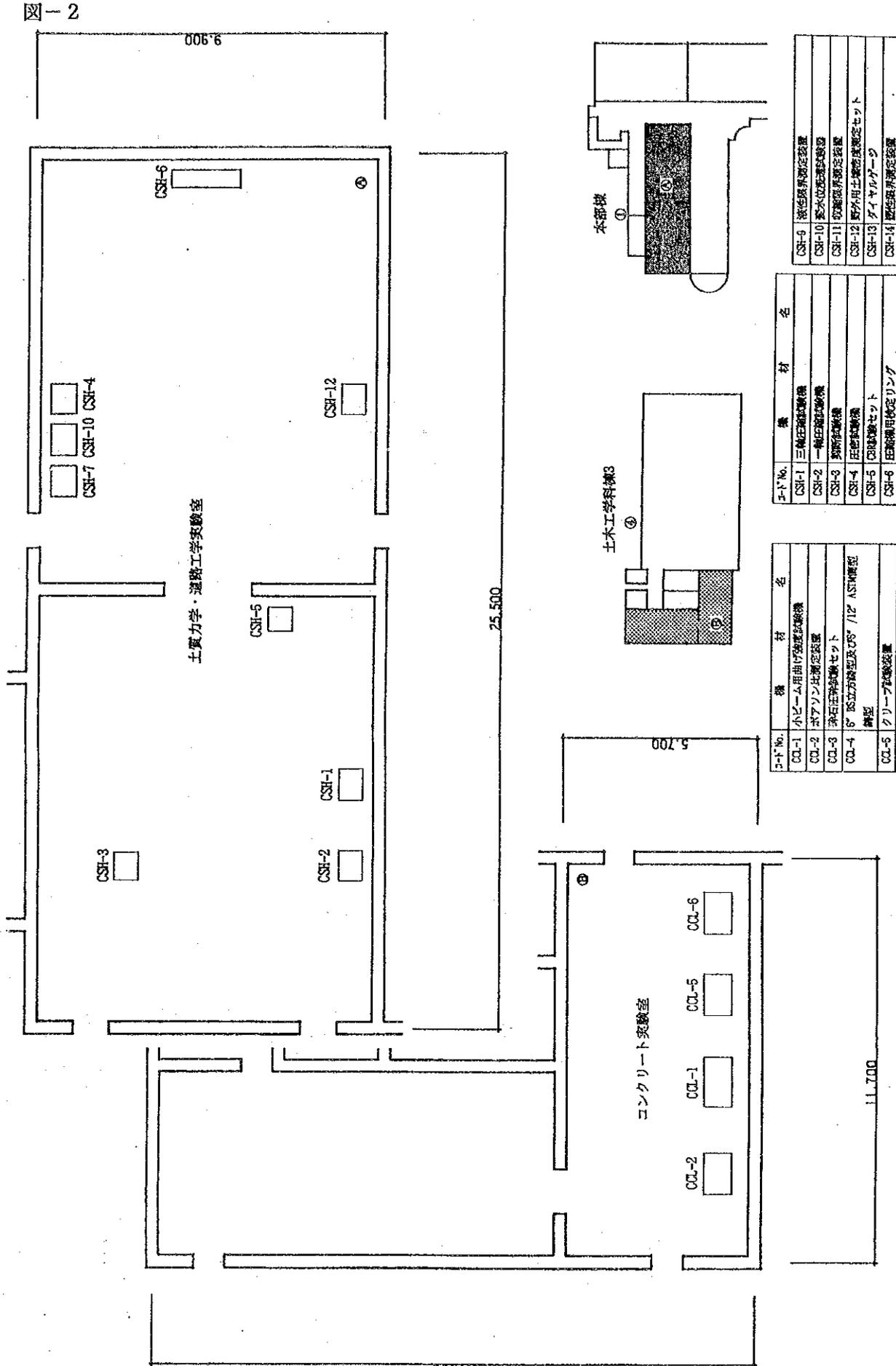
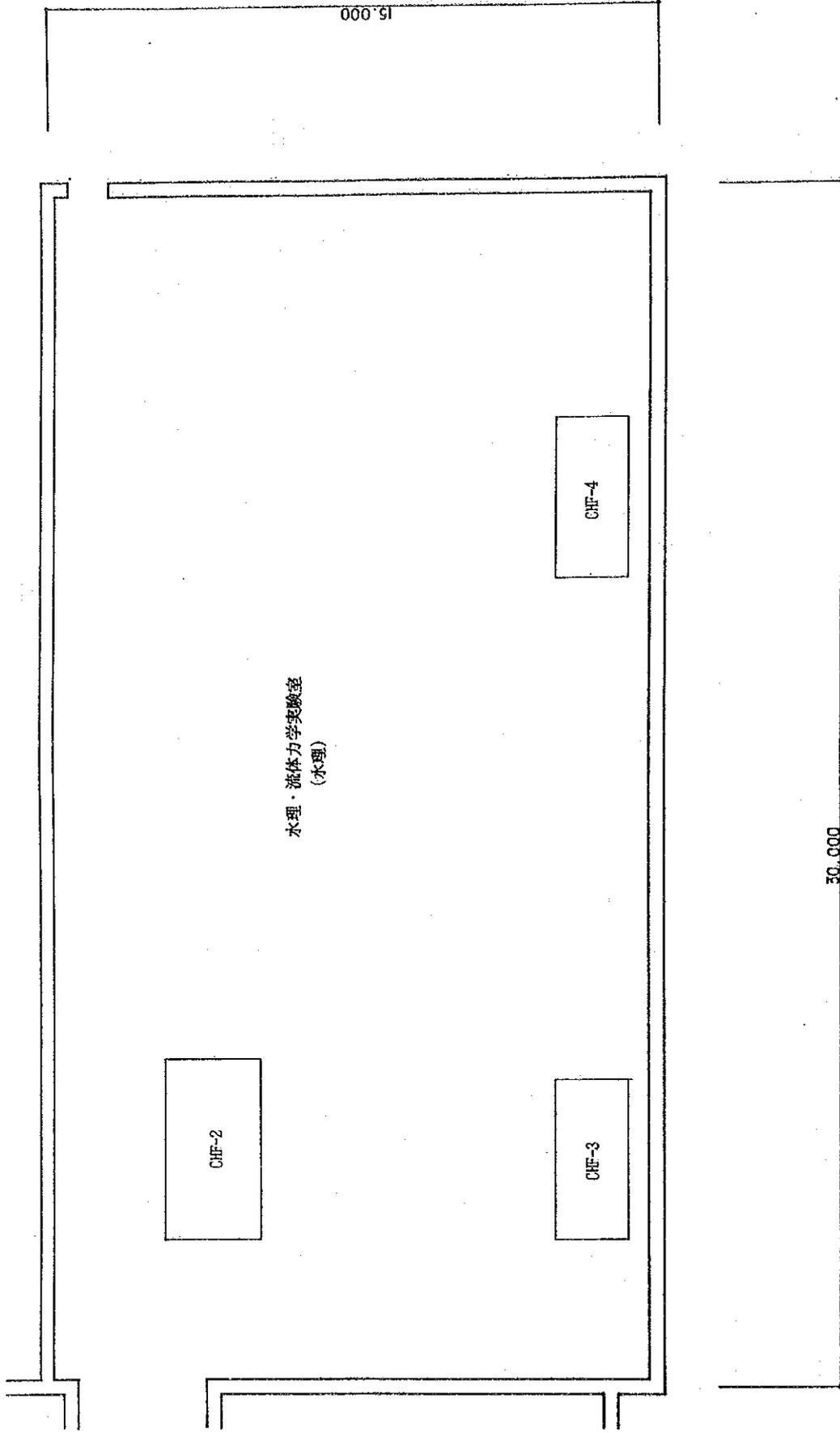


図-2

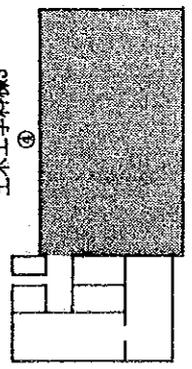
コードNo.	機 材 名
CCL-1	小ゼーム用曲げ強度試験機
CCL-2	ポアソン比測定装置
CCL-3	凍結試験セット
CCL-4	6" BS立方体型及PS / 12" ASTM型型
CCL-5	クリープ試験装置
CCL-6	コンクリート養生槽
CCL-7	超音波コンクリートマスター

コードNo.	機 材 名
CSH-1	三軸圧縮試験機
CSH-2	一軸圧縮試験機
CSH-3	剪断試験機
CSH-4	圧密試験機
CSH-5	CBR試験セット
CSH-6	圧縮用特定リング
CSH-7	定水位差試験機
CSH-8	電子天秤

CSH-9	液性限界測定装置
CSH-10	含水比測定試験器
CSH-11	収縮限界測定装置
CSH-12	野外用土質改良測定セット
CSH-13	ダイヤルゲージ
CSH-14	塑性限界測定装置

