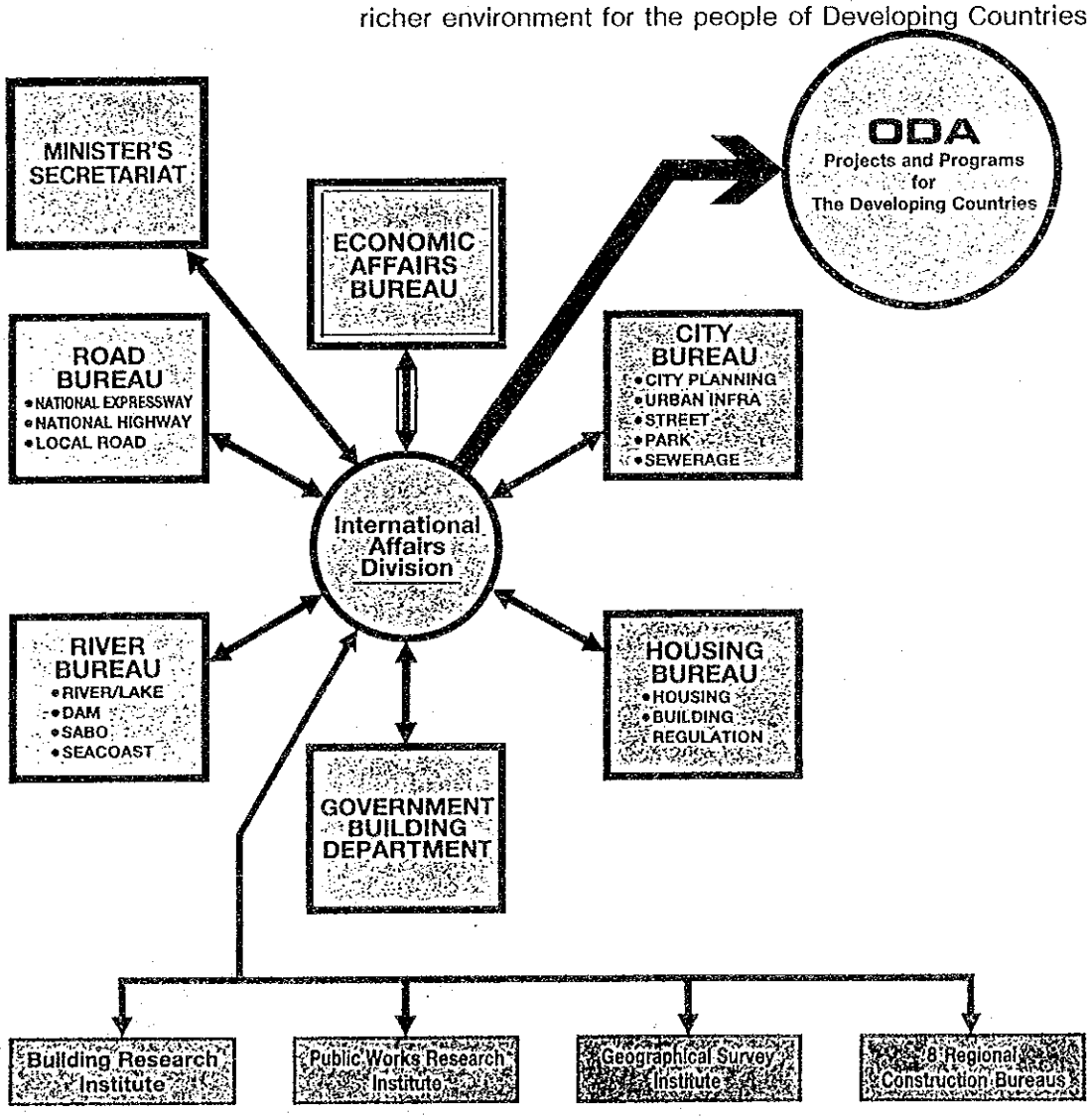
ODA&MOC

Official Development Assistance Ministry Of Construction

What is MOC?

The Ministry of Construction (MOC) plays an important role for the socioeconomic development of JAPAN.
MOC is making strong efforts to create a rich environment for the whole nation. They have done so by installing various infrastructures such as roads, rivers, parks, sewage systems and housing. They monitor all the construction and development activities through careful planning, controlling and management. Through the ODA MOC is also making a great contribution in the field of engineering services in order to ensure a richer environment for the people of Developing Countries.

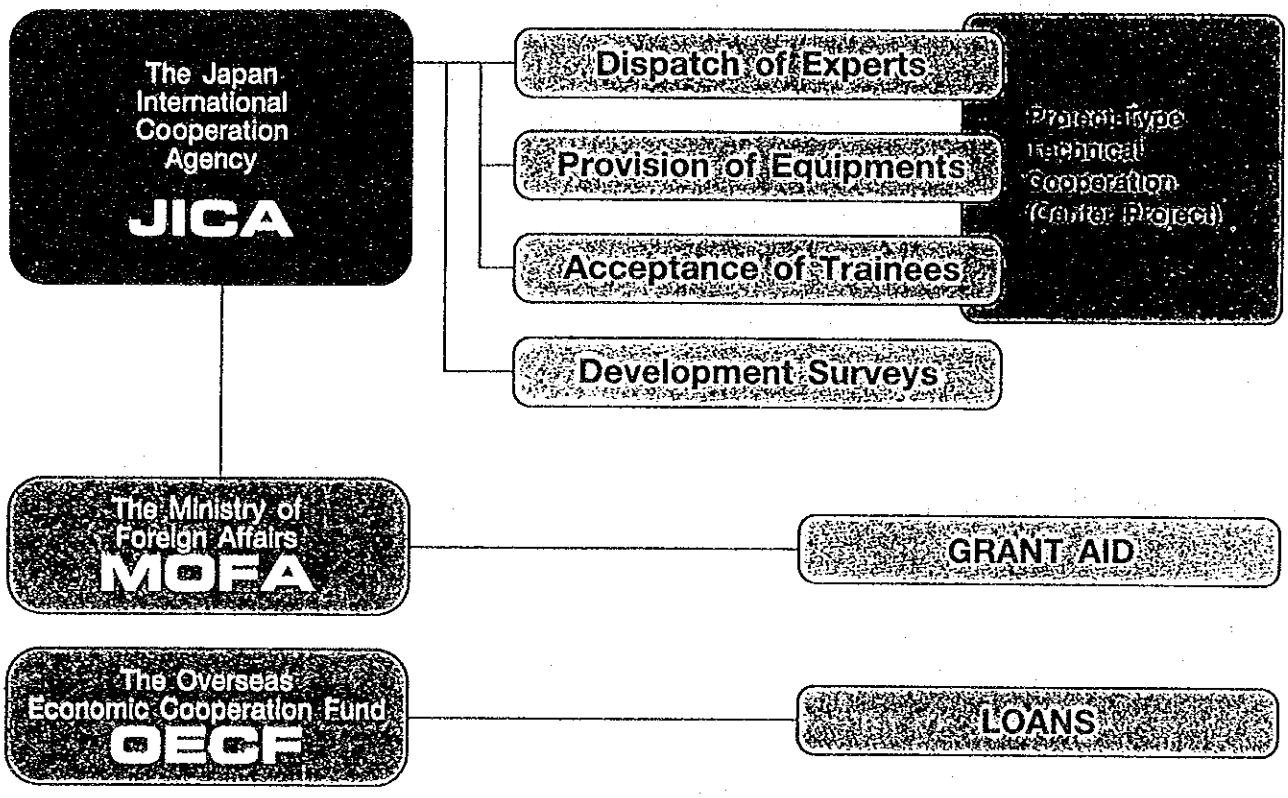


INTERNATIONAL AFFAIRS DIVISION, ECONOMIC AFFAIRS BUREAU, MINISTRY OF CONSTRUCTION
GOVERNMENT OF JAPAN

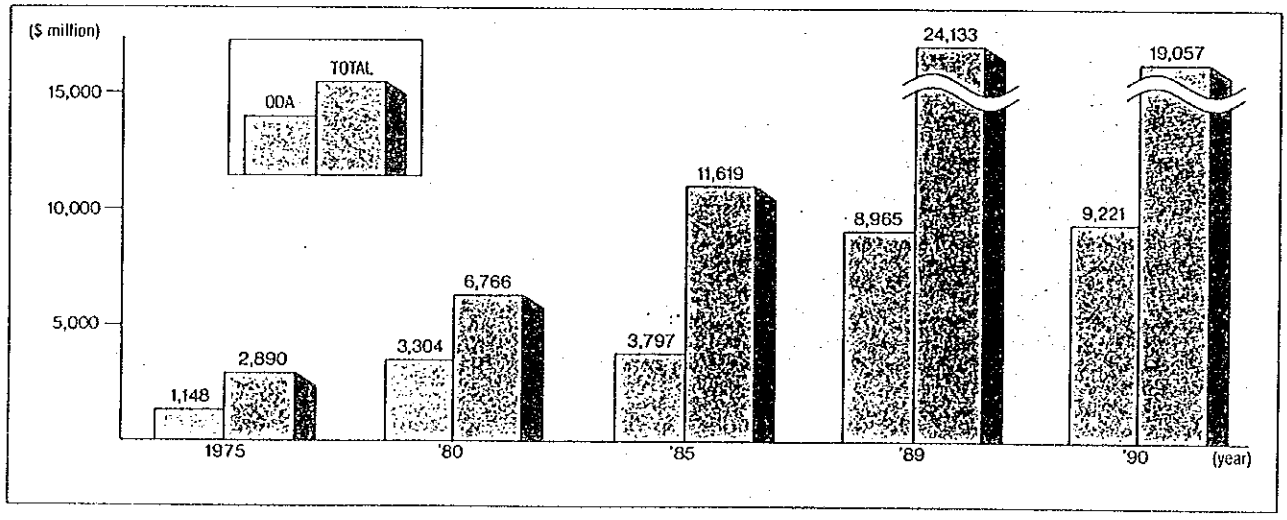
JAPAN'S ODA SYSTEM

Based on the concept of international mutual interdependence and the importance of humanity, Japan has been implementing various ODA programs for developing countries in order to promote their economic development and the welfare of their people. The Ministry of Construction (MOC) has been making major contributions to further Japan's international cooperation by transferring it's specialized technology and extensive experience in the field of public works, construction and physical planning. Through JICA, the Ministry of Construction (MOC) has contributed to developing countries in many ways:(1) research and surveys into various development projects, (2) the dispatch of experts over short-term and long-term periods, (3) taking the lead in enhancing the technology transfer by (a) accepting and training foriegn guests, and (b) managing overseas centers for research and training.

The MOC also contributes to the promotion of economic cooperation projects covering construction as well as engineering services related to the OECF LOANS and MOFA's Grant Aid Projects.



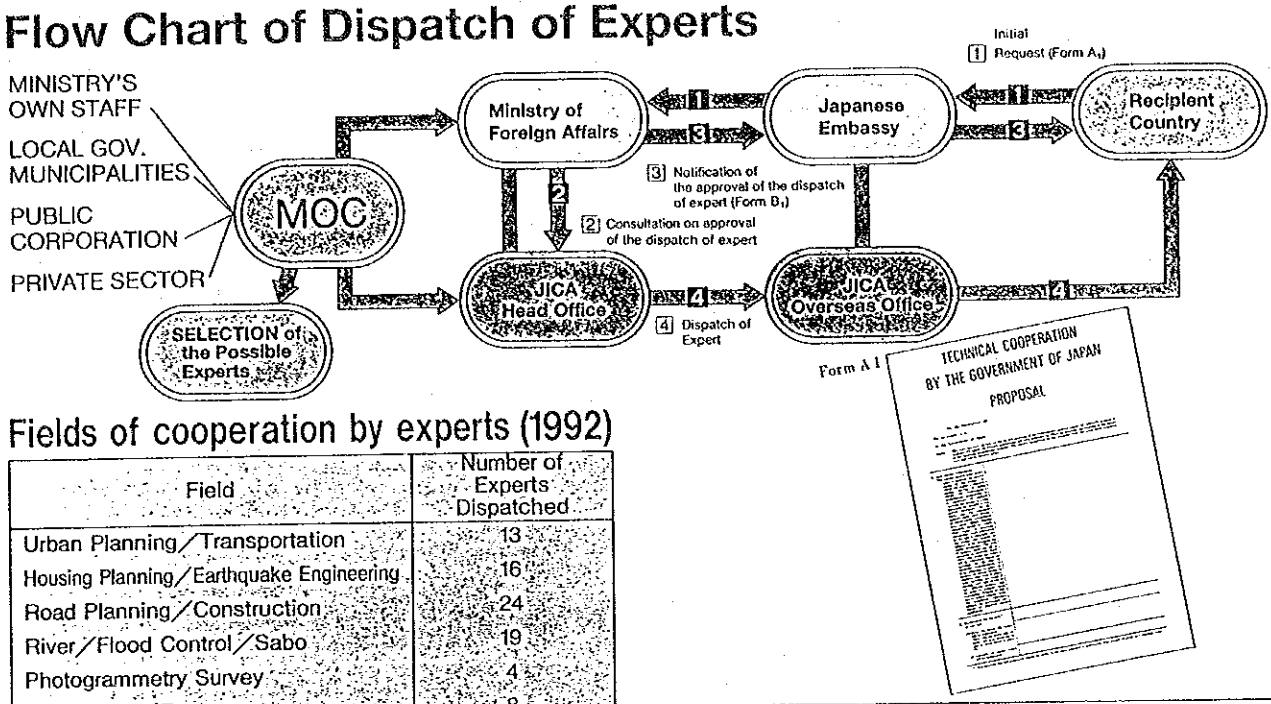
The Transition of Japan's Economic Cooperation



DISPATCH OF EXPERTS

The MOC implements special programs whereby experts are dispatched to developing countries to give technological guidance and / or to assist in policy planning. These programs are carried out through JICA. Experts are dispatched either for long-term periods (1 year or more) or short-term periods (less than 1 year). The selection of appropriate specialists is made by the MOC. These specialists are selected not only from the staff of MOC, but also from local government authorities, public corporations and private companies.