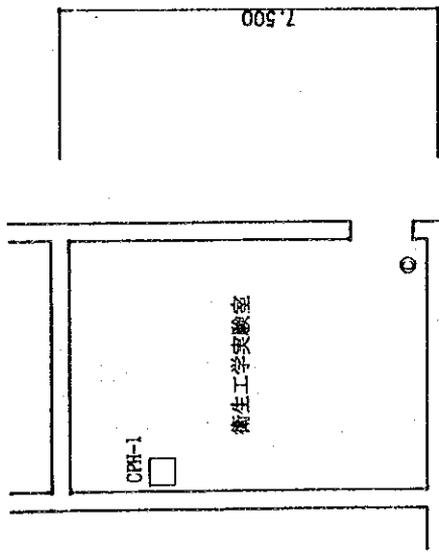
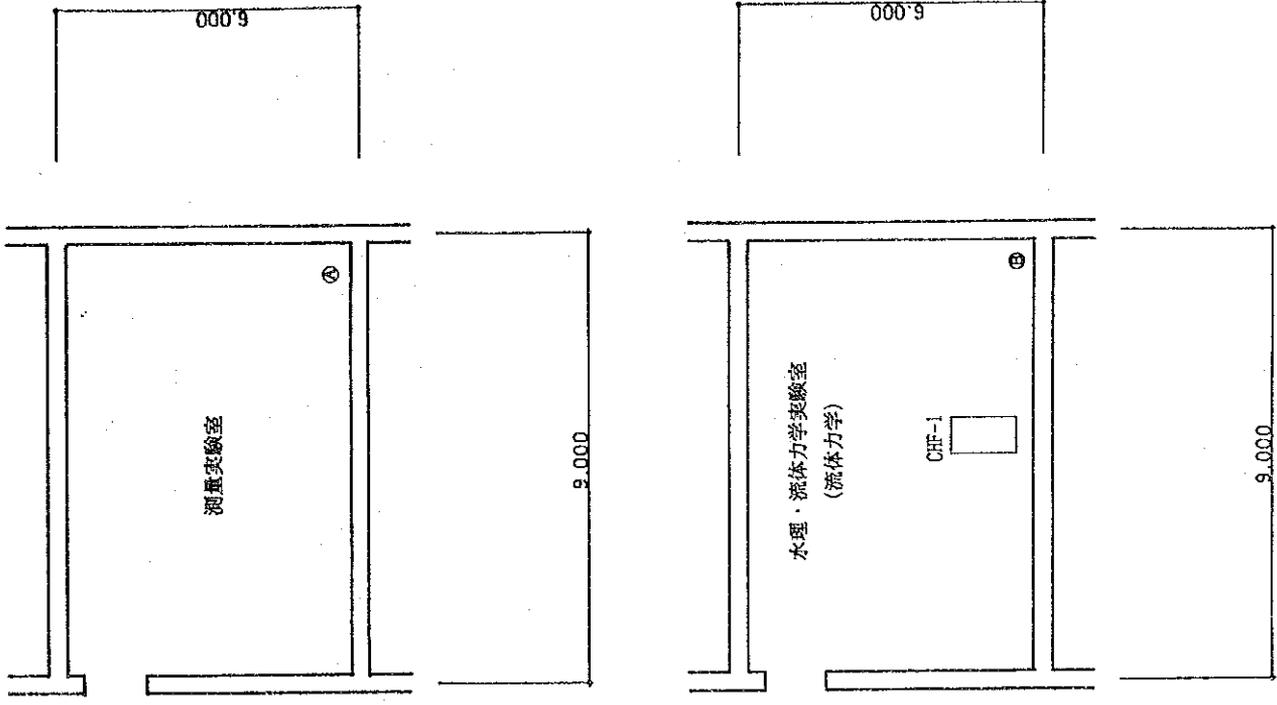


土木工学科棟③



エド No.	機 材 名
CHF-1	水力学テストベンチ
CHF-2	堆積物運搬送水路
CHF-3	水流降流計測装置
CHF-4	層流分析台

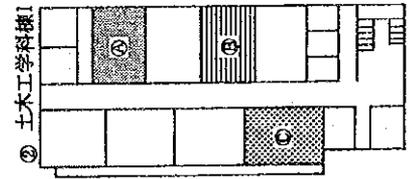
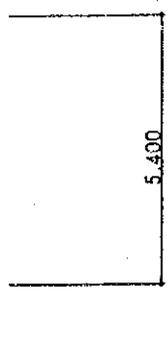
図-4



コードNo.	機 材 名
CSI-1	三軸圧縮試験機
CSI-2	一軸圧縮試験機
CSI-3	引張試験機
CSI-4	圧縮試験機
CSI-5	CSH試験セット
CSI-6	圧縮機用検定リング
CSI-7	定水位差速試験機
CSI-8	電子天秤
CSI-9	液性粘着測定装置
CSI-10	定水位差速試験器
CSI-11	収縮器用測定装置
CSI-12	野外用土壌湿度測定セット
CSI-13	ダイヤルゲージ
CSI-14	液性粘着測定装置