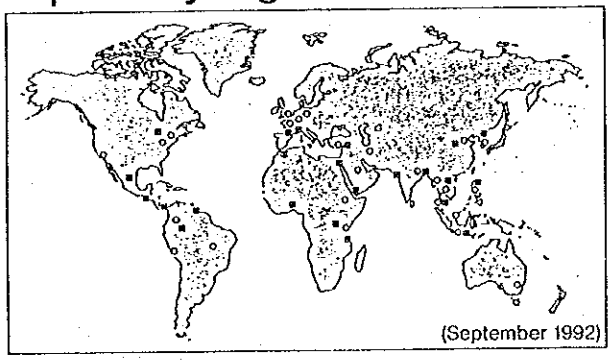
Flow Chart of Dispatch of Experts



Fields of cooperation by experts (1992)

Field	Number of Experts Dispatched
Urban Planning／Transportation	13
Housing Planning／Earthquake Engineering	16
Road Planning／Construction	24
River／Flood Control／Sabo	19
Photogrammetry Survey	4
Construction Equipment	8
Sewage	6

Chart showing the dispatch of experts by region



○ Attachees (29 persons)

GREAT BRITAIN・FRANCE・German (Berlin)・USA (WASHINGTON, NEW YORK, LOS ANGELES)・BRAZIL (BRASILIA)・COLOMBIA・PERU・SAUDI ARABIA・IRAN・IRAQ・TURKEY・NEPAL・KENYA・KOREA・CHINA・MYANMAR・SINGAPORE・MALAYSIA・THAILAND・INDONESIA (JAKARTA, SURABAYA)・PHILIPPINES・AUSTRALIA・BELGIUM (EC)・ETIOPIA

■ JICA Experts and so on (97 persons)

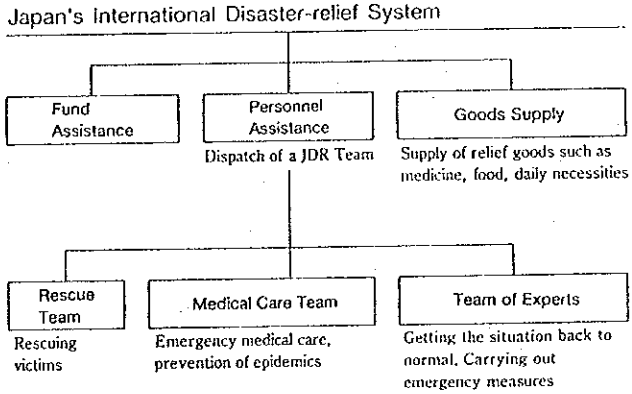
PERU・VENEZUELA・SWITZERLAND・FRANCE・KOREA・PHILIPPINES・THAILAND・INDONESIA・MALAYSIA・PAPUA NEW GUINEA・EGYPT・KENYA・TANZANIA・YEMEN・PANAMA・COLOMBIA・USA・TURKEY・GHANA・CHINA・HONDURAS・NEPAL・CENTRAL-AFRICA・MEXICO・MOROCCO

Japan Disaster Relief Team (JDRT)

The Japan Disaster Relief Team System was established to promptly carry out international disaster-relief activities upon the request of disaster-striken countries or international organizations. Particularly in developing countries.

In 1987, this system was further consolidated on a comprehensive basis. Thus, the JDRT system has expanded Japan's scope of cooperation with the international society.

Japan's International Disaster-relief System



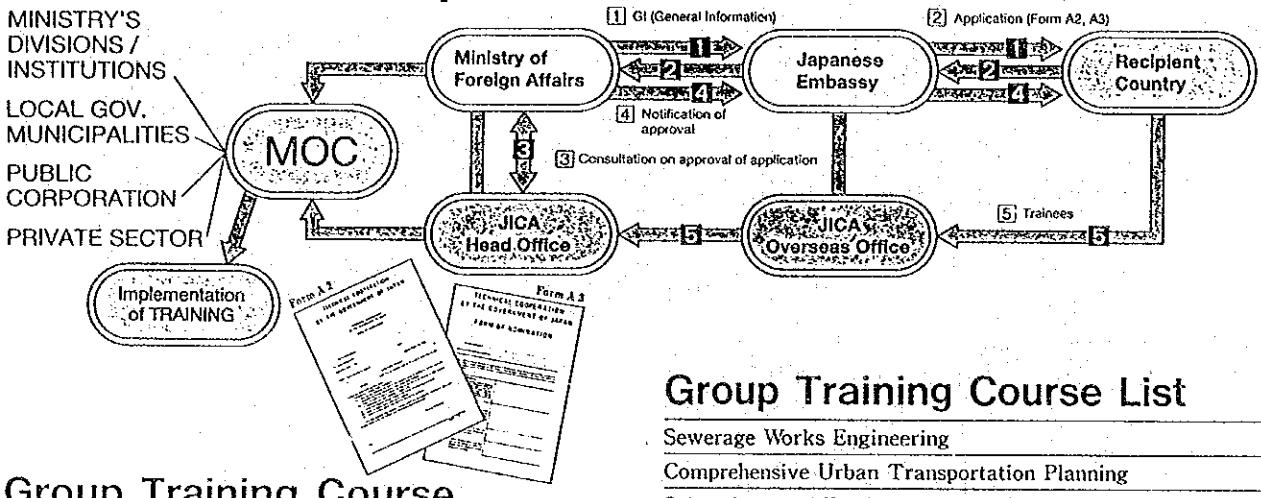
ACCEPTANCE OF TRAINEES

The MOC extends its cooperation by implementing educational and training programs for trainees from developing countries. It trains them in the appropriate divisions or institutes of the Ministry of Construction (MOC), and introduces them to local governments, public corporations and so on.

There are three types of study programs:(1) group training courses conducted for specific fields, (In 1991, 24 study courses ran for 268 trainees from 64 countries), (2) counterpart training programs conducted for counterparts of JICA experts in relation to development studies, and (3) individual training programs conducted for individual experts in response to requests from developing countries, (In 1991,436 trainees came to Japan for training (2)& (3)).

In addition, group training courses are implemented in 3rd World Countries.

Flow Chart of Acceptance of Trainees



Group Training Course

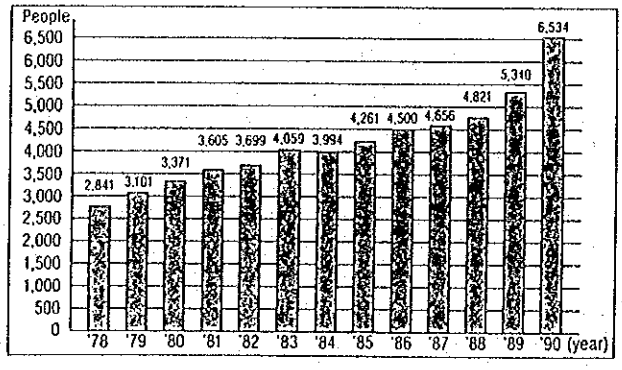
The main aim of the group training course is to extend cooperation so as to develop human resources in developing countries. In group training courses, about 10 participants are trained in one specific field. In principle, only one member from each participating country is accepted. In this way, group training provides the opportunity for international contact among the participants. Group Training is organized using, "Custom-made" curriculum with the intention of satisfying the common needs of participating developing countries.

Third Country Training Programs (TCTP)

In this scheme, the group training course is held in one specific developing country instead of Japan hosting the participants from the countries of the same region.

The aim of these programs is to transfer knowledge and technology appropriate for the local conditions of the region concerned. The training programs are selected for certain developing regions which have common bases socially, cultually and linguistically.

The Transition of Trainees Accepted



Group Training Course List

Sewerage Works Engineering
Comprehensive Urban Transportation Planning
Seismology and Earthquake Engineering
Bridge Engineering
Highway Construction (Seminar)
Construction Engineering (Civil Works)
Soil Engineering Foundation
River and Dam Engineering
City planning
Urban Development
Housing
Improvement of Housing and Living Environment
Building Engineering
Surveying and Mapping(Photogrammetry)
Maintenance of Construction Machinery
Maintien des Machines pour la Construction
Construction Project Manager
Volcanology and Volcanic Sabo Engineering Course
Terminal Facility Planning and Urban Design
Advanced Construction Technology
Social Infrastructure Development & Planning
Environment Assesment in Infra.-Development

The Third Country Training Course List

Earthquake Engineering	Indonesia / Egypt
Housing	Brazil / Indonesia
Sabo	Indonesia

The Semi-Governmental Organization and Foundation Related to The Ministry of Construction

Semi-Governmental Organization

1. Japan Highway Public Corporation
2. Honshu-Shikoku Bridge Authority
3. Metropolitan Expressway Public Corporation (Tokyo)
4. Hanshin Expressway Public Corporation (Osaka)
5. Housing and Urban Development Corporation
6. Water Resources Development Corporation
7. Japan Sewage Works Agency
8. The Japan Regional Development Corporation

Foundation

1. Japan Construction Training Center
2. Technology Research Center for River Front Development
3. Foundation of River and Basin Integrated Communication

Project -Third Sector

1. Kansai International Airport Co. Ltd.
2. Trans-Tokyo Bay Highway Corporation

CHART FOR RESPONSIBILITY OF THE VARIOUS MINISTRY IN WATER AND RIVER WORKS

(MINISTRIAL SCOPE OF WORKS)

* Sabo (anti-erosion) Works

National Land Agency, Prime Minister's Office. --- National Water Resources Development Plan

* Ministry of Construction --- Overall controled and managed of rivers by River Law

Ministry of Agriculture and Forestry --- Irrigation

Ministry of Transport --- Ports and Harbours

Ministry of International Trade and Industry --- Industrial Water

Ministry of Health and Welfare --- Domestic Water

Environmental Agency --- Water and Environmental Pollution

* Water Resources Development Projects

River

* Multi or Single Purpose Dam

Flood Control, Hydroelectlic, Irrigation, Water Supply, etc.

Dams

* Steep Slope Protection Works

* Sewage

* Urban Flood Mitigation

* Bridges

* River Planning and Designs

* River Administration

* Water Use Coordination

* Water Quality and Pollution

* Flood Forecasting and Warning

* Flood Disaster Prevention Works

* River Improvement Works

Flood mitigation facilities, Drainage gate, Levees, Bank erosions, Bed-stability, Maintenance, Water environment and Flood defence Systems

* Barrages

Sand-ber

* River Mouth Works (Estuary)

* Coastal (Beach) Erosion Works

Port and Harbour Bureau, Ministry of Transport.

Sea and Ocean

Maritime Safety Agency, Ministry of Transportation.

Fishery Port Bureau, Ministry of Agriculture and Forestry.

Domestic, Irrigation and Industrial Water Supply.

* Sewage

* In-land and Urban

* Flood Mitigation Works

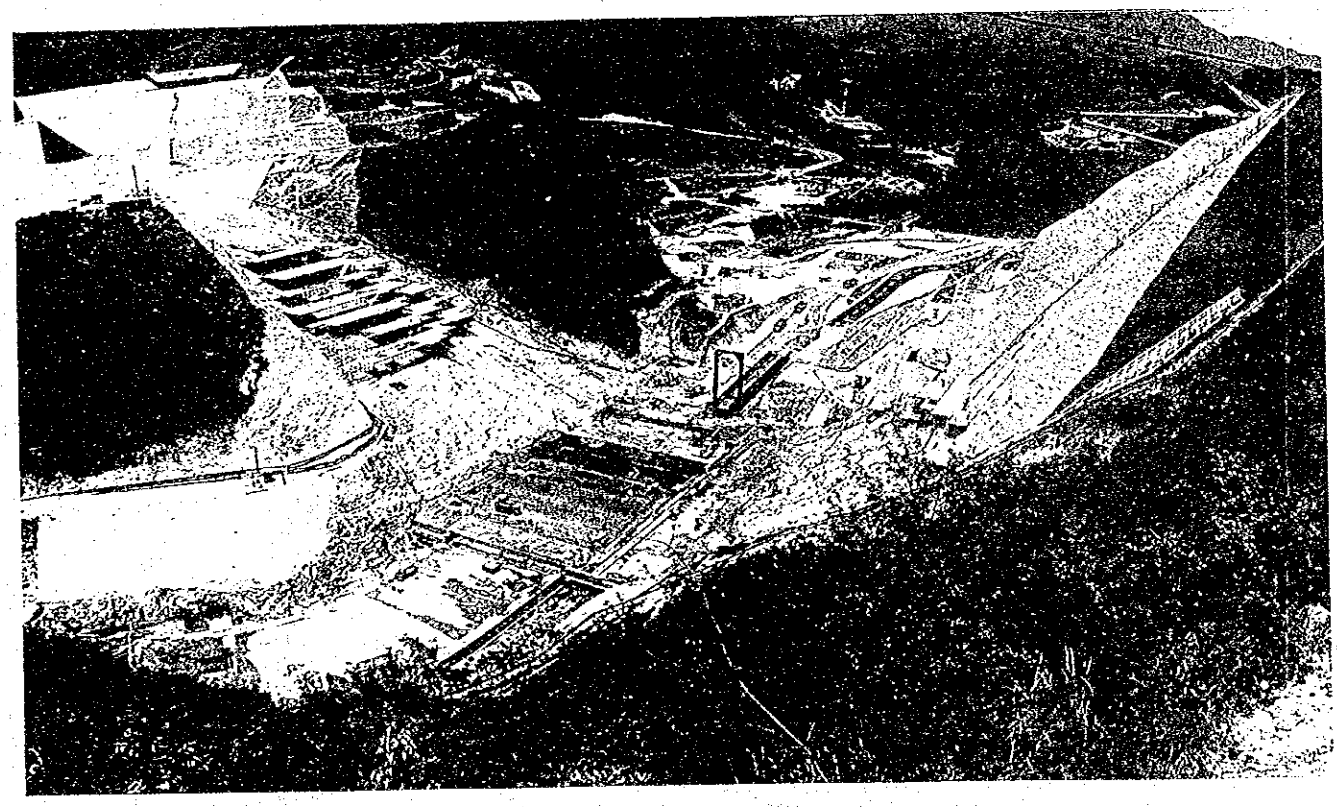
* Flood Diversion Canal

* Coastal Erosion Works

RYUMON DAM CONSTRUCTION BY RCD METHOD

KIKUCHI RAVINE

In the north-westerrn part of Volcano Aso's somma, the varied mountain streams and surrounding beautiful forest combine to create one of the most fantastic picturesque landscapes in Western Japan.



Ministry of Construction, Kyushu Regional Construction Bureaus

PROJECT DESCRIPTION

The Ryumon Dam is a composite dam consisting of a concrete gravity dam as its major part and a rock-fill dam partly located at the right bank. The Dam is to be constructed in the Hazama River, a tributary on the right of the Kikuchi River upstream basin in the North-east of Kumamoto prefecture and has the following functions:

Purposes of the Dam

(1)Flood Control

The flood control at the Dam site is planned in such a way that the present basic high water discharge of 4,500m³/s at the Tamana River downstream, by accommodating 440m³/s of the estimated high water discharge 540m³/s at the Dam and allowing a constant runoff of the remaining 100m³/s, can be reduced to 3,800m³/s with support of a dam to be built upstream of the Dam.

(2)Maintenance of Normal Functions of the River

The Dam is planned to maintain a normal water flow to the downstream during the dry spell as well as to supplement and augment the existing water right in the downstream areas.

(3)Irrigation

The Dam will irrigate the Tamana Plain Agricultural Development Project extending over the both banks of downstream Kikuchi River funded by the National and Kumamoto Prefectural Governments and the existing Kikuchi Height Irrigation Project expanding over the upstream of the Kikuchi River.

(4)Industrial Water Supply

The Dam will daily supply industrial water of 55,000m³ to Nagasu and Arao districts (which will become a central part of the proposed new Omuta Industrial Park City), and of 45,000m³ to Omuta City in Fukuoka pref.

The effective capacity of the Dam is planned to be 41,500,000m³ but only the Hazama River watershed will not suffice the requirement. Therefore, the capacity is planned to supplement by taking in water via the proposed Tsue transmission channel (12.2km in length) connected to the Shimouke Dam and the planned Tatekado channel (4.2km in length) extended from the Kikuchi main river.

RYUMON DAM & RCD METHOD

The Roller Compacted Dam (RCD) Method is a rationalized concrete dam construction method, development for which the Ministry of Construction of Japan has played a central role. The RCD Method, which incorporates that of the fill-type dams, features that lean and no-slump mix concrete is hauled in dump trucks, spread with bulldozers, and compacted with vibratory rollers.

The primary advantages of the RCD Method are:

a) Construction time can be curtailed with mass-concreting:
b) Costs for cement, formwork for horizontal joints, clean-up, grouting to joints, etc can be reduced:
c) Dependence on skilled mechanics can be reduced with the use of standard machinery and
d) Safety and work efficiency can be enhanced as concrete in RCD Method is placed over bigger areas and in lower lifts than those of the conventional block placement.