コードNo.	機 材 名
CSL-1	粘結機
CSL-2	電子式トータルステーション粘結機

コードNo.	機 材 名
CPH-1	BOD用内蔵菌培養器
CPH-2	電子天秤



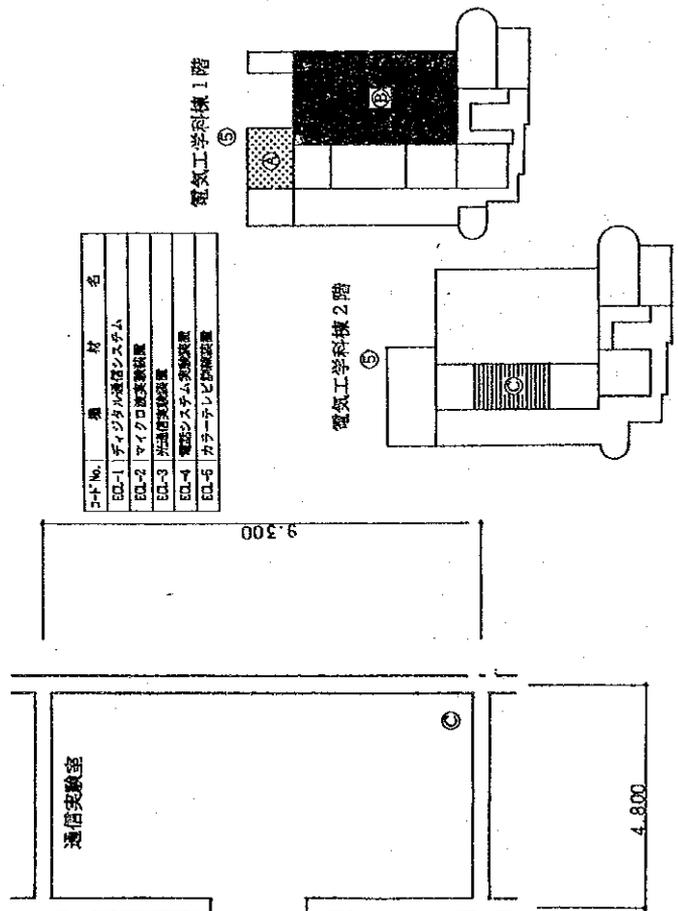
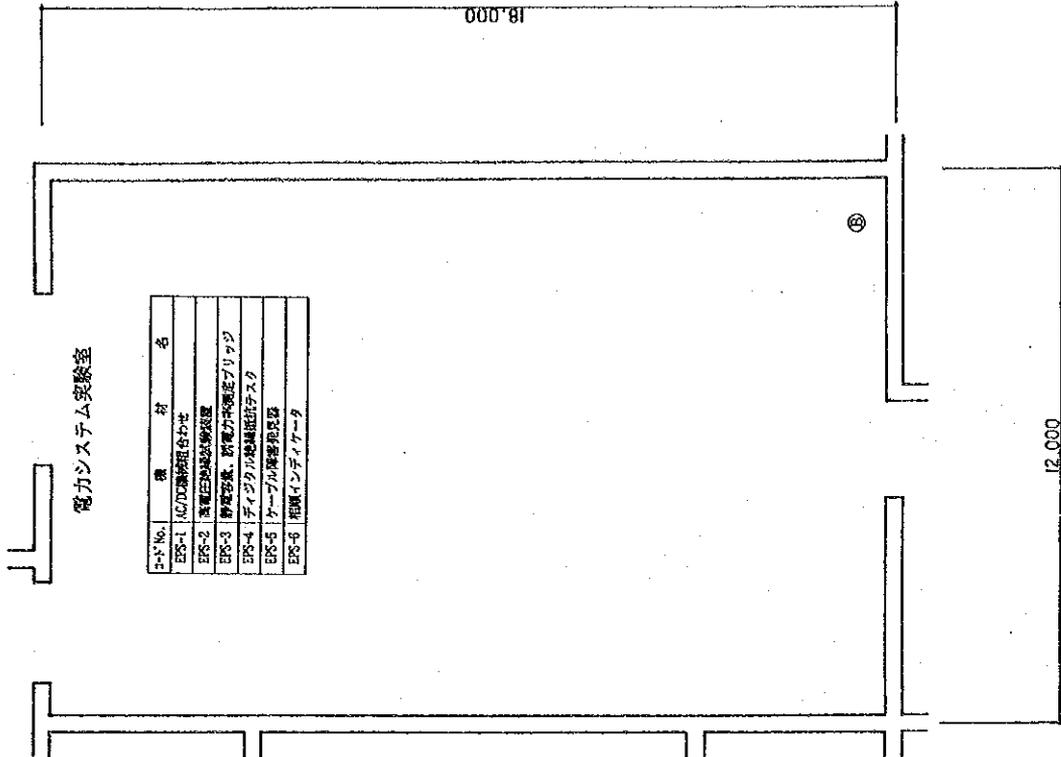
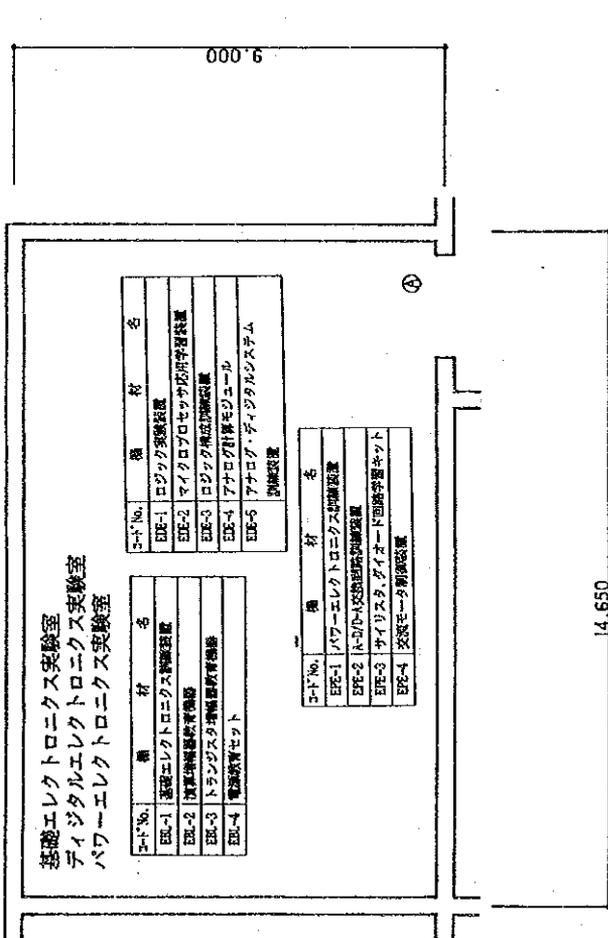
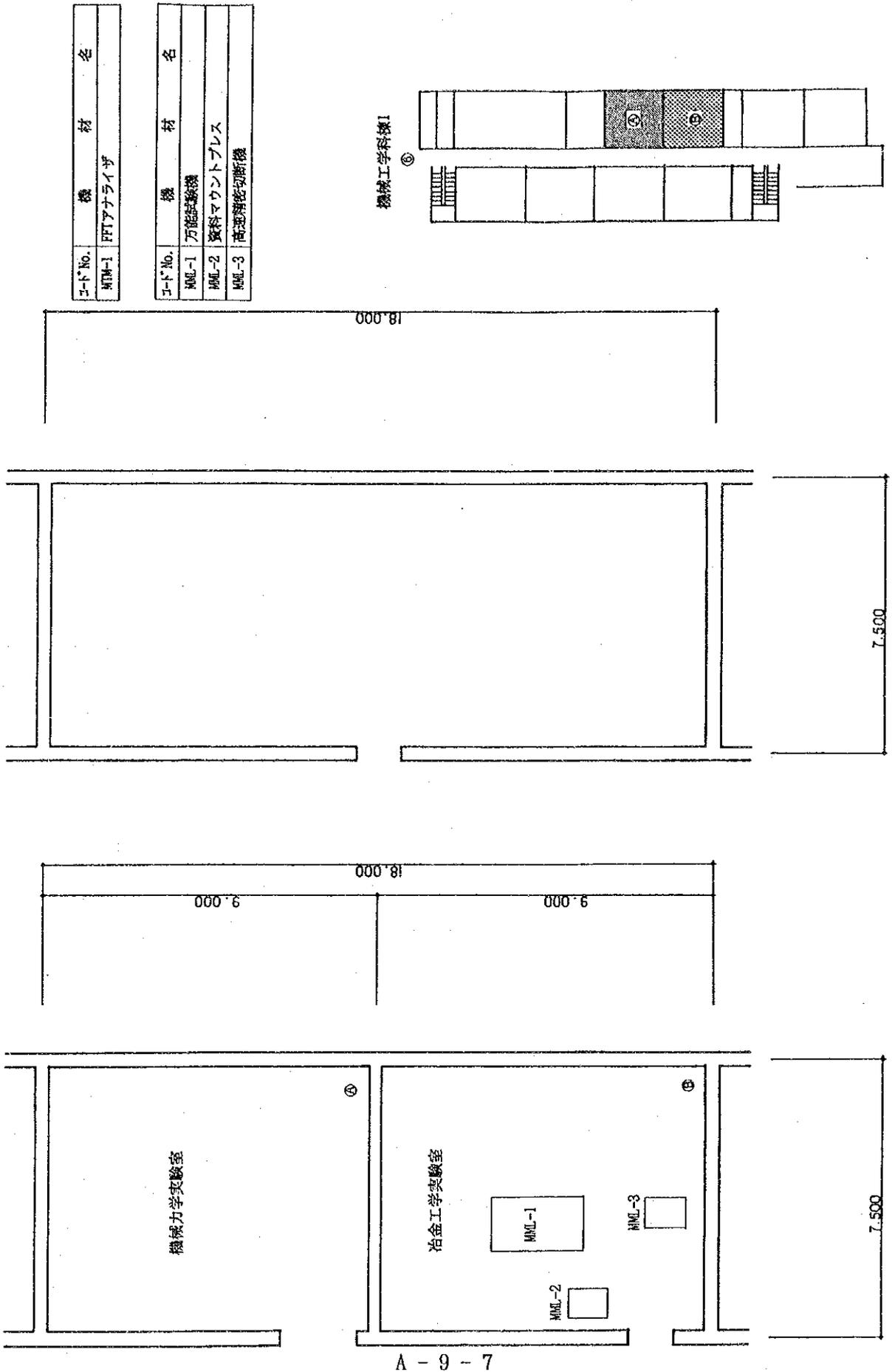
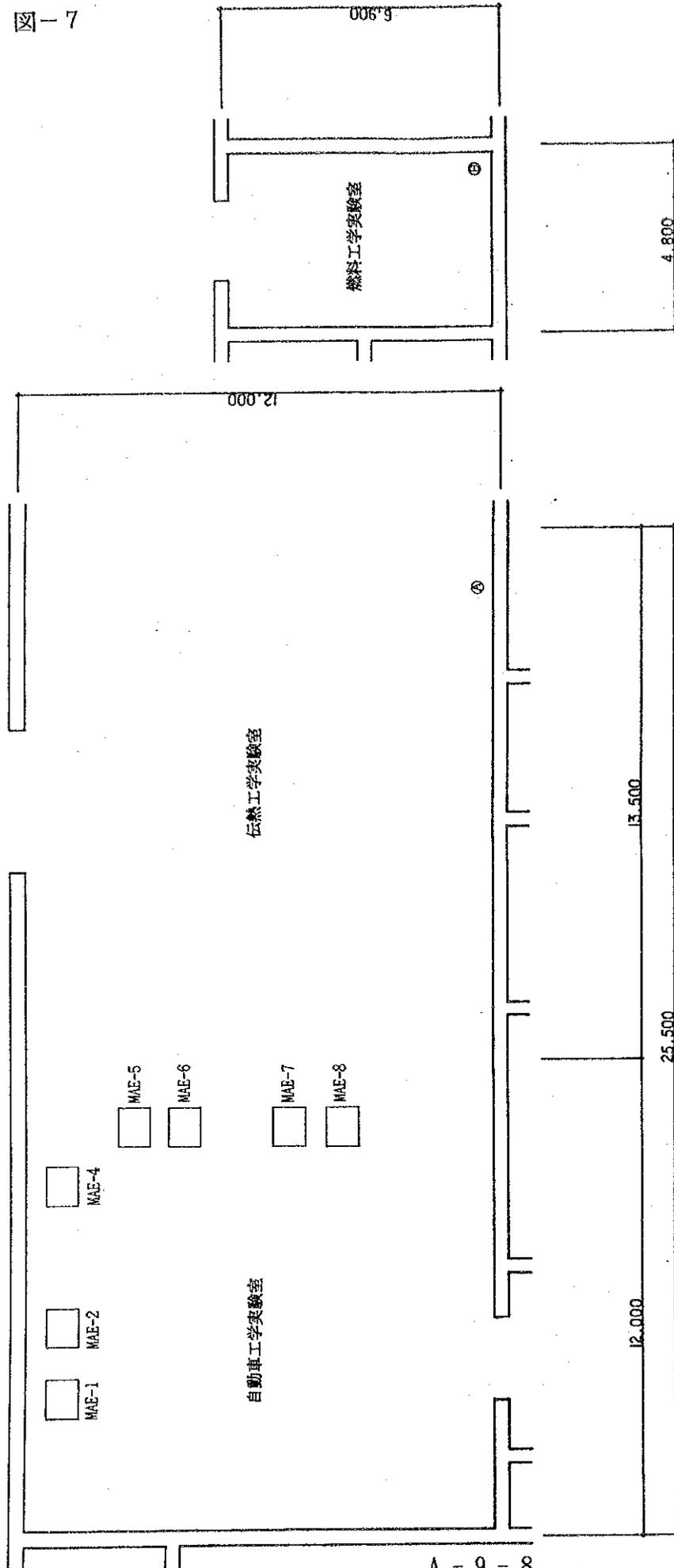