On the other hand, the RCD Method has the following disadvantages:

e) Protection against flooding during the construction is slightly harder than the conventional block placement method since the RCD has less blocks.
f) Area to be treated before the next lift is placed is larger as each lift is lower.
g) Additional temporary facility is required as the concreting work reach the embankment crest.

As the embankment volume of the Ryumon Dam, a concrete gravity dam, measures as much as 840,000m³, the RCD Method is adopted for the first time in Kyushu to rationalize the construction.

The RCD Method employed for the Dam features:

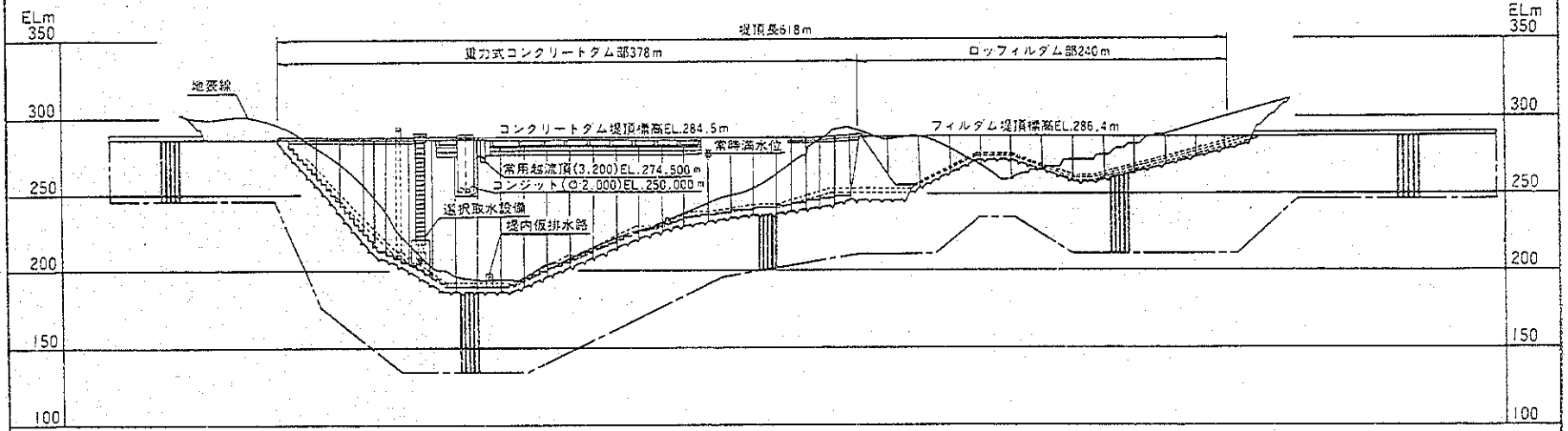
① Five and four accesses are planned on the left and right banks respectively to haul in dump trucks concrete from the concrete plant direct to the dam embankment. The embankment will be connected with temporary bridges equipped with hydraulic lift-up mechanism.

② Since the cable crane is not installed, for the areas not directly accessible by dump trucks, concrete is transported by a combination of, trucks, a mobil-type transfer conveyor and a spreader conveyor. This is the first application of such combined method in Japan.

The spillway top will be concreted using belt conveyors.

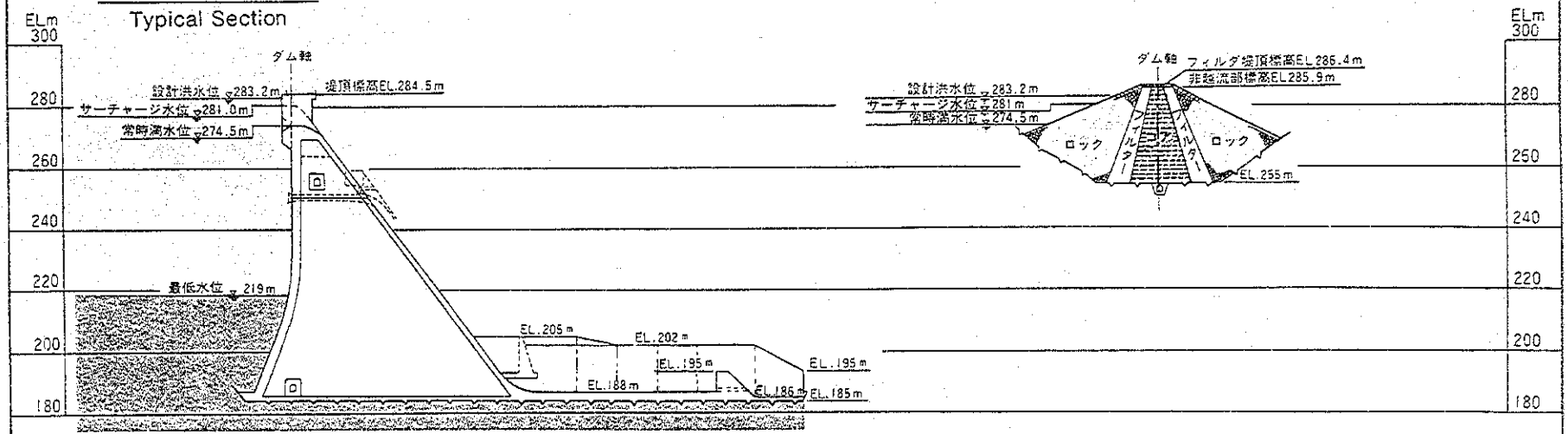
縦断図(上流面図)
Longitudinal Profile (Upstream)

S＝1：4,000

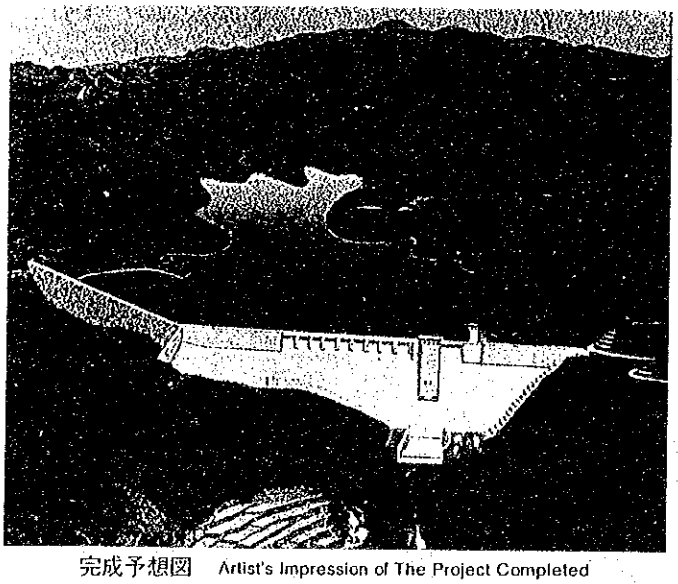


標準断面図
Typical Section

S＝1：2,000

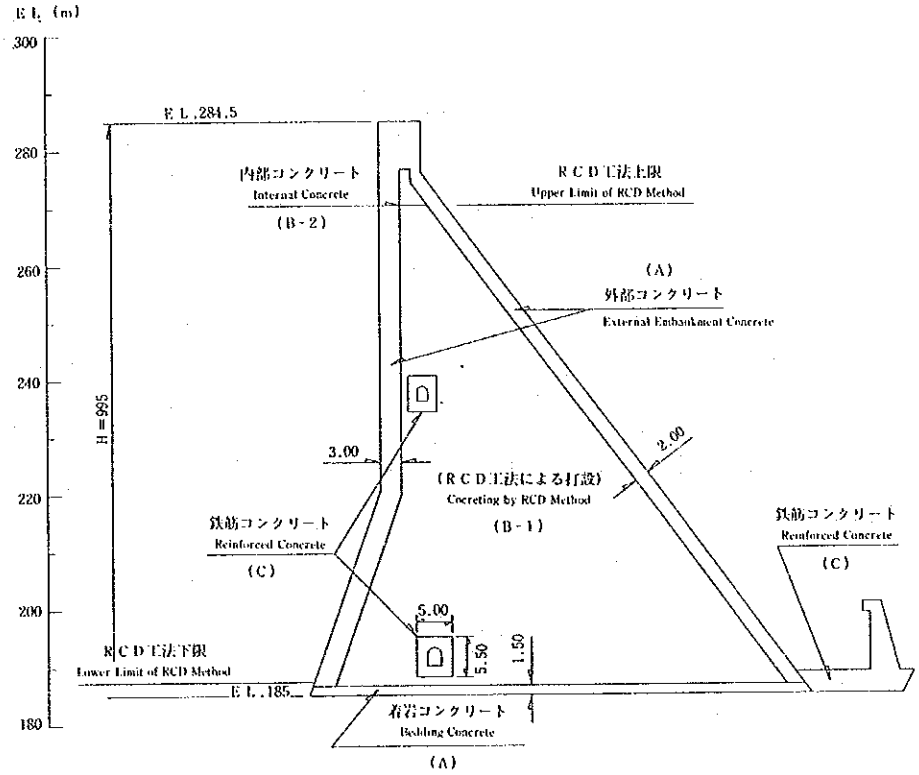


Year.			1987	1988	1989	1990	1991	1992	1993	1994
工種 Work	単位 Unit	数量 Quantity	昭和62年度	63	平成元年度	2	3	4	5	6
			1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
転流工 River diversion	式	1		11/28転流開始 start of Diversion 28 Nov						
基礎堀削（1次） Excavation	m^3	1,002,000								
〃（フィル部2次） 〃 (fill part)	m^3	118,700								
コンソリデーショングラウト Consolidation grouting	m	8,020								
ブランケットグラウト Blanket grouting	m	13,740								
カーテングラウト Curtain grouting	m	50,070				堤体部カーテン Embankment		リム及フィル部カーテン Rim & Fill parts		
堤体コンクリート Embankment concrete	m^3	813,600								
減勢工コンクリート Energy dissipator concrete	m^3	30,400			試験施工 Trial construction					
フィル部盛立工 Fill embankment	m^3	208,300								
カットオフコンクリート Cut off concrete	m^3	6,700								
原石採取 Quarrying	式	1								
閉塞工 Permanent Closure	式	1								堤外 堤内 Outside of Embankment Inside of Embankment
共通仮設工 Common temporary work	〃	1								
試験湛水 Trial reservoir filling	〃	1								10/ 湛水開始 start of reservoir filling



完成予想図　Artist's Impression of The Project Completed

配合別打設区分図　Concrete Placing by Mixes



	Gmax (mm)	スランプ (cm)	V・C値 (sec)	空気量 Air (%)	W/C+F (%)	F/C+F (%)	S/A (%)	単位量 Quantity (kg/m³)							
								W	C+F	S	粗骨材 Coarse Aggregate				混和剤 admixture
											5～20	20～40	40～80	80～150	
A	150	4±1	−	3±1	52.4	30	24	110	210	493	386	340	433	387	0.525
B-1	150	−	20±10	1.5±1	69.2	30	28	90	130	621	396	348	443	396	0.325
B-2	150	3±1	−	3±1	66	30	25	106	160	523	398	350	445	398	0.400
C	80	6±1	−	3.5±1	54.2	30	32	130	240	626	397	397	529	−	0.600
M	−	−	−	−	54.5	30	−	300	550	1368	−	−	−	−	−

A　：本体外部及び着岩部
External Embankment Concrete and Bedding Concrete

B-1：ＲＣＤコンクリート（合理化施工内部）
ＲＣＤ Concrete (rationalized placing portion)

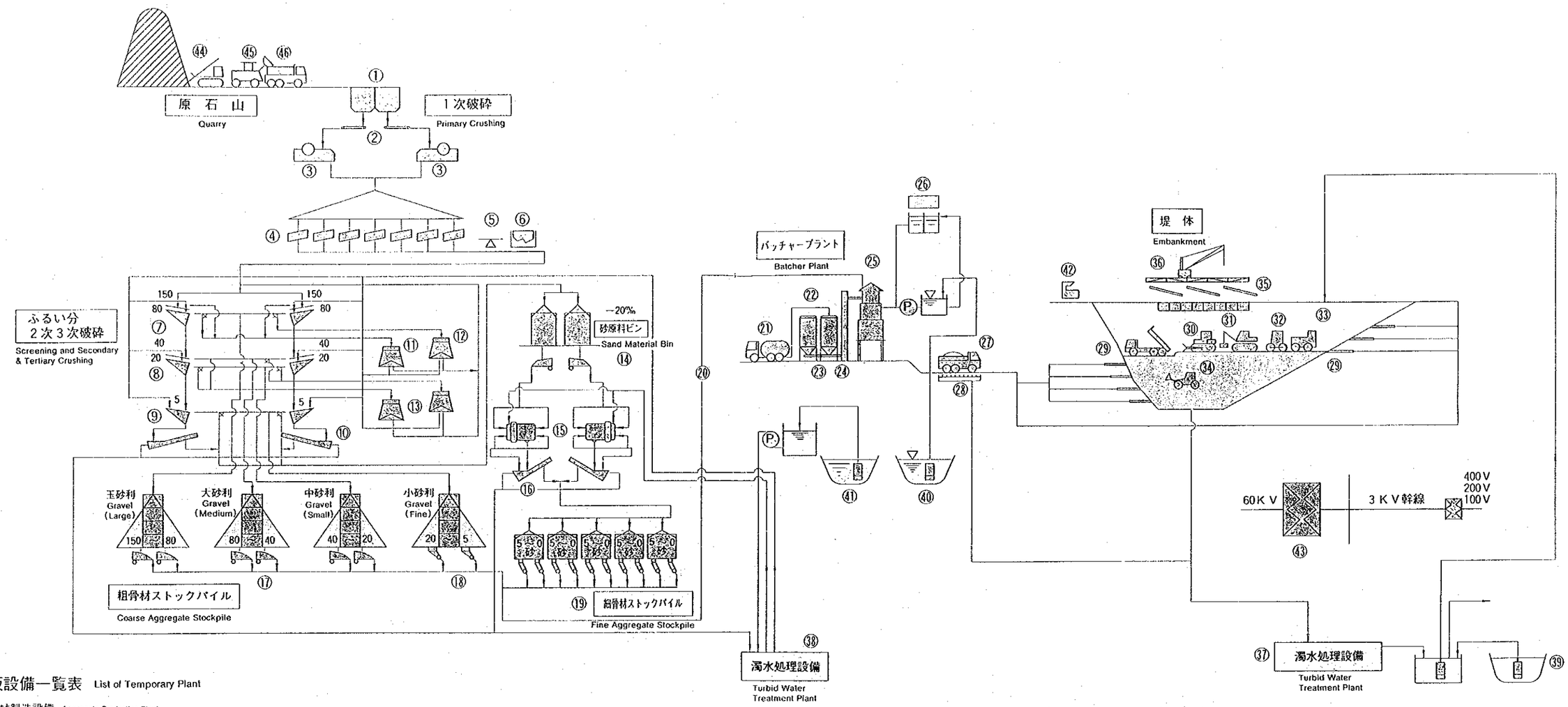
B-2：本体内部（通常打設内部）及び打止型枠部
Internal Embankment Concrete (nomal placing portion) and Portion surrounding Form

C　：構造物まわり（鉄筋コンクリート部）
Structure Surrounds (reinforced concrete portion)