図-6



コードNo.	機材名
MML-1	FFTアナライザ

コードNo.	機材名
MML-1	万能試験機
MML-2	資料マウントプレス
MML-3	高速精密切断機



8-9-A

コードNo.	機材名
ME-1	ポンペ熱量計
ME-2	エンカーガス熱量計
ME-3	セイボルト配管計
ME-4	グリーンズちよう度試験器
ME-5	オルガクトガス分析器

コードNo.	機材名
MIT-1	水/水蒸気流熱伝達装置
MIT-2	ふく射熱伝達装置
MIT-3	温度測定装置
MIT-4	熱伝達実験装置

コードNo.	機材名
MAE-1	燃料噴射ポンプスター
MAE-2	燃料・空気流測定装置
MAE-3	ホイールライメント測定装置
MAE-4	自動放電系・電子システム試験装置
MAE-5	電子式エンジンテストター
MAE-6	ターボチャージャー付者エンジン
MAE-7	ドラム及びディスクブレーキ
MAE-8	オートマチックトランスミッション

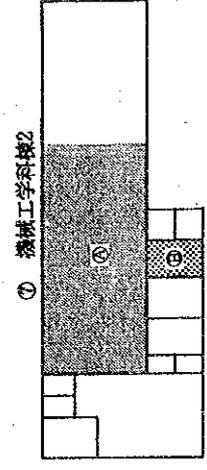
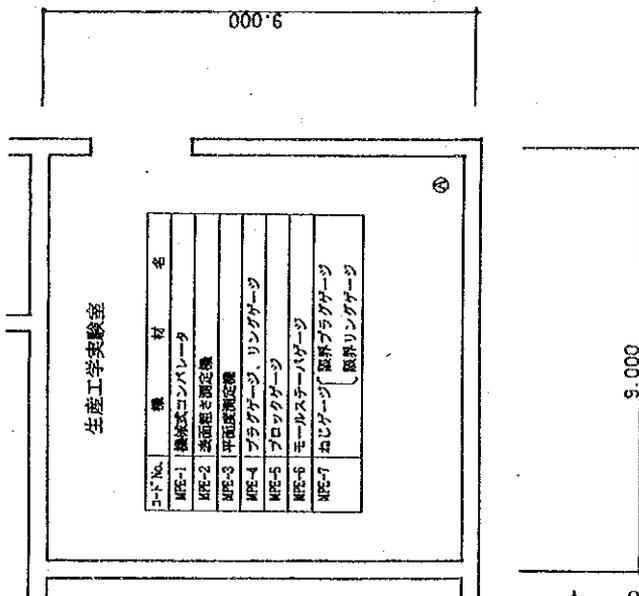
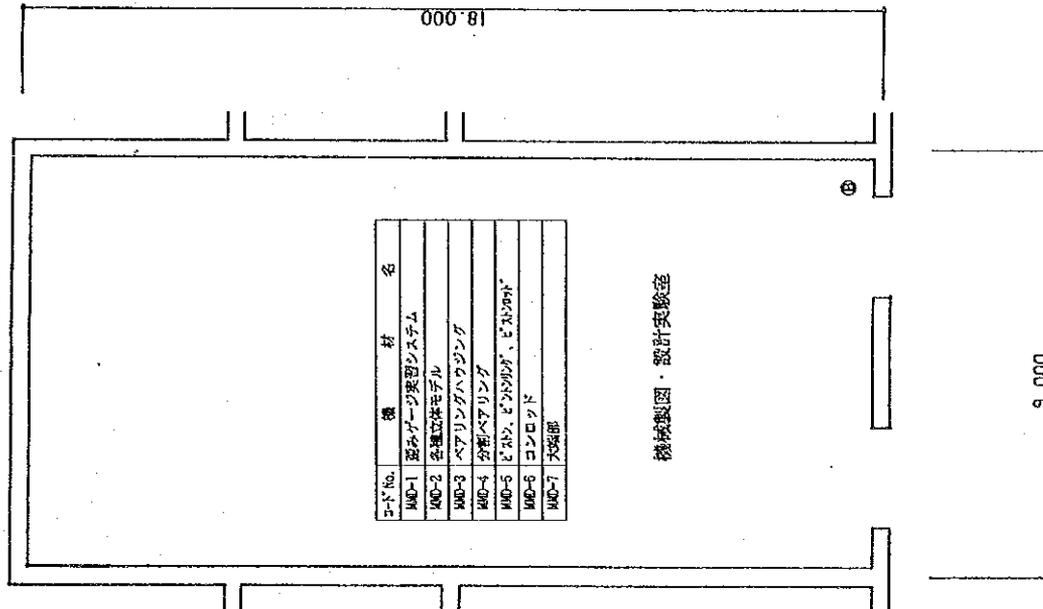
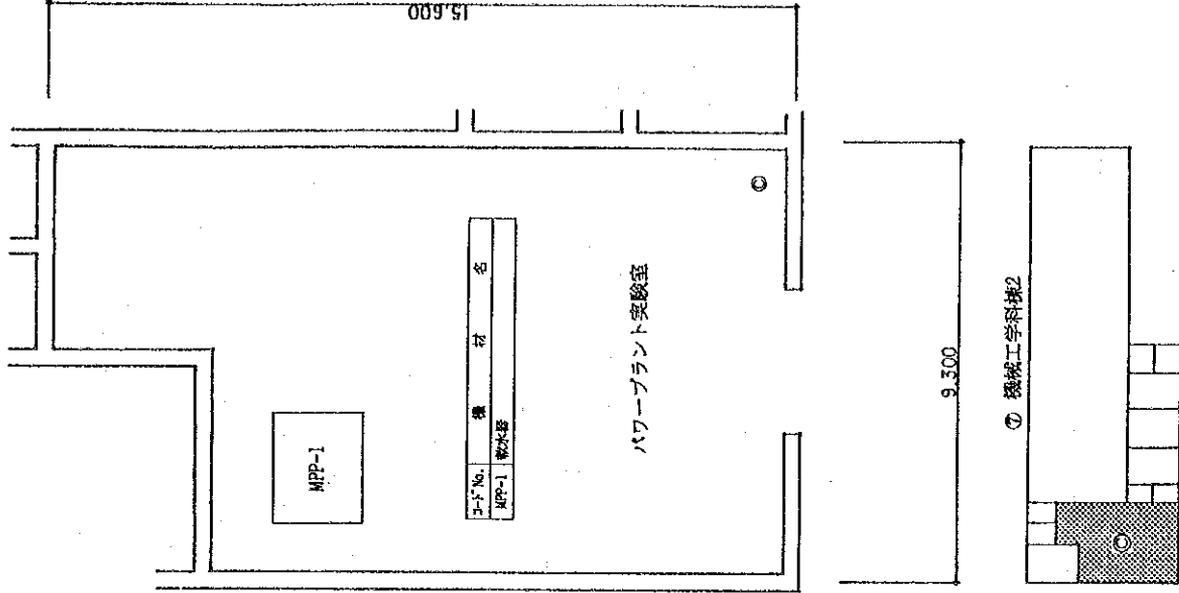
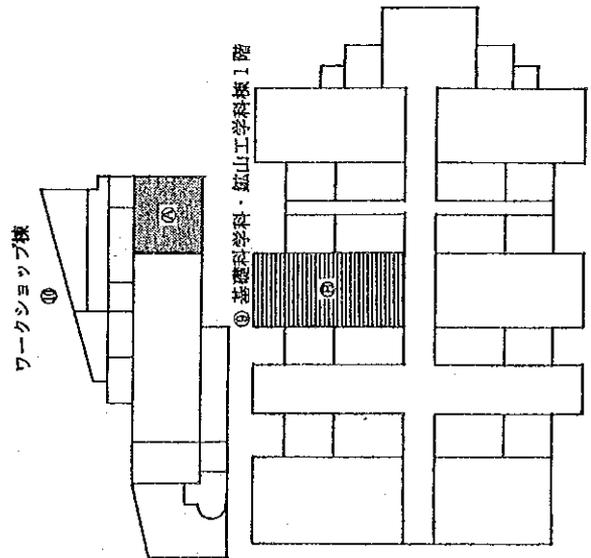
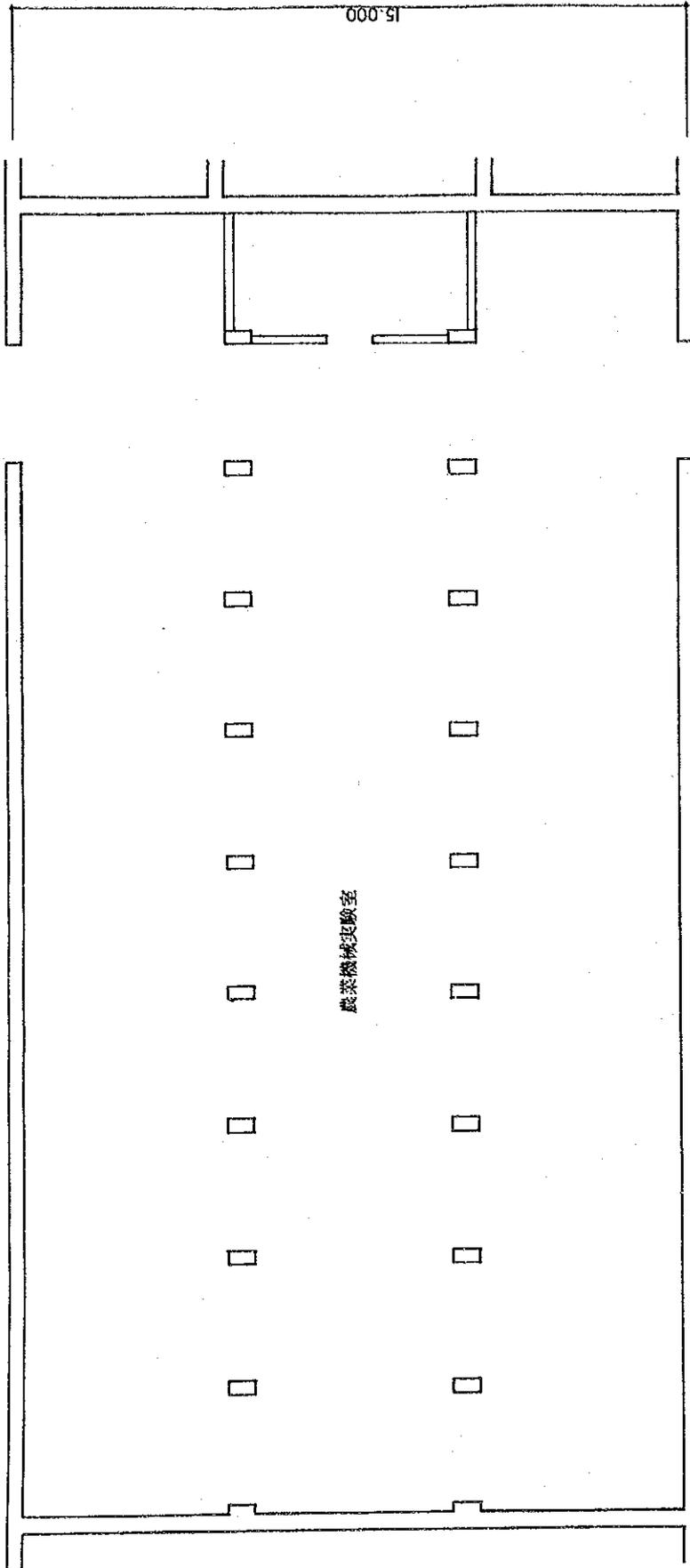