M　：水平打継目モルタル
Horizontal Construction Joint Mortar

仮設備機械フローシート　Temporary Plant Flow-chart

Temporary Plant Flow-chart



仮設備一覧表　List of Temporary Plant

骨材製造設備　Aggregate Production Plant

	名称 Machinery	規格 Specification	数量 Quantity
①	グリズリ Grizzly	6900×5500	1
②	エプロンフィーダー Apron Feeder	1500×4250	2
③	1次ジョークラッシャー Primary Jaw Crusher	1050×1500	2
④	振動フィーダー Vibratory Feeder	914×1524	7
⑤	コンベヤスケール Conveyor Scale	700 t/H	1
⑥	金属片検出器 Metal Detector		1
⑦	1次スクリーン Primary Screen	1500×4800	2
⑧	2次スクリーン Secondary Screen	1500×4800	2
⑨	3次スクリーン Tertiary Screen	2100×5400	2
⑩	2次クラッシファイヤー Secondary Classifier	1350×8500	2

	名称 Machinery	規格 Specification	数量 Quantity
⑪	2次コーンクラッシャー Secondary Cone Crusher	300×1500	1
⑫	2次コーンクラッシャー 〃	250×1300	1
⑬	3次コーンクラッシャー Tertiary Cone Crusher	85×1500	2
⑭	振動フィーダー Vibratory Feeder	558×1067	2
⑮	ロッドミル Rod Mill	2900×3900	2
⑯	製砂クラッシファイヤー Sand Classifier	1350×8500	2
⑰	振動フィーダー（粗骨材） Vibratory Feeder (coarse aggregate)	1200×1500	6
⑱	カットゲート（小砂利） Cut Gate (fine gravel)	650□×1550	2
⑲	カットゲート（砂） 〃 (sand)	650□×1550	10
⑳	骨材輸送設備 Aggregate Transport System	B1200 750 t/H	1式

コンクリート製造輸送設備　Concrete mixing & Transportation plant

	名称 Machinery	規格 Specification	数量 Quantity
㉑	セメント運搬車 Cement Haufer	10~15 t	
㉒	セメントサイロ Cement Silo	800 t	2
㉓	スクリューコンベヤ Screw Conveyor	60 t/H	5
㉔	バケットエレベーター Bucket Elevator	60 t/H	1
㉕	バッチャープラント Batcher Plant 2axes, forced mixing	2軸強制練 3㎥×2台	1
㉖	冷却水設備 Cooling Water Plant	190000 kcal/H	1式
㉗	ダンプトラック Dump Truck	15 t	8
㉘	洗車設備 Car Washer	15 t用	1式
㉙	リフトアップ桟橋 Lifing Bridge	W4000×L 45000	2

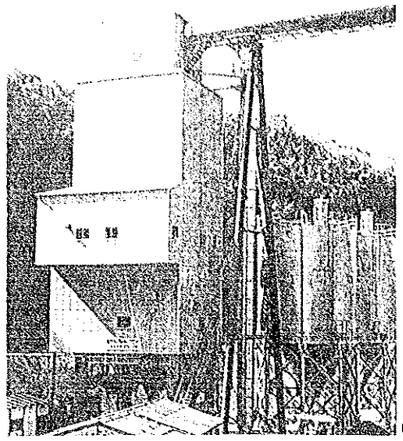
コンクリート打設設備　Concrete placing plant

	名称 Machinery	規格 Specification	数量 Quantity
㉚	ブルドーザー Bulldozer	湿地 17 t	2
㉛	振動目地切機 Vibratory Joint Cutter	PC 120	1
㉜	振動ローラー Vibratory Roller	BW-200 7 t	6
㉝	タイヤローラー Tire Roller	25 t	1
㉞	タイヤショベル Tire Shovel	1.2㎥	1
㉟	ベルトコンベヤ Belt Conveyor	600㎜	1式
㊱	走行クレーン Travelling Crane	11×10m	1

その他の設備　Other Plant

設備名 Plant		名称 Machinery	規格 Specification	数量 Quantity
濁水処理設備 Turbid water treatment	㊲	本体用濁水処理設備 Main turbid water treatment plant	250㎥/H	1式
	㊳	骨材用濁水処理設備 Aggregate turbid water treatment plant	1000㎥/H	1式
給水設備 Water supply	㊴	本体給水設備 Main water supply plant	5㎥/min φ150×110kW	3
	㊵	B・P給水設備 B.P. water supply plant	1㎥/min φ100×22kW	2
	㊶	骨材製造給水設備 Aggregate water supply plant	2.5㎥/min φ150×55kW	2
給気設備 Air supply	㊷	コンプレッサー Compressor	50P s	2
受変電設備 Power supply	㊸	特高受変電設備 High-voltage Substation	60KV/3KV 2500KVA×2	1式
原石山 Quarry	㊹	クローラードリル Crawler Drill	油圧	3
	㊺	タイヤショベル Tire Shovel	5㎥	2
	㊻	ダンプトラック Dump Truck	20 t	8

Construction Procedures of RCD Method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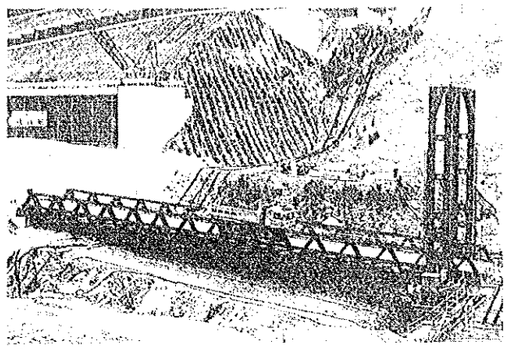
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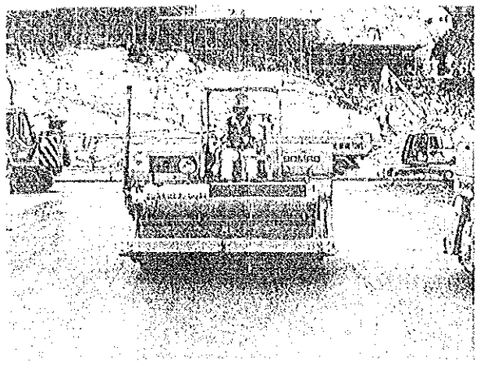
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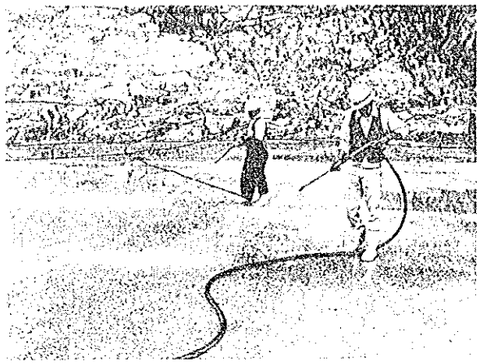
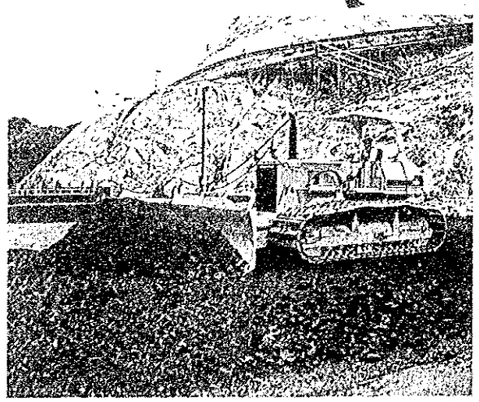

⑥

① コンクリート製造 Concrete mixing	② コンクリート運搬 Hauling	③ 敷　均　し Spreading	④ 横継目造成 Construction of Transverse Joint	⑤ 転　圧 Compaction	⑥ グリーンカット Green-cut	⑦ 散水及び養生 Water Sprinkling & Curing	次リフト打設 Next Lift
BP　3.0m³×2台	15 t ダンプトラック 15 t Dump Truck	17 t 湿地ブルドーザ 17 t Swampdozer	11 t 振動目地切機 11 t Vibratory Joint Cutter	7 t 振動ローラー 7 t Vibratory Roller	モータースイーパー Motor Sweeper ポリッシャー Polisher ウォータージェット Water Jet	スプリンクラー Sprinkler	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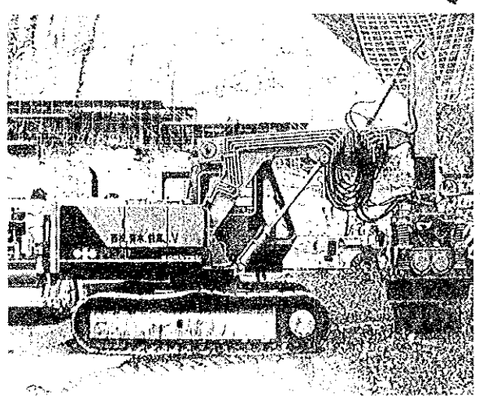
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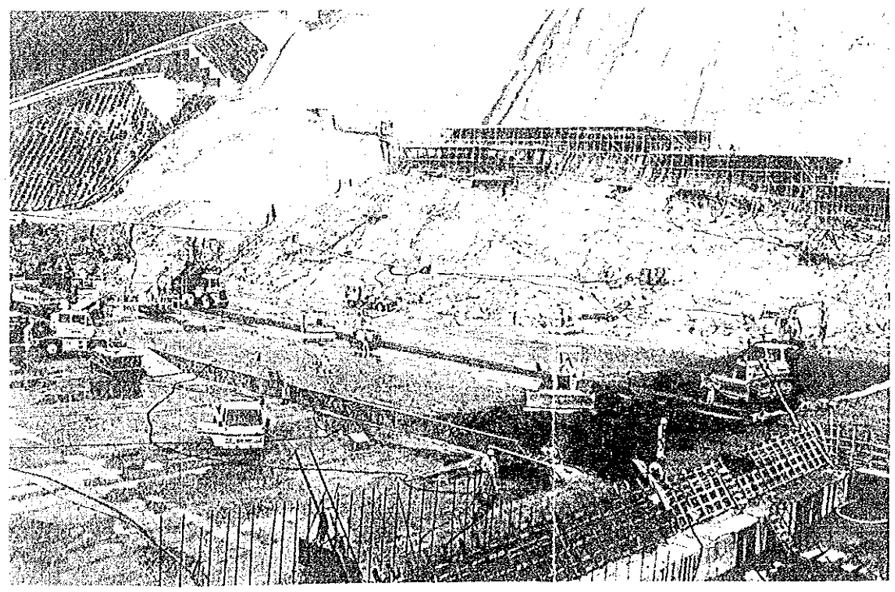
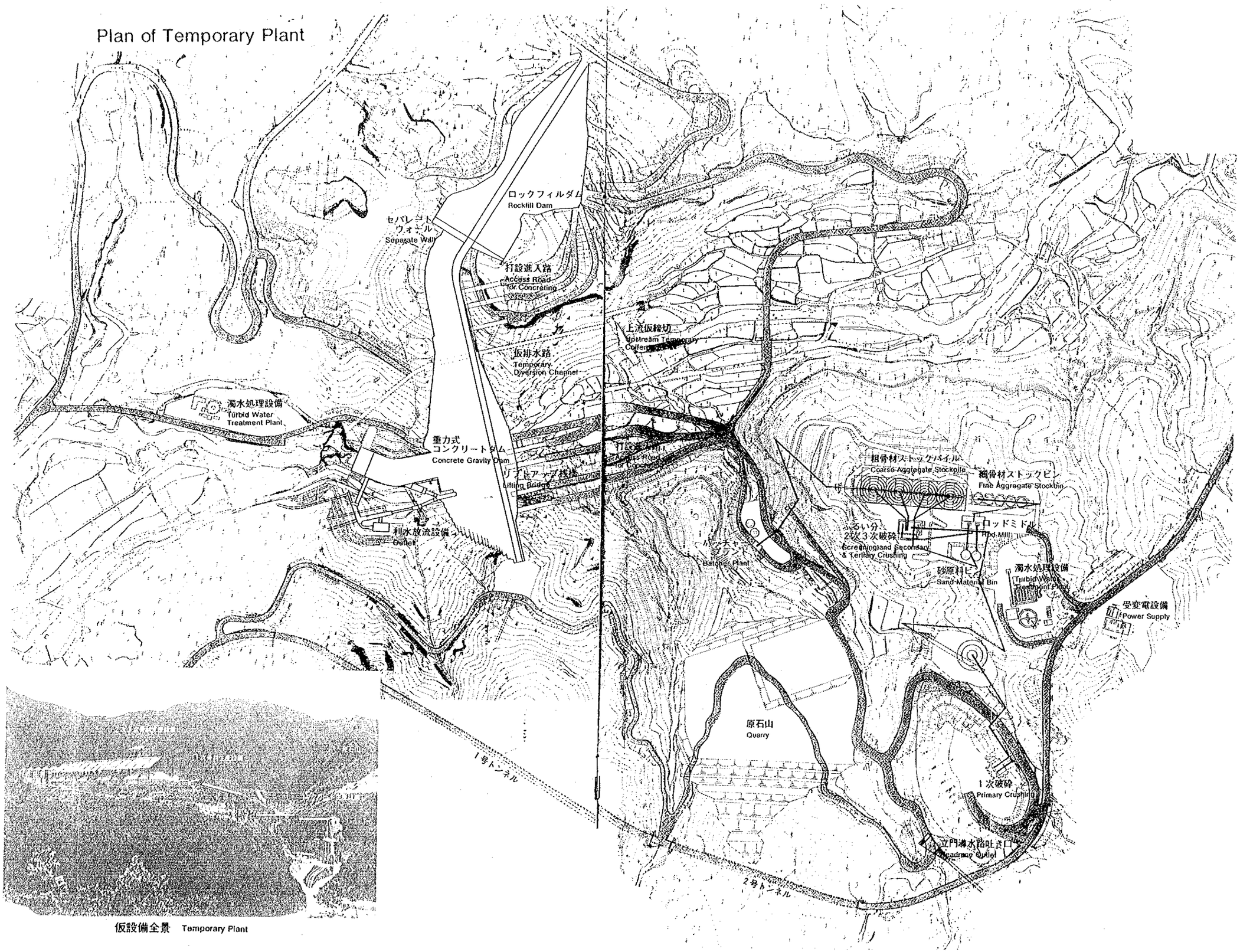

コンクリート打設状況全景　Concrete Placing

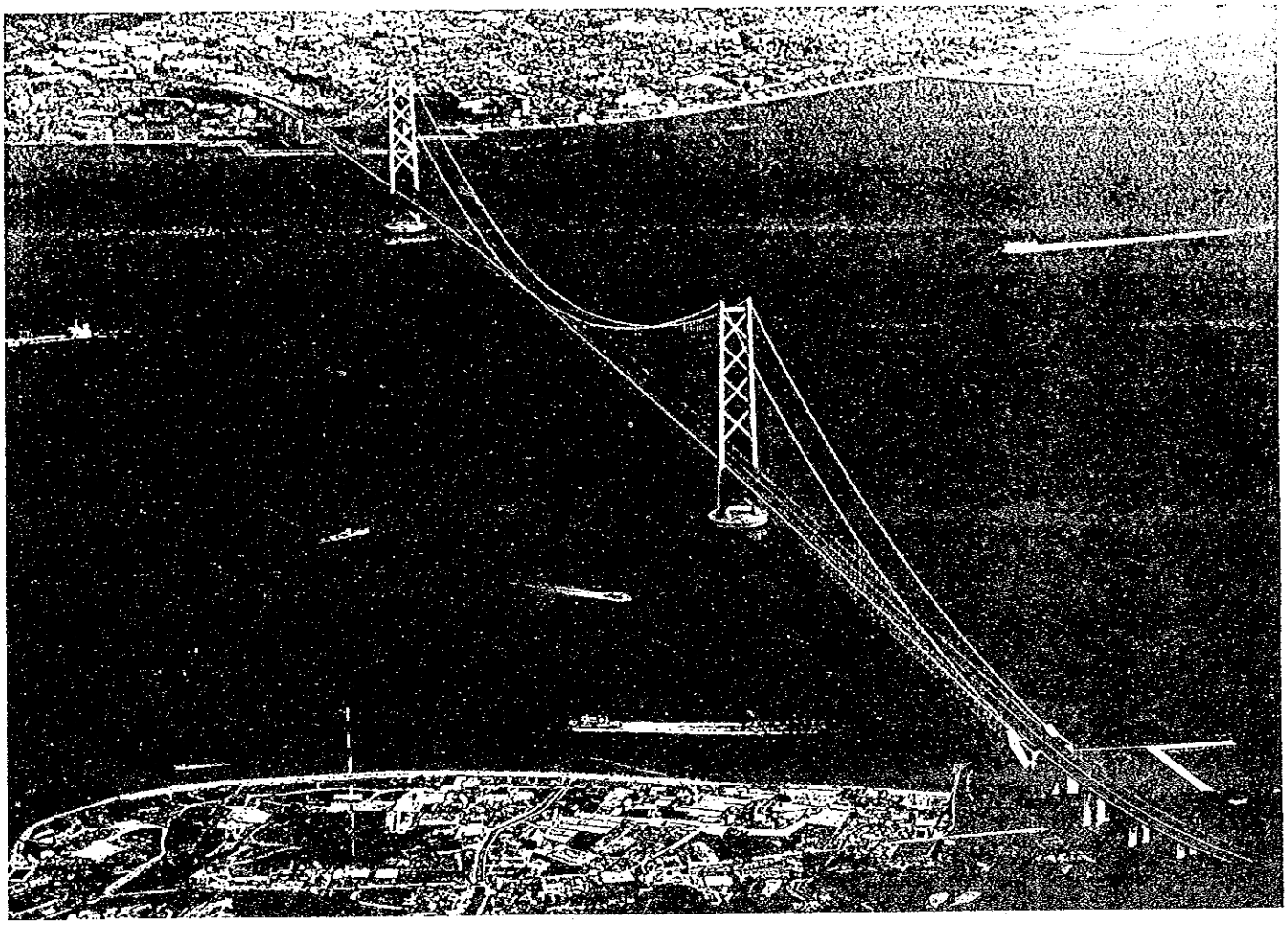
Plan of Temporary Plant



仮設備全景　Temporary Plant

Honshu-Shikoku Bridge • Kobe-Naruto Route

AKASHI KAIKYO BRIDGE



Tarumi Construction Office
First Construction Bureau
Honshu-Shikoku Bridge Authority

The World Longest Suspension Bridge Extending To The 21st Century.

Summary

The Akashi Kaikyo Bridge is a 3-span, 2-hinged stiffening truss suspension bridge which will span the Akashi Straits. The bridge will link Honshu, the main island of Japan, with the island of Awaji and will be 3,910m long with a center span of 1,990m.

Construction was begun in May 1988 and the bridge is due to be completed in 1998. The center span will be about 500m longer than that of the Humber Bridge in England, making it the longest suspension bridge in the world.

Location and Function

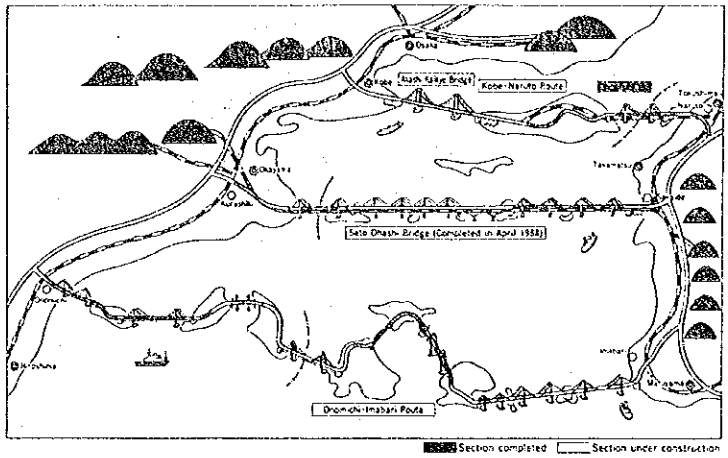
The Kobe-Naruto route currently under construction by the Honshu-Shikoku Bridge Authority will branch off from the Kobe-nishi Bypass (National Highway No.2) at Tarumi in the city of Kobe and cross over the Akashi Straits to Awaji island and, via the Ohnaruto Bridge (already completed over the Naruto Straits), will finally link up with the National Highway No.11 in the city of Naruto.

This highway will be approx. 81km long and link the three islands of Honshu, Awaji and Shikoku as a part of a nationwide highway network. The road has been planned to contribute to development of industry, economy and culture of the region.

Among the road making up this route, the highway running from the Tsuna-Ichinomiya Interchange to the Naruto Interchange (approx. 45km) has already been opened to the traffic. In 1986 it was decided to begin construction of the highway (approx. 36km) from Tarumi Junction to the Tsuna-Ichinomiya Interchange including the Akashi Kaikyo Bridge. And now, the Akashi Kaikyo Bridge is under construction.

The Ohnaruto Bridge and the Akashi Kaikyo Bridge will integrate Honshu with Shikoku.

Honshu-Shikoku Bridge Routes

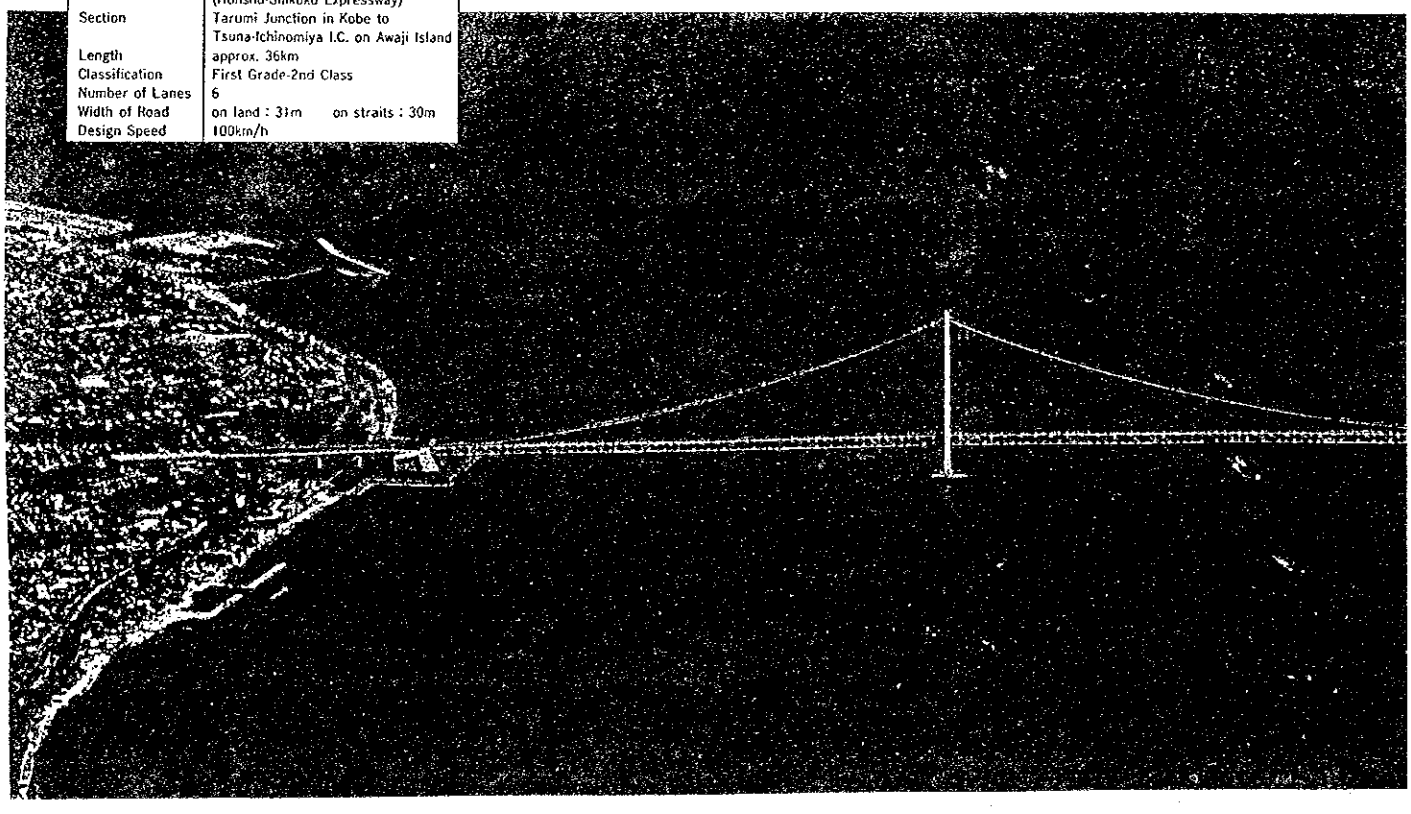


The World's 10 Longest Bridges

	Name	Center Span	Country	Year Completed
①	Akashi Kaikyo Bridge	1,990	Japan	1998 (est.)
2	Great Belt East Bridge	1,624	Denmark	1997 (est.)
3	Humber Bridge	1,410	England	1981
4	Verrazano Narrows Bridge	1,298	U.S.A.	1964
5	Golden Gate Bridge	1,280	U.S.A.	1937
6	Mackinac Straits Bridge	1,158	U.S.A.	1957
⑦	Minami Bisan-seto Bridge	1,100	Japan	1988
8	Fatih Sultan Mehmet Bridge	1,090	Turkey	1988
9	Bosporus Bridge	1,074	Turkey	1973
10	George Washington Bridge	1,067	U.S.A.	1931

○ : Honshu-Shikoku Bridge □ : Combined road/rail bridge

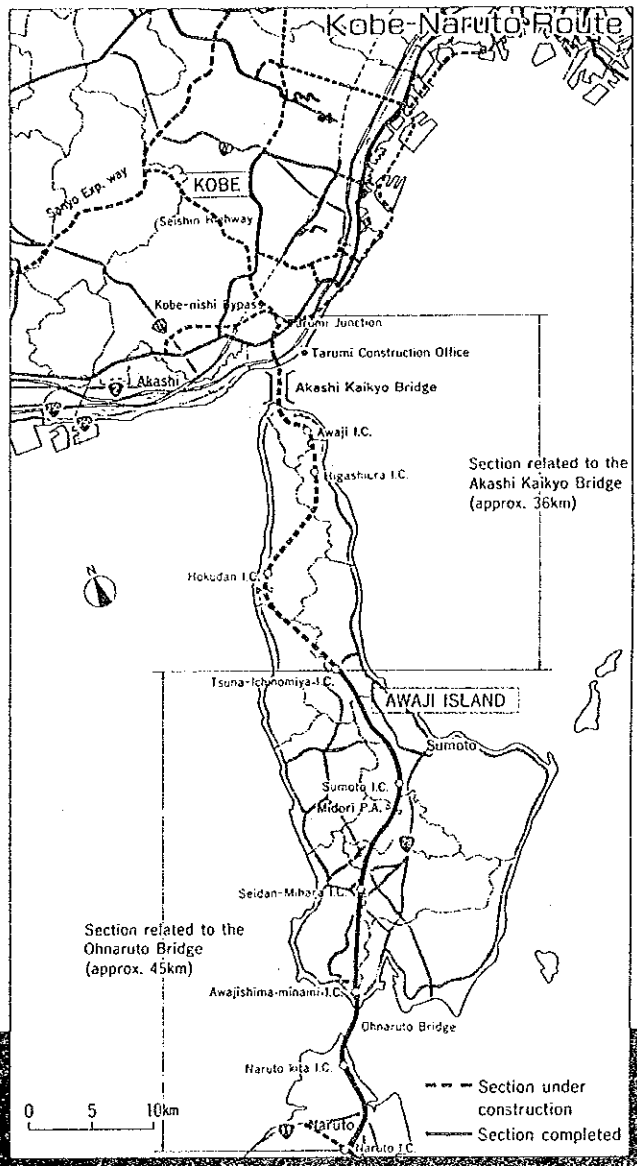
Route (In Section Related to the Akashi Kaikyo Bridge)	
Name of Route	National Highway No.28 (Honshu-Shikoku Expressway)
Section	Tarumi Junction in Kobe to Tsuna-Ichinomiya I.C. on Awaji Island
Length	approx. 36km
Classification	First Grade-2nd Class
Number of Lanes	6
Width of Road	on land : 31m on straits : 30m
Design Speed	100km/h

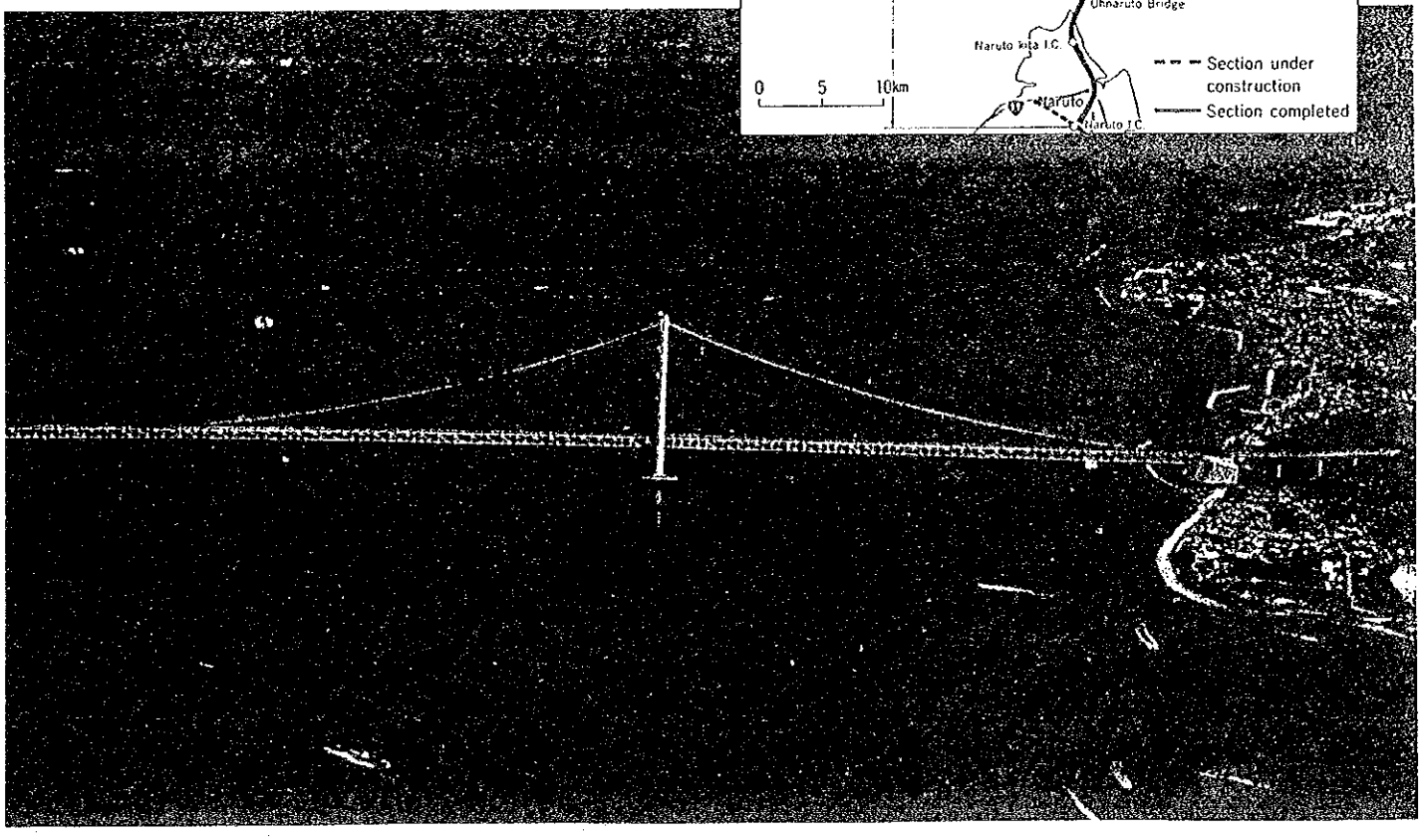


To Contribute To The Economy, Culture and Dream For Tomorrow.