図-8

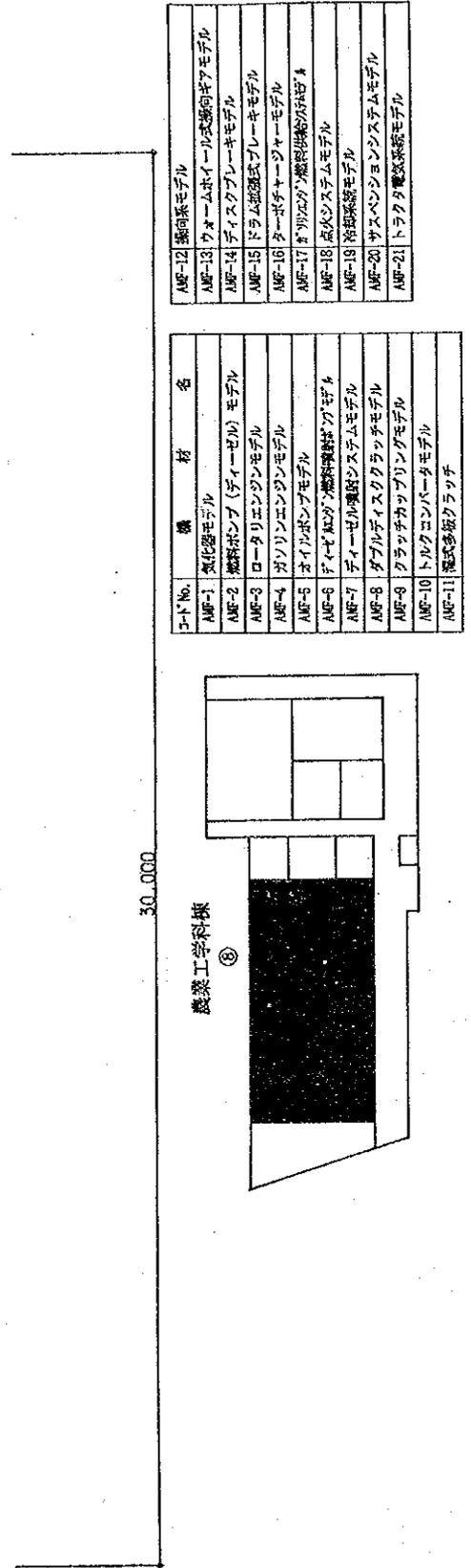


A - 9 - 9





農業機械実験室



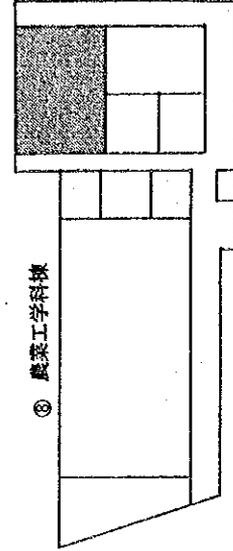
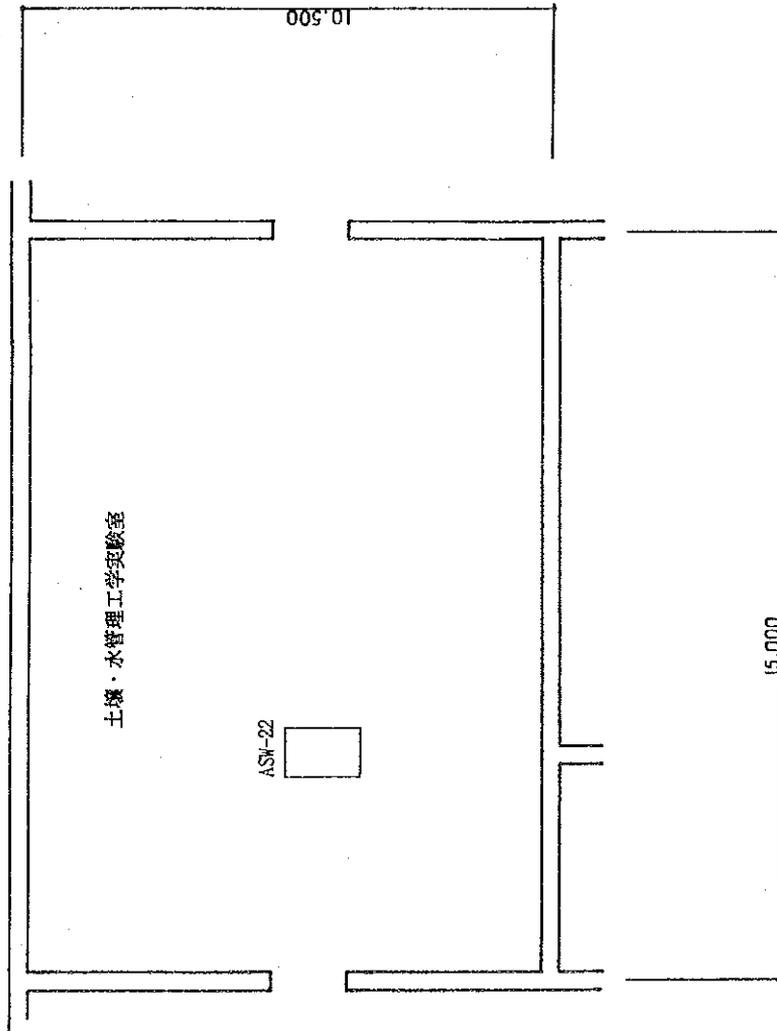
農業工学科棟

30,000

コードNo.	機 材 名
AMP-1	酸化器モデル
AMP-2	燃料ポンプ (ディーゼル) モデル
AMP-3	ロータリエンジンモデル
AMP-4	ガソリンエンジンモデル
AMP-5	オイルポンプモデル
AMP-6	ディーゼルエンジン燃料供給システム
AMP-7	ディーゼルエンジンシステムモデル
AMP-8	ダブルディスククラッチモデル
AMP-9	クラッチカップリングモデル
AMP-10	トルクコンバータモデル
AMP-11	電式多級クラッチ
AMP-12	振向きモデル
AMP-13	ウォームホイール式振向きモデル
AMP-14	ダイヤクブレキモデル
AMP-15	ドラム式ブレーキモデル
AMP-16	ターボチャージャーモデル
AMP-17	燃料供給システム
AMP-18	点検システムモデル
AMP-19	冷間実験モデル
AMP-20	サスペンションシステムモデル
AMP-21	トラクタ電気系統モデル

図 10

コードNo.	機 材 名
ASW-1	土壌水分計測器
ASW-2	土壌水分計プローブ
ASW-3	土壌水分計及び抵抗ブロック
ASW-4	土壌穿孔セット
ASW-5	ふるい分析セット
ASW-6	携帯型デジタルpH計
ASW-7	電子天秤
ASW-8	土壌透水性測定器
ASW-9	単純型土壌透水性測定器
ASW-10	土壌検査キット
ASW-11	水質検査キット
ASW-12	土壌圧強測定器
ASW-13	携帯ダイヤルゲージ地中温度計
ASW-14	塩分計
ASW-15	伝導性及び温度計測器
ASW-16	多目的水質検査キット
ASW-17	水位記録計
ASW-18	液性限界測定装置
ASW-19	雨量記録計
ASW-20	デジタル式気温・風力計
ASW-21	展示用かんがい装置
ASW-22	地下水計測装置