Brief History

1955. 4	JNR began to study 'Honshi Awaji Line' (A route).
1959. 4	Ministry of Construction initiated highway study.
1969. 5	New Comprehensive National Development Plan was approved. (3 routes were authorized.)
1970. 7	Honshu-Shikoku Bridge Authority was established.
1973. 10	Ministers of Construction and Transportation approved construction plans for 3 routes.
1973. 11	Construction was postponed due to gov't economic measures.
1975. 8	Gov't decided to construct one route (Seto Ohashi Br.s) and some bridges for regional development.
1985. 6	The Ohnaruto Bridge opened to the traffic.
1985. 12	Gov't decided to construct the Akashi Kaikyo Bridge.
1986. 4	Ground-breaking ceremony of the Akashi Kaikyo Bridge.
1986. 7	Final design and field studies (experimental excavation, etc.) for main piers started.
1988. 5	On-site construction was started.
1989. 3	2P steel caisson was installed.
1989. 6	3P steel caisson was installed.
1989. 8	Reclamation works for 1A and 4A were completed.
1989. 10	2P casting underwater concrete started.
1990. 1	3P casting underwater concrete started. 4A cast in-situ slurry wall construction started.
1990. 3	1A cast in-situ slurry wall construction started.
1990. 12	2P casting concrete in the air started.
1991. 3	3P casting concrete in the air started.
1991. 8	1A excavation was completed.
1991. 9	Casting concrete for 1A foundation started.
1991. 12	2P casting concrete was completed.
1992. 3	3P casting concrete was completed. 4A excavation was completed.
1992. 4	Erection work for 2P tower started.
1992. 4	Casting concrete for 4A foundation started.
1992. 6	Erection work for 3P tower started.

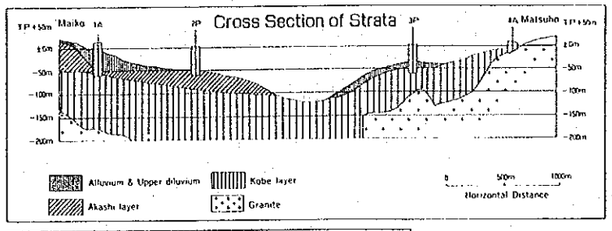


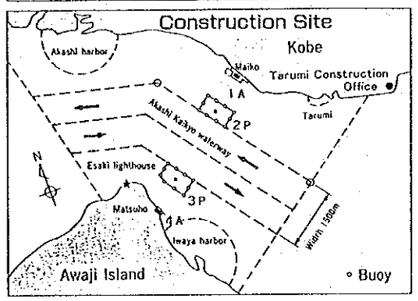


Natural Conditions

The Akashi Straits is about 4km wide. The maximum depth along the bridge's route is about 110m and the maximum tidal current reaches 4.5m/sec. The straits has been a good fishing area as well as important maritime transportation route utilized with about 1,400 ships per day.

The strata below the Akashi Straits consist of alluvium, the upper diluvium, the Akashi layer, the Kobe layer and granite. Except 4A anchorage, which is to be supported by the slightly submerged granite on the shoreline of Awagi island, other grounds for foundations consist of Akashi layer (sand and gravel layer) or Kobe layer (loose rocks piled up in the Pliocene).





Bridge's Design

The Akashi Kaikyo Bridge will be 3,910m long with a center span of 1,990m, and will be the longest suspension bridge in the world. Careful attention has been paid to even smallest details in its design in order to enable the bridge to withstand hard natural conditions in the area.

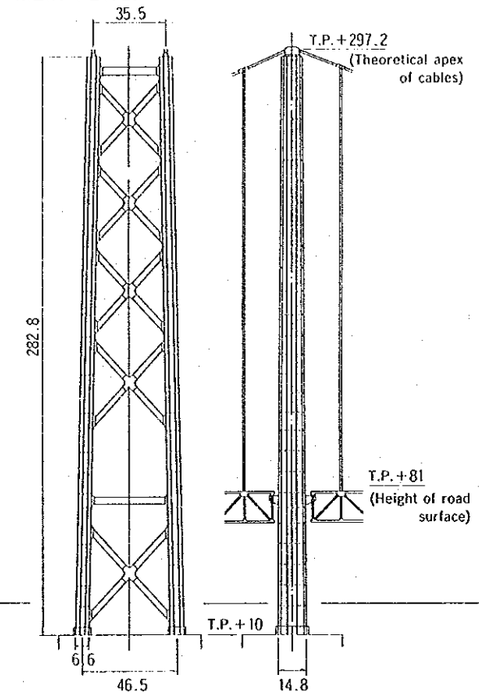
A basic wind speed (10min. averaged speed at 10m above the sea level) for the wind-proof design has been established as 46m/s whose return period is expected to be 150 years. Every part of the bridge is so designed as to be safe in both static and dynamic manner against this storm. The stiffening truss, for example, which has 14m height and 35.5m width ensures safety even in violent winds of about 80m/s. The bridge is also well designed to withstand severe earthquake of 8.5 on the Richter scale, which is expected to occur about 150 km away from the site. The two main cables having diameter of 1.1m are parallel-wire cables and will be erected with "Prefabricated Strand Method". The 2 main towers holding cables rise about 300m above the sea level.

Approximately 200,000 tons of steel will be used for super-structure and 1.42 million m³ of concrete for substructure. Thus, the Akashi Kaikyo Bridge will set new records in its size and will be of unprecedented scale.

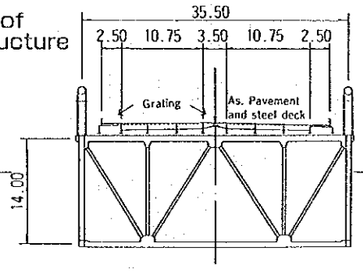
Design Conditions

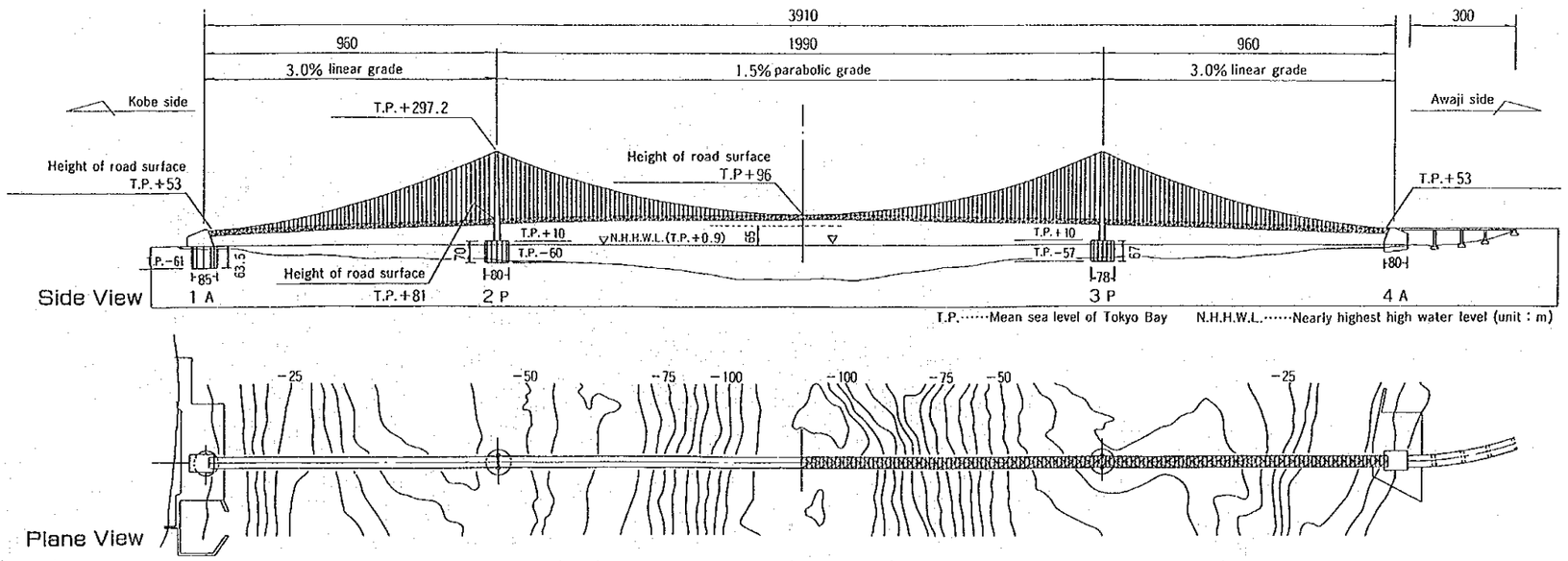
Item	Specifications
Type of Bridge	3-span, 2-hinged stiffening truss suspension bridge
Cable Span	960 + 1,990 + 960 = 3,910m
Proposed Height at the Bridge Center	T.P. + 96m (approx.)
Clearance	+ 65m (from N.H.H.W.L.)
Height of Tower	T.P. + 297m (approx.)
Diameter and Number of Cable	⌀1.1m × 2
Height & Width of Stiffening Truss	14.0m × 35.5m

Main Tower



Cross-Section of Suspended Structure

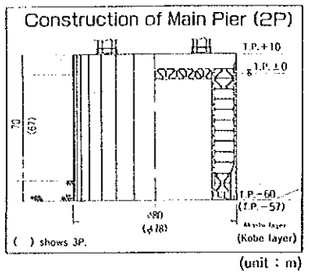




SUBSTRUCTURE

Main Pier Foundations

The main pier will transmit approx. 120,000 tons(1.2GN) of downward force to the bedrock. Since the main piers are constructed in hard natural conditions, 'the Laying-down caisson method' is used to reduce the works on the sea and to raise the safety. In the method, huge steel caissons are towed and set on the pre-excavated seabed, then underwater concrete is cast. cast.



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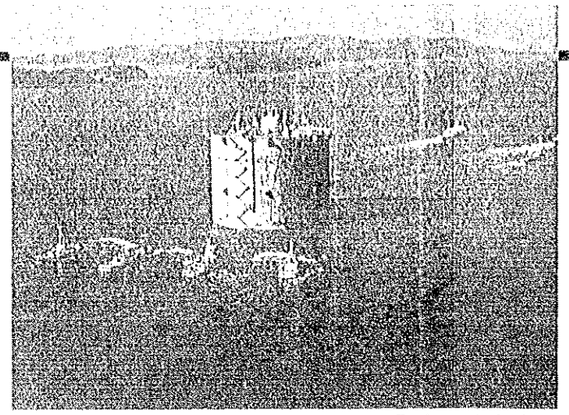
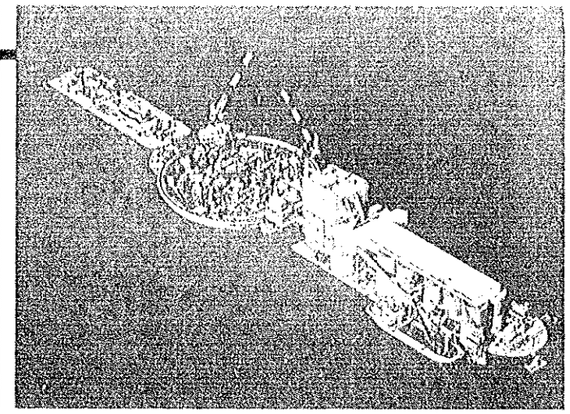
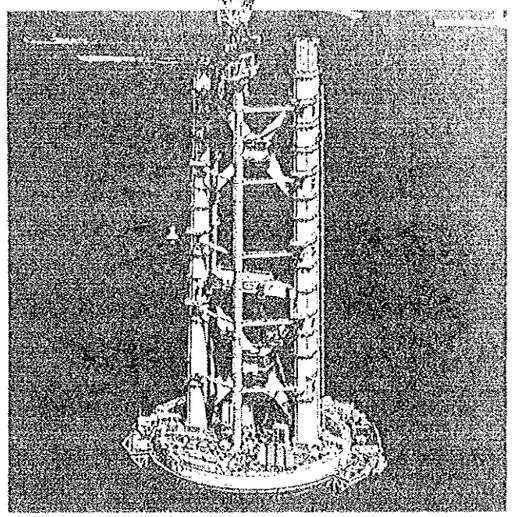

Towing a steel caisson

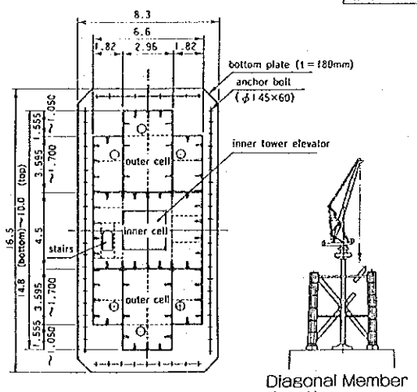

Casting under-water concrete

SUPERSTRUCTURE

Main Tower Construction

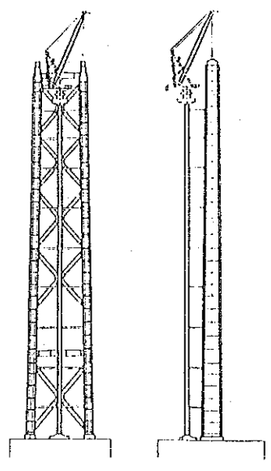

Tower Shaft Section

Erection Process



Diagonal Member Erection

Tower Shaft Erection

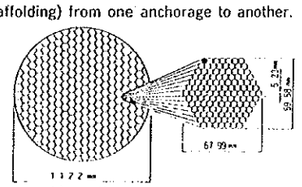

Erection Completed

Main towers are made of steel. One tower shaft receives approx, 50,000 ton (500MN) of downward force from a main cable and must transmit this force as well as own weight to the pier. The entire tower height of 282.8m is divided into 30 tiers, which are also separated to 3 cells except the first tier.

A main concept of the erection of such tower is to pile up blocks which are fabricated as accurate as possible in factories. The crane used in the site is a self-standing type tower crane which can lift up weight of 160 ton and raise itself. In order to suppress oscillation by wind, the tower shaft has cruciform cross section and tuned-mass dampers are installed.

Main Cable

The main cables are to be erected with "Prefabricated Strand Method", in which a strand consisting of 127 wires is fabricated in factory and is transported to the site to be stretched on the catwalk (mid-air scaffolding) from one anchorage to another.



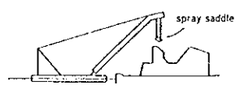
cable section

Cable Dimension

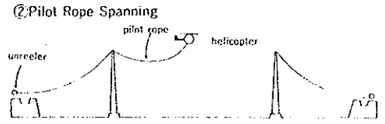
cable	diameter	112cm
	maximum tension	approx 60,000 ton/cable (600MN)
	structure	127 wires/strand × 290 strands/cable =36,830 wires/cable
	length	4085m
strand	wire diameter	φ5.23mm
	allowable stress	82kgf/mm² (≒837MPa)
	dimension	68mm × 60mm
	length	4071 ~ 4074m
	total length	4.07km × 127 × 290 × 2 = 300,035km

Cable Erection Process (Prefabricated Strand method)

①Spray Saddle Installation

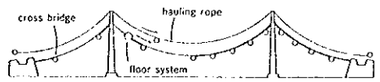


②Pilot Rope Spanning

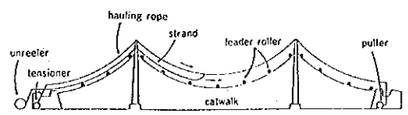


③Catwalk Rope Erection

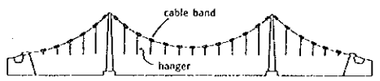
④Catwalk Floor System



⑤Strand Erection

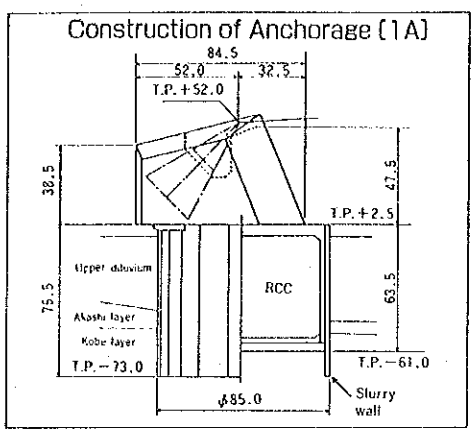


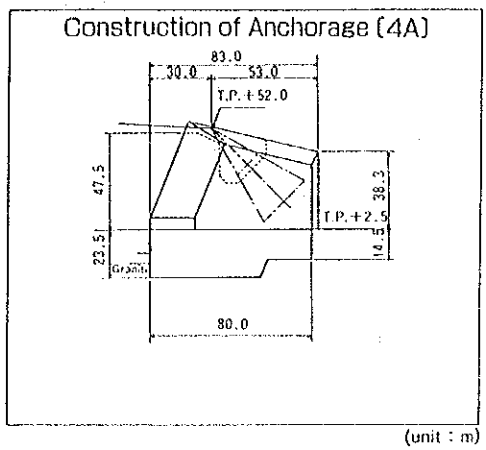
⑥Squeeze, Cable band and hanger rope



Anchorage

As the anchorages are constructed near the shore, the sites were reclaimed before the construction. The body of anchorages will be 63m wide and 84m long. Although the dodies for 1A and 4A are similar, their foundations are different in the size and construction method due to the geological conditions. 1A foundation in particular had to be embeded into 61m below the sea level, and the excavation was thus done in open-air manner while circular slurry wall with 85m diameter and 2.2m thickness was utilized as retaining wall. The wall for 4A excavation, on the other hand, was made up with steel pipes and earth anchors. After excavations, the entire bulk of both foundations was filled with concrete. Concrete to be used in the anchorage work (body) is a newly developed highly-flowing concrete.





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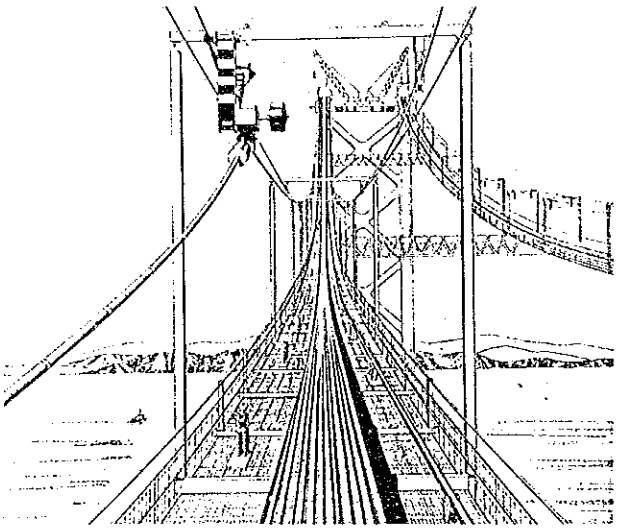
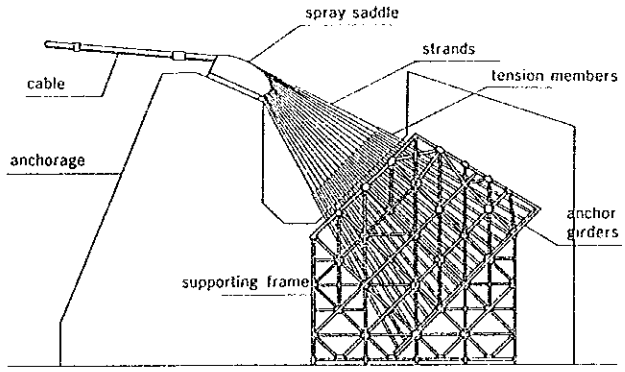
Cable Construction

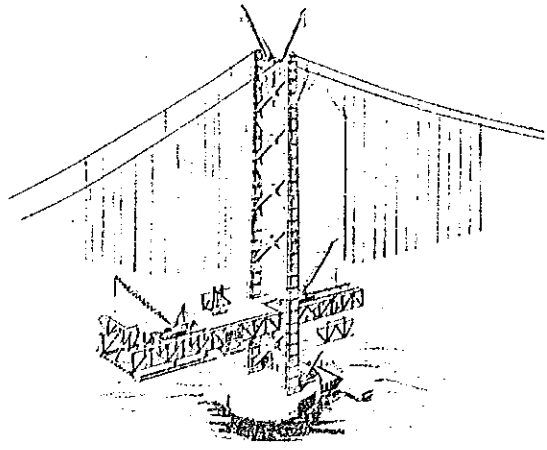


The main cables spread out to individual strands at a spray saddle which is ahead of the anchorage. Then, each strand is fixed at the tip of cable anchor frame tension member in the anchorage. The force, transmitted through the strands, is sent from the tension members to anchor girders. It is then, transmitted as a compressive force to the concrete of anchorage and is sustained by the ground.



Stiffening Girder Erection

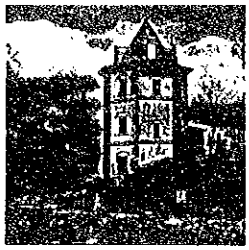
The erection of the stiffening truss will be done by 'Erection with plane block method' confirmed in previous bridges, because this method dose not use the sea surface under the erection where many ships cross. In this method, panels assembled into truss shape in a plant are erected at the construction site. The panels are carried on barges from the plant to the main pier or the bridge bench, then are lifted and carried to the erection point on the bridge to be erected with traveler cranes. When one erection is completed, the traveler crane proceeds to the next panel. The erection of this bridge is planned to be initiated with installing tower-attached blocks (6 panels) and the bridge bench blocks (8 panels) with a floating crane. Then, at the center span, the overhanging erection of the panel block is done from the tower area to the mid-span, and at the side span, from bridge bench area to the tower.



Sightseeing Spots Around the Office

Ijokaku (photo at right)

At the end of the Meiji era, it is said that a Chinese trader established an orchard in Kamide (now Nishi Ward) and built this villa to celebrate a good first harvest. Ijokaku (also known as Rokkakudo) gets its name from the fact that it has windows facing all directions, with a different view from each.



Izanagi Shrine (photo at right)

This shrine is closely connected with the Japanese creation myth and is dedicated to the gods Izanagi and Izanami. The wide courtyard contains the hall of worship and the main hall which were built in the style of Shinto shrine architecture. Also gracing this area are a pair of sacred camphor trees.

Kai Shrine

Around the 4th century, the tribe of fishermen who established the province of Akashi built this shrine in honor of three gods related to the sea. Tradition says that when the Empress Jingu encountered a storm in the open sea off Tarumi she prayed to the god of the sea to calm the storm.

Awajishima Park

This large-scale multi-purpose park is currently under construction in the Higashi Ura-cho and Awaji-cho areas of Tsuna District, overlooking the Akashi Straits. The observation pavilion and walking paths are already open to the public, and in the future the park will also contain a museum, a baseball field and other facilities.

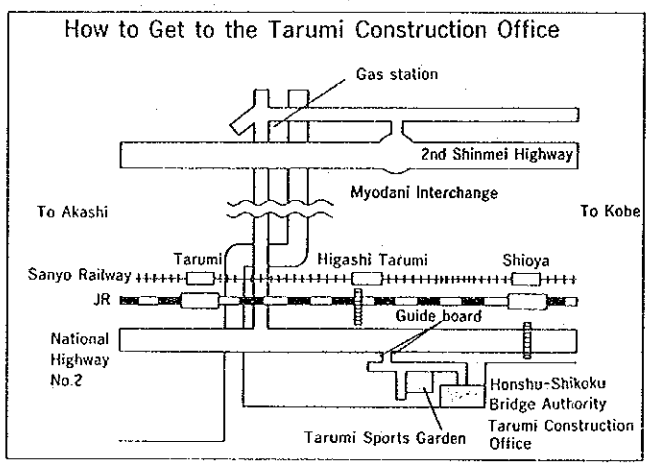
Goshikizuka Tumulus (photo at left)

Built between the end of the 4th and 5th centuries, this circular tomb has a rectangular frontage (194 × 81 × 18m) whose sloping surface is covered with about 2.5 million stones. In the Nihon Shoki, it is recorded that the tumulus was built to camouflage the battle cruisers in the Akashi Straits.

Onokoro "Ai-Land" Park (photo at left)

This park features a "Miniatureland" containing 1/25th scale models of famous buildings and temples from around the world. It also contains a "Travel Museum".

How to Get to the Tarumi Construction Office



Honshu-Shikoku Bridge Authority

Head Office	45th Mori Bldg. 5-1-5 Toranomon, Minato-ku, Tokyo 105	Tel. (03)3434-7281
First Construction Bureau	Kobe Commerce, Industry and Trade Center Bldg. 5-1-14 Hamabe-dori, Chuo-ku, Kobe 651	Tel. (078)251-6622
Tarumi Construction Office	1-1-66 Hiraiso, Tarumi-ku, Kobe 655	Tel. (078)753-1832

1989. 3
1991. 5
1992. 11

LAND READJUSTMENT

Yuzo AOKI

Director, Izumi Development Office, Kansai Branch Office,
Housing & Urban Development Corporation

JAPAN INTERNATIONAL COOPERATION AGENCY

I. BASIC IDEAS OF LAND READJUSTMENT

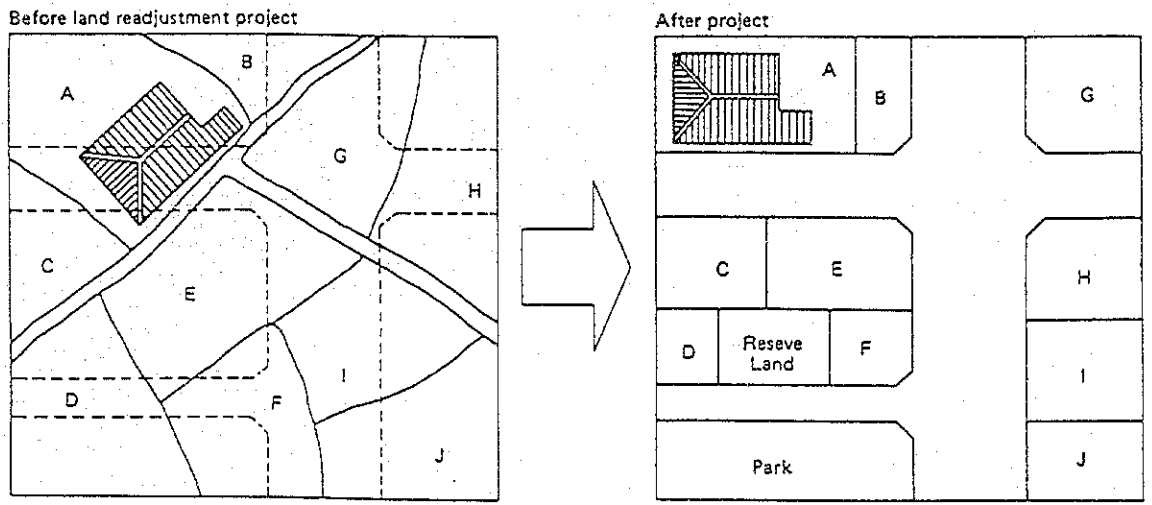
1. What is Land Readjustment?

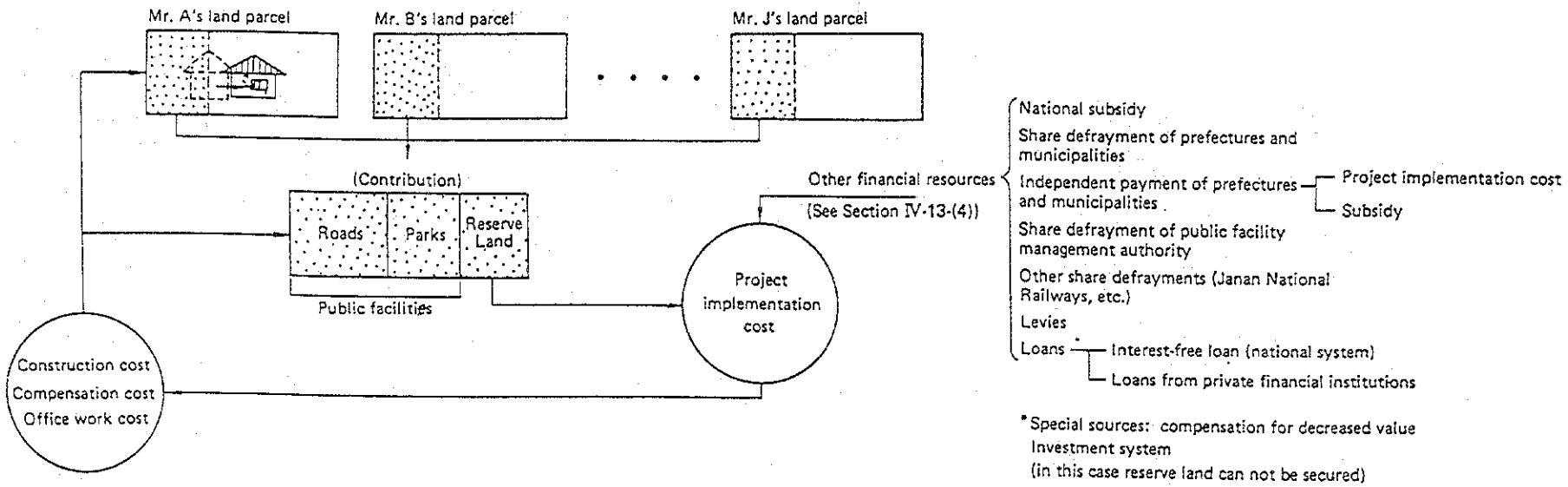
Land readjustment is a technique by which public facilities in a certain area, such as roads, parks and sewerage that are necessary for life, are created and/or improved, and individual sites are made easier to use and their site utility is increased by dividing them into more regular shapes. We believe that it is an excellent technique for improving urban areas.