コードNo.	機 材 名
NMP-1	ワイヤラインコアパーレル
NMP-2	炭素粉付測定用ワイヤコアダプタ
NMP-3	ダイヤモンドピット

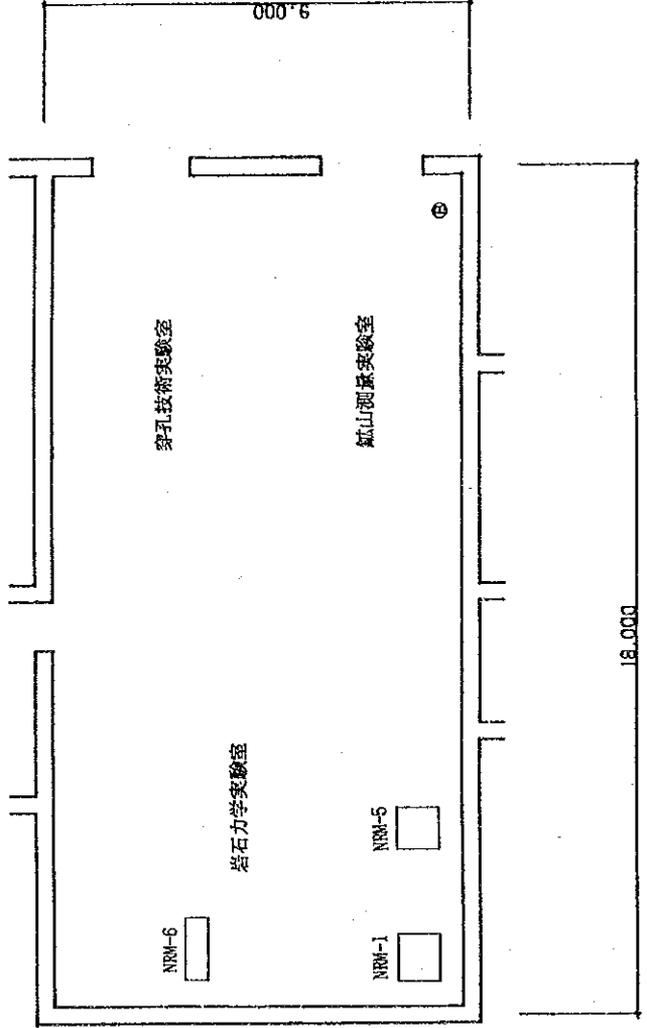
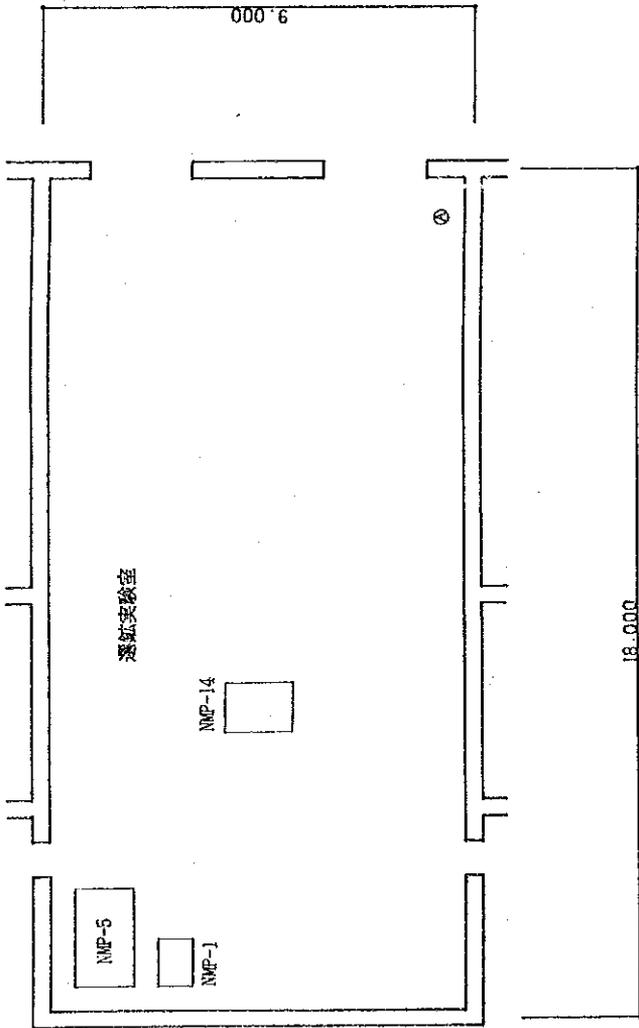
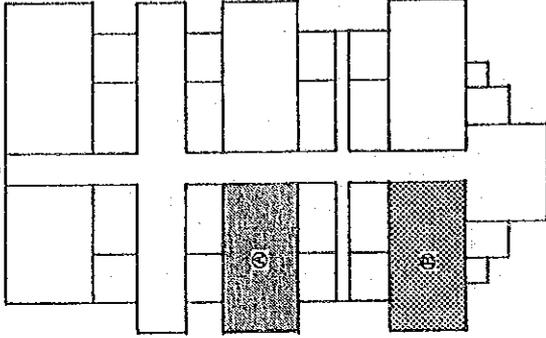
コードNo.	機 材 名
NSP-1	自動レベル計 (台数:20)
NSP-2	自動レベル計 (台数:25)
NSP-3	案内台下付型探検機
NSP-4	デジタル式探検機
NSP-5	スチレンス製巻尺
NSP-6	探検機
NSP-7	新着探検機
NSP-8	レーザ探検機
NSP-9	探検機

コードNo.	機 材 名
NMP-1	汎用実験装置
NMP-2	ふさい分取装置
NMP-3	ふるいセクト
NMP-4	特殊型探検機
NMP-5	Dカメラ
NMP-6	自動ポインタスケール (DC用)
NMP-7	自動ポインタスケール (AC用)
NMP-8	マツル電気式
NMP-9	電子天秤
NMP-10	乾燥器各種
NMP-11	乾燥器各種
NMP-12	乾燥器各種
NMP-13	乾燥器各種
NMP-14	ローリングマシン

コードNo.	機 材 名
NPM-1	新着探検機
NPM-2	探検機
NPM-3	白色灯
NPM-4	水電灯
NPM-5	器具サンプル用クランプ
NPM-6	コア探検機
NPM-7	コアパーレル
NPM-8	シムカットハンマー
NPM-9	ダイヤモンドキャリア

基礎科学科・鉱山工学科棟 1 階

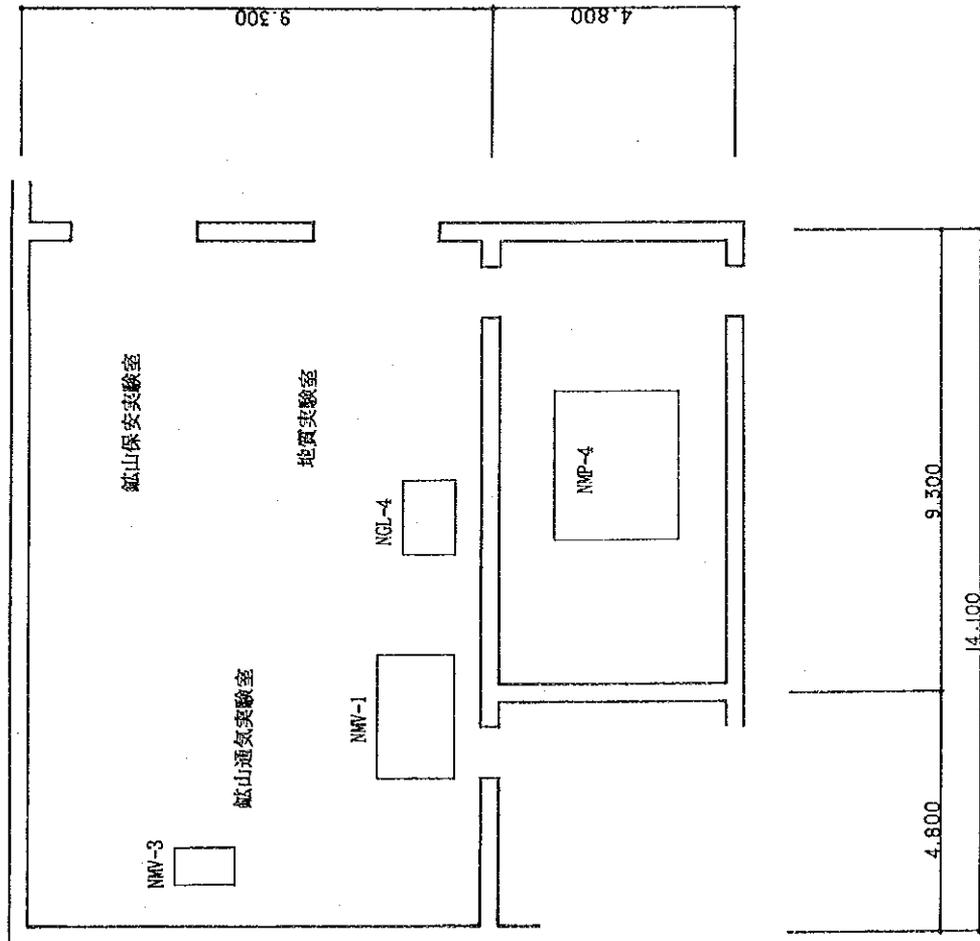


コード No.	機 材 名	機 材 名
NCL-1	標準用CO <sub>2</sub> 測定器	顕微鏡機
NCL-2	標準用予設計	起馬及び原子構造模型セット
NCL-3	多種類ガス測定器	造山地形モデル
NCL-4	坑内用石炭安全灯	薄片製作装置
NCL-5	秒時計	タガネ及び鉱山用ハンマー

コード No.	機 材 名
NMS-1	標準用アネロイド気圧計
NMS-2	標準用予設計
NMS-3	多種類ガス測定器
NMS-4	坑内用石炭安全灯
NMS-5	秒時計
NMS-6	標準用アネロイド気圧計

コード No.	機 材 名
NM-1	顕微鏡機
NM-2	救命呼吸器
NM-3	ハイプ摩滅及び液体摩滅計測器
NM-4	デジタル式照度計
NM-5	ガイガーカウンター

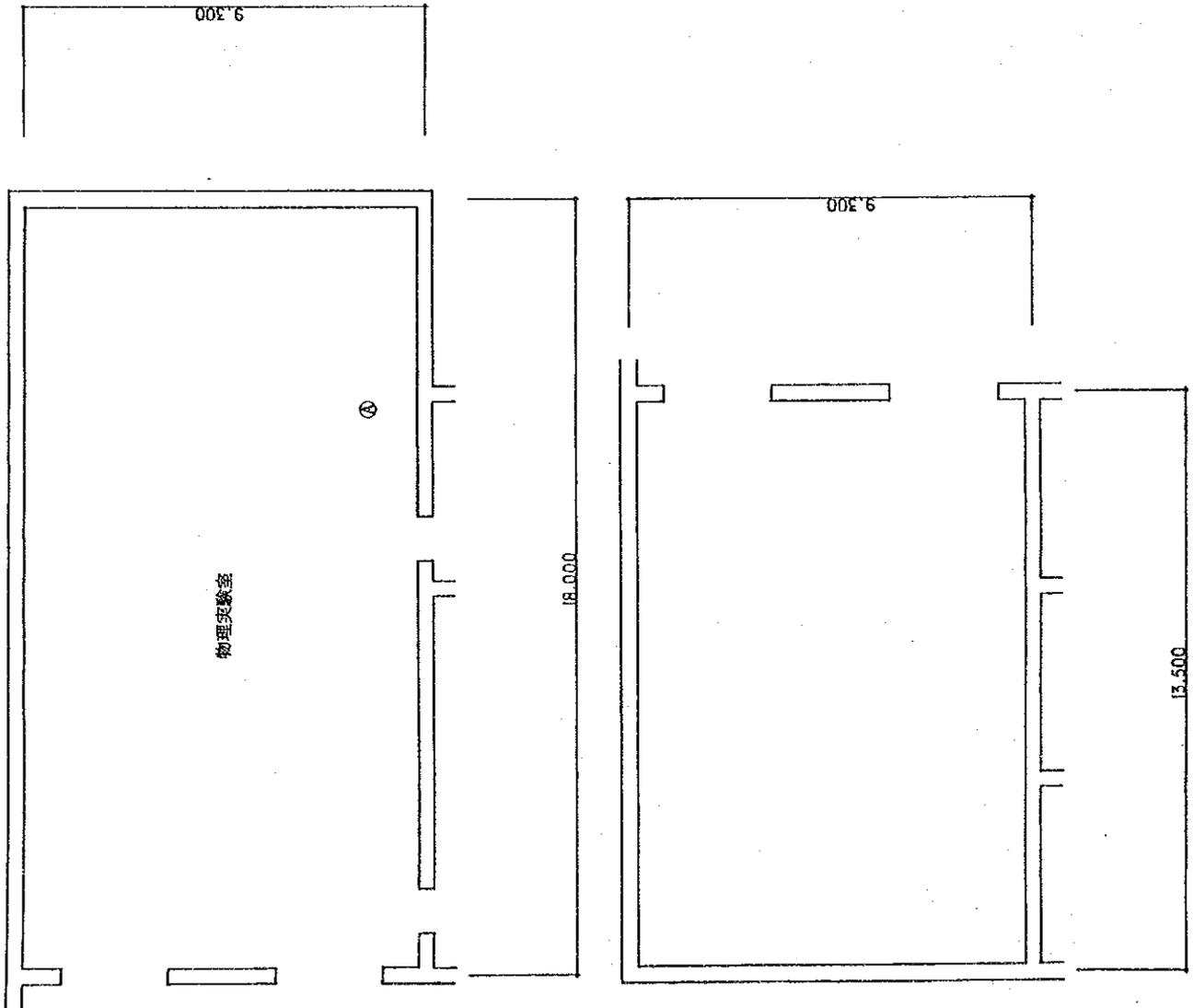
コード No.	機 材 名
NM-1	顕微鏡機
NM-2	救命呼吸器
NM-3	ハイプ摩滅及び液体摩滅計測器
NM-4	デジタル式照度計
NM-5	ガイガーカウンター



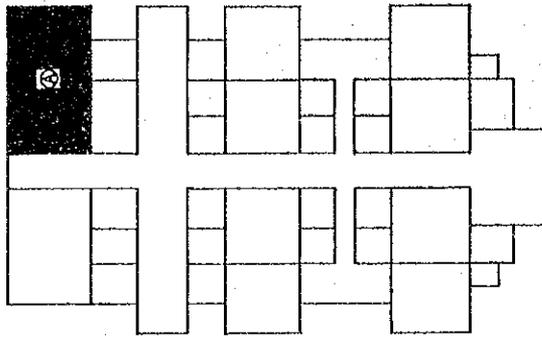
基礎科学科・鉱山工学科棟 1階

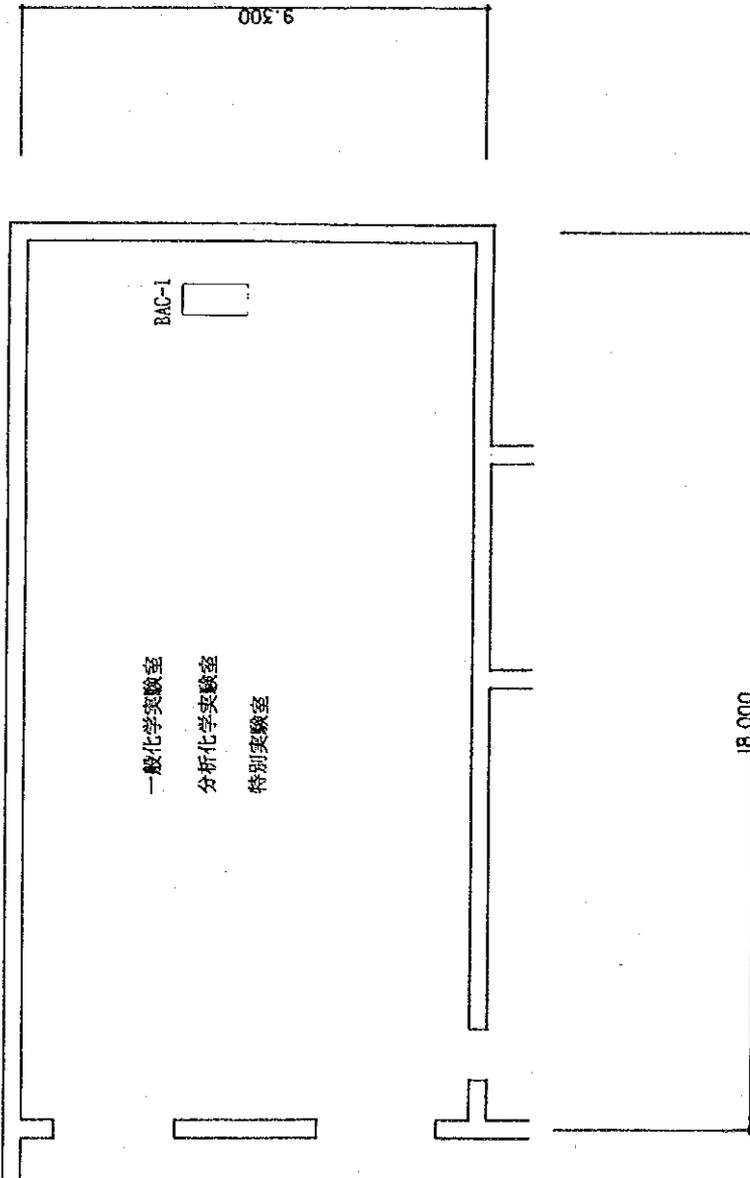
図 - 13

コードNo.	機材名
BPL-1	ガイガーミューラ計数管
BPL-2	マイクログラフ記録装置
BPL-3	直流安定電源
BPL-4	高圧電源
BPL-5	電位計
BPL-6	昇巻可変変圧器