For a land readjustment project, an urbanized or suburban area in which the land including farmland and woods is not utilized in a rational and fruitful manner, and/or where public facilities are not yet fully developed, is selected. By creating and improving public facilities, dividing, annexing and exchanging land parcels, and altering lot shapes and land conditions, the area is developed into a community in which comfortable living with complete municipal functions, is possible.

More concretely, owners of land in the project area are asked to contribute an equitable portion of their land to build public facilities and to create reserve land to be used for covering the project cost through its sale. Although land owners lose a small portion of their land, they receive greater benefit through the project because the shapes of their sites become more regular and therefore easier to use, equipped with the necessary public facilities, which increases the utility value of their sites greatly. This aspect of land readjustment, where land owners give away portions of their land for the whole project, is called "contribution" and "contribution" is an absolutely crucial element in land readjustment projects.

Another important element of land readjustment is "replotting": the pre-adjustment area minus the contribution for public facilities and reserve land is distributed to the individual owners of land as "replots", and all the rights and interests that have existed to the previous sites are transferred to the new replotted sites. This transfer of rights is called "replotting disposition". These two elements, "contribution" and "replotting", are the major characteristics of land readjustment.





*Special sources: compensation for decreased value Investment system
(in this case reserve land can not be secured)

Seminar on Construction Engineering and Social Infrastructure Development Projects

DATE:1994.9.15
PLACE:KGM会議室

9:00～	Registration	
9:20～9:35	Opening Remarks	Ms. Denya SENYAY Director of Training Division
9:35～9:50	Introduction of the Course	Hideyuki YOSHIDA Staff, Training Division, Osaka International Centre, JICA
9:55～11:05	Seminar-1 Activities of the Government and Corporation for Social Infrastucture Developments RCD-Dam Construction& River Improvement works	Eiichi SAZAWA Director, International Project Department, Japan Construction Training Center
11:05～11:20	Tea Break	
11:20～12:30	Seminar-2 Highway Planning and Construction in Japan	Tsutomu KUROTANI Deputy Director, Planning Division, Planning Department, Kinki Regional Construction Bureau, Ministry of Construction
12:30～13:30	Lunch Time	
13:30～14:40	Seminar-3 Housing and Urban Land Development in Japan	Yuzo AOKI Director, Izumi Development Office, Kansai Branch Office, Housing & Urban Development Corporation
14:40～14:50	Break	
14:50～16:00	Seminar-4 City Redevelopment Projects in Major City of Kyushu	Eiichi SAZAWA Director, International Project Department, Japan Construction Training Center
16:00～16:30	Discussion	

Seminar on Construction Engineering and Social Infrastructure Development Projects

DATE :1994.9.21
PLACE:ラムセス ヒルトン(カイロ)

8:30～	Registration	
9:00～ 9:10	Opening Remarks	Mr.Mohamad Magd El Din Chairman of Central Authority of Development
9:10～ 9:20	Address	Mr.Tadasi Sinoura Resident Representative of Japan International cooperation Agency
9:20～ 9:30	Address	Amb.Sobhi NAFEE Assistant Deputy Minister of Ministry of Foreighn Affairs
9:30～ 9:40	Introduction of the Course	Hideyuki YOSHIDA Staff,Training Division,Osaka International Centre,JICA
9:40～10:50	Seminar-1 Activities of the Government and Corporation for Social Infrastucture Developments RCD-Dam Construction& River Improvement works	Eiichi SAZAWA Director,International Project Department,Japan Construction Training Center
10:50～11:05	Tea Break	
11:05～12:15	Seminar-2 Highway Planning and Construction in Japan	Tsutomu KUROTANI Deputy Director,Planning Division,Planning Department, Kinki Regional Construction Bureau,Ministry of Construction
12:15～13:30	Lunch Time	
13:30～14:40	Seminar-3 Housing and Urban Land Development in Japan	Yuzo AOKI Director,Izumi Development Office,Kansai Branch Office, Housing & Urban Development Corporation
14:40～14:50	Break	
14:50～16:00	Seminar-4 City Redevelopment Projects in Major City of Kyushu	Eiichi SAZAWA Director,International Project Department,Japan Construction Training Center
16:00～16:30	Discussion	

Seminar on Construction Engineering and Social Infrastructure Development Projects

DATE:1994.9.27
PLACE:マリオットホテル

8:30～	Registration	
9:00～ 9:15	Opening Remarks	Mr.Farooq Ahmed Syed Assistant Chief Rural Development & Local Planning Section,MPW
9:15～ 9:20	Address	Mr.Noriaki Nisimiya Deputy Resident Representative of Japan International cooperation Agency
9:20～ 9:35	Introduction of the Course	Hideyuki YOSHIDA Staff,Training Division,Osaka International Centre,JICA
9:40～10:50	Seminar-1 Activities of the Government and Corporation for Social Infrastucture Developments RCD-Dam Construction& River Improvement works	Eiichi SAZAWA Director,International Project Department,Japan Construction Training Center
10:50～11:05	Tea Break	
11:05～12:15	Seminar-2 Highway Planning and Construction in Japan	Tsutomu KUROTANI Deputy Director,Planning Division,Planning Department, Kinki Regional Construction Bureau,Ministry of Construction
12:15～13:30	Lunch Time (Dynasty Buffet in MariottHotel)	
13:30～14:40	Seminar-3 Housing and Urban Land Development in Japan	Yuzo AOKI Director,Izumi Development Office,Kansai Branch Office, Housing & Urban Development Corporation
14:40～14:50	Break	
14:50～16:00	Seminar-4 City Redevelopment Projects in Major City of Kyushu	Eiichi SAZAWA Director,International Project Department,Japan Construction Training Center
16:00～16:30	Discussion	

（１）援助窓口に対する質問内容

Questionnaire to the participants nominating organization
援助窓口に対する質問内容

(Please type or write in block letter)

1. Please state the national policy regarding the field of this training course.
当該分野に関する政策

2. Please state the process of nominating the participants upon receiving the General Information (GI) of Group Training Course in Construction Project Manager and Social Infrastructure Development and Planning sent from the Embassy of Japan/JICA office and also how long it takes to get through.
ＧＩ受領後の人選手順
Your office → → → → your office
1)___ more than 2 months
2)___ less than 2 months

3. Choose one from below regarding the selection of applicants for these group training course in your country. 当該研修分野への需要
Construction Project Manager Course
1)_____ difficult to select one due to the large number of the applicants
2)_____ easy to select one due to the small number of the applicants
3)others (state reasons)

Social Infrastructure Development and Planning Course
1)_____ difficult to select one due to the large number of the applicants
2)_____ easy to select one due to the small number of the applicants
3)others (state reasons)

4. Do you finalize the nomination on the basis of GI (1) or on the basis of your organization's criteria (2)?
窓口機関での最終人選
1) _____ 2) _____
If you answered (2), please explain the screening policies in your organization.

5. Do you think the GI of these course clearly describes the objectives, the contents and the level of the training programme?
ＧＩ内容の適否
1) _____ yes 2) _____ no
If no, what sort of additional information do you think useful?

6. After your organization receives the notice of participant's acceptance, how long does it take till he/she finishes all the procedures necessary for departure?
受入れ回答後、出発までの手続き
1)____ more than 1 month 2)____ more than 2 weeks 3)____ less than 2 weeks
And when do you prefer to accept the notice?
1)____ more thanl month before the departure
2)____more than 2 weeks before the departure
3)____others

7. Does the participant report to your office after he/she finishes the training ?
帰国後、窓口機関での研修成果の確認
1) _____ usually yes 2) _____ usually no
If usually yes, please describe the methods and contents of the report.

If usually no, how does your organization evaluate the accomplishment of the training?

8. How is these course evaluated in your country?
a. Construction Project Manager Course
1)____excellent
2)____good
3)____not so good
Reasons for your above choice.

b. Social Infrastructure Development and Planning Course

1) ____excellent

2) ____good

3) ____not so good

Reasons for your above choice.

9. If you have any opinion about these course in comparison with other similar courses inside or outside your country, please state below.
他機関主催の研修との比較

10. Please state your prospects of the future demands in the field of Construction.
同分野での将来ニーズ等の関連情報

11. Other Comments

（２）研修員所属先に対する質問内容

Questionnaire to the organization of the ex-participants
研修員所属先に対する質問内容

(Please type or write in block letter)

A. Group Training in Japan

1. Please state the process to nominate candidates, after you receive the General Information (GI) of the Group Training Course in Construction Project Manager and Social Infrastructure Development and Planning sent from the embassy of Japan/JICA office and also the time required at each process.
ＧＩ受領後、人選の手順

How many months before the training course do you prefore to receive the GI?
(We usually require you to submit the application 2 months before the training course)

1) ___ More than 5 months before the training
2) ___ More than 3 months before the training
3) ___ Less than 3 months before the training
4) ___ Other

2. Choose one from the below regarding the selection of the applicants for the participation in this group training course in your country.当該研修分野への需要

a. Construction Project Manager Course

1) _____ difficult to select one due to the large number of the applicants
2) _____ easy to select one due to the small number of the applicants
3) _____ others (state reasons)

b. Social Infrastructure Development and Planning Course

1) _____ difficult to select one due to the large number of the applicants
2) _____ easy to select one due to the small number of the applicants
3) _____ others (state reasons)

3. What is your policy and qualification standards for selecting candidates?
人選方針

4. Are you sufficiantly informed of the objectives, target of the training, content and level of the programme for selecting candidates?
人選時の充分な情報の有無
1) _____ yes 2) _____ no
If no, could you point it out?

5. Please describe the necessary procedures and required time for participants before leaving for Japan upon the notice of acceptance. Also give your opinions on the favorable time of acceptance notice. 受入回答から出発までの手続き

6. Do you regard the participation in this Group Training Course as a contributing factor for participant's personnel appraisal and promotion in your organization in future?
研修参加と人事評価との関係
1) _____ yes (____ a lot, ____ somewhat) 2) _____ no
If yes, how do you consider it?

7. Please state your methods to evaluate the participant's achievement of the training course. 研修結果の評価方法

8. Did you require the participant to submit a report after he/she had come back from Japan? レポート提出の有無

1)___ Yes 2)___ No

if yes, how did you evaluate the report ?

9. Do you find what the participant acquired or developed during his/her training in Japan is practically applied in his/her work?研修成果の活用度

1) _____ yes (___ a lot ___ somewhat) 2) _____ no

if yes, how is it applied?

If no, please explain the reason.

10. Please comment about these training course from the view point of length, content level etc.

a. Construction Project Manager Course

b. Social Infrastructure Development and Planning Course

Questionnaire of JICA's Follow-up Team

11. As follow-up services, Japan International Cooperation Agency conducts the following for ex-participants:
    - to dispatch follow up team for the purpose of further improvement of Training Courses (survey of training effects and future technical needs, technical guidance)
    - to provide the ex-participants with technical information, literatures (addresses are selected by JICA)
    - to send magazine "ＫＥＮ－ＳＨＵ－ＩＮ" (only for 2 years) to ex-participants
    - to assist ex-participants to organize alumni associations.

    If you have any comments or suggestions concerning these services, please explain them.
    アフターケア活動へのコメント

12. Please state your prospects of the future demands and related informations for adjusting and improving this training course.
    同分野での将来ニーズ等の関連情報

（３）研修員本人に対する質問内容

Questionnaire to the ex-participants

研修員本人に対する質問内容

(Please type or write in block letters)

A. Personal Data

1. Name in Full _____ Age _____

2. Present Position _____

Name of Organization _____

(Division, Department, Ministry・・・)

B. Educational Data

1. Education/Training (Degree/Non-degree) before attending training at JICA.

Name of Educational/ Training Institute	Location of Institution	Years attended from - to -	Certificate/Diploma/Degree & Major in

2. Education/Training (Degree/Non-degree) after attending training at JICA.

Name of Educational/ Training Institute	Location of Institution	Years attended from - to -	Certificate/Diploma/Degree & Major in

B. Employment/Work Experience

1. Work experience: Please describe briefly what kind of work/job you have had since you returned home, including the present one.

Work/Job Position	Dates (from-to-)	Responsibilities

2. Nature of your present job: Indicate by an (x) mark in the corresponding box.

Activities	Full aprox. 85%	Major aprox. 75%	Partly aprox. 50%	Slightly aprox. 25%
Research/Inspection				
Instruction				
Production				
Administration				
Others, specify				

D. Evaluation of the JICA training Programme

1. When did you attend the JICA training ? (Year)

2. What was your initial expectation of JICA training?

3. Did the training programme correspond to your initial expectation ?

____ Compleately
____ Highly
____ Somewhat
____ Hardly
____ Not at all

Please state your answer briefly.

4. Can you apply the knowledge & technique acquired during the training in your present job ?

____ All
____ Most
____ Some
____ A little
____ None

Please state your answer briefly.

5. Has your personal improvement occurred in your job since you attended the JICA training.

☐ Yes
☐ No

If yes, plese check where applicable.

____ Promotion of the position
____ Work conditions
____ Responsibility
____ Increase of salary
____ Contents of work
____ Professional recognition
____ International contacts
____ Others

Please state your answer briefly.

6. Which part of JICA training was most useful in relation to your present job ?

7. Did you pass on to anyone any of the skill/knowledge that you had acquired from the training.

Full aprox. 85%	Major aprox. 75%	Partly aprox. 50%	Slightly aprox 25%	Non 0%

- Please state how and what part of the skill/knowledge did you pass on ?

- If you answered `Slightly` or `Non`, please state the reason.

7. Indicate your hope for the possible participation in the refreshers training course if organized (circle either (1) of (2))
   (1) participate in
   (2) do not participate in

7-a. Write any subjects below you would pursue if (1) chosen.

7-b. Describe your reason if (2) chosen.

8. List and describe all the pending problems you are troubled with in promoting and developing the construction projects in your country (list items in each row below:Lack of

_____ trained personnel	_____ support of supervisor
_____ equipment	_____ technical literature
_____ funds	_____ markets
_____ foreign experts	_____ national training institutes
_____ research facilities	_____ transport facilities
_____ career perspective	_____ foreign currency

Various constraints:

_____ economic situation	_____ brain drain
_____ poor management	_____ promotion structure
_____ too much foreign influence	_____ no suitable training
_____ political situation	_____ poor maintenance if equipment

8-a. The detailed description of the pending problems

9. Please give your suggestion on this training for further improvement.

4．持ち帰り資料一覧

(1)トルコ

・Urban Problems and Policies in Turkey
(Ministry of Public Works and Settlement)

・Organization and Activitics
(Ministry of Public Works and Settlement)

・Gerede-Ankara and Ankara Peripheral Motorway
(Enka-Bechtel Joint Venture)

・Pictorial Overview of Ongoing and Completed Highway Construction Works
-Gerede-Ankara and Ankara Peripheral Motorway Project-
(Enka-Bechtel Joint Venture)

・Opening of 120km Ankara Gerede Motorway

(2)エジプト

・Arab Republic of Egypt, Ministry of Public Works and Water Resourses
North Sinai Development Organization

・Physical Planning in Egypt

・The Greater Cairo Region Master Plan Long Range Urban Development


JICA
Japan
International
Cooperation
Agency
国際協力事業団