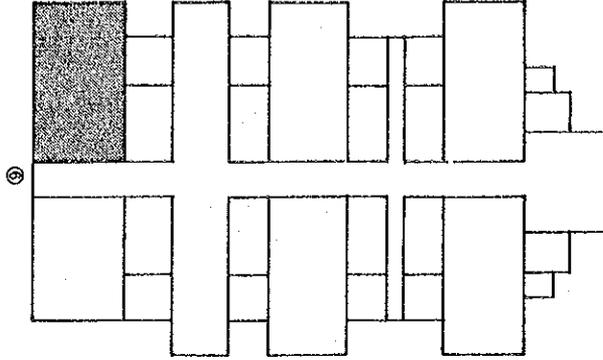


基礎科学科・鉱山工学科棟 2階





基礎科学科・鉱山工学科棟 1階

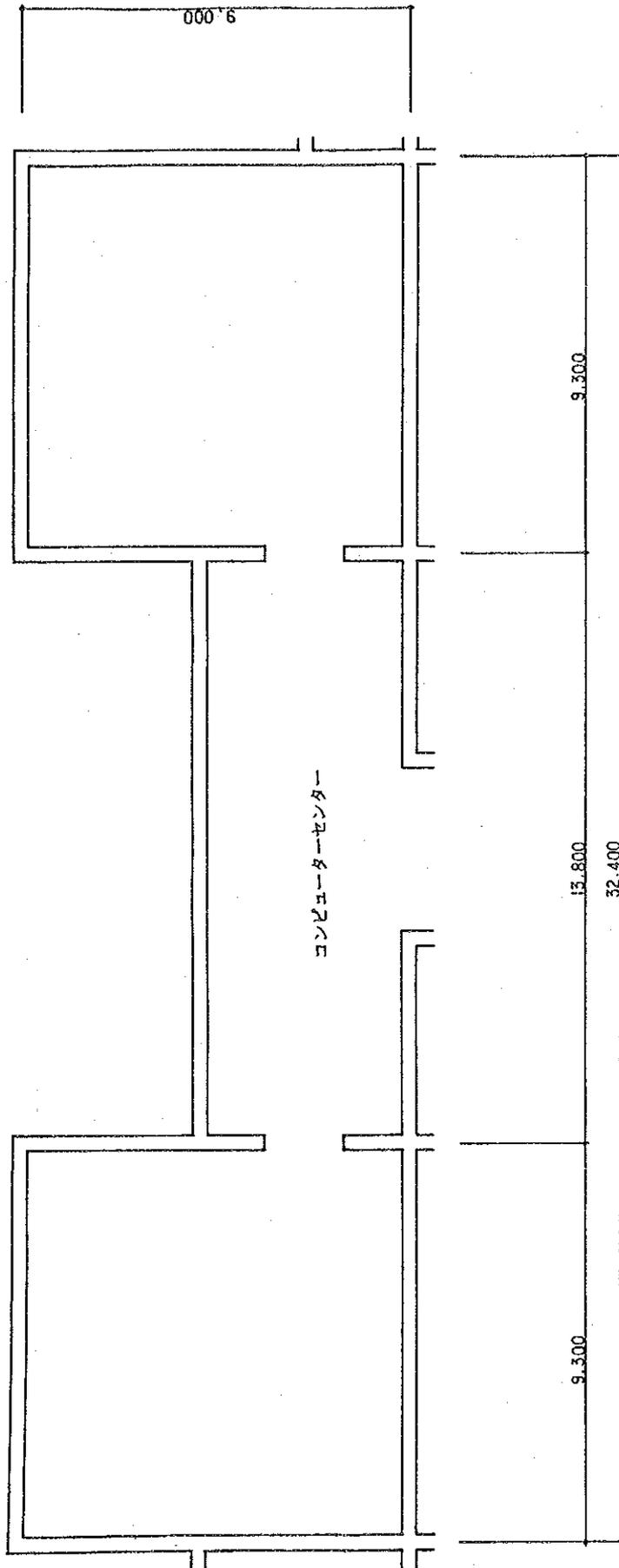


コードNo.	機	材	名
BCC-1	遠心分離機		
BCC-2	マグネティック・スターラ		
BCC-3	フラスコ・シエーカ		
BCC-4	乾燥炉		
BCC-5	サーモスタット		
BCC-6	ホットプレート		
BCC-7	恒温槽		
BCC-8	マントルヒーター		
BCC-9	チャンバー形加熱炉		
BCC-10	真空ポンプ		
BCC-11	回転式真空エバポレータ		

コードNo.	機	材	名
BAC-1	原子吸光分光光度計		
BAC-2	電位差測定装置		
BAC-3	内測定用ディジタル型ミリボルト計		
BAC-4	薬とスターラ付きテフロンビンカー		
BAC-5	薬付と白金るつぼ		
BAC-6	電気分極装置		
BAC-7	紫外-可視分光光度計		
BAC-8	ポラログラフ		
BAC-9	ガス分析装置		
BAC-10	摩電導測定装置		

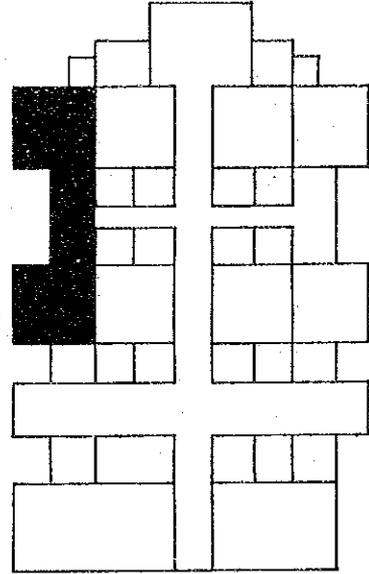
コードNo.	機	材	名
BSL-1	石油蒸留装置		
BSL-2	タール粘度計		
BSL-3	残留炭素テスタ		
BSL-4	アッペレル計		
BSL-5	偏光計		
BSL-6	ブルドン型圧力ゲージ		

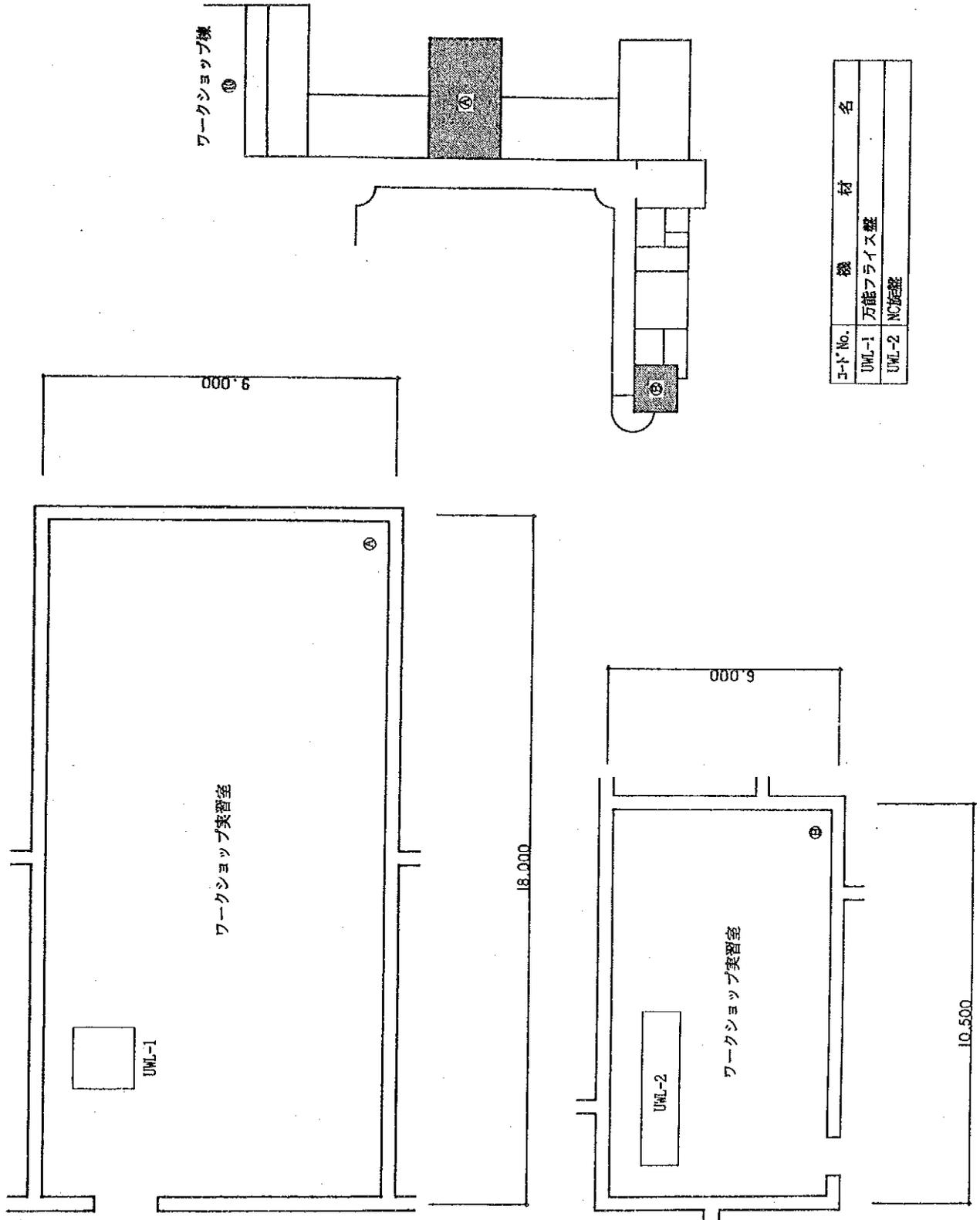
図-15



コードNo.	機材名
BCC-1	パーソナルコンピュータ
BCC-2	プリンター

基礎科学科・鉱山工学科棟 2階





国際協力事業団

パキスタン・イスラム共和国 ペンヤウル工科大学機材整備計画基本設計調査報告書

平成5年2月

ユニオン・エス

JICA

117  
217  
018

LIBRA

JICA