



ADVANCE POLYMER

Bearing System & Bridge Component Products



www.advancepolymer.co.th

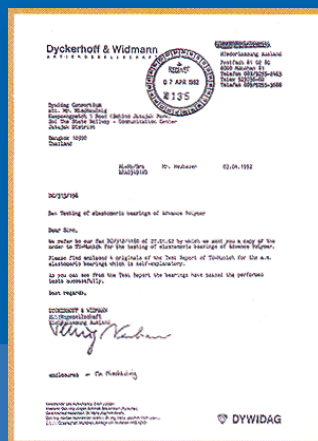
ISO 9001 CERTIFIED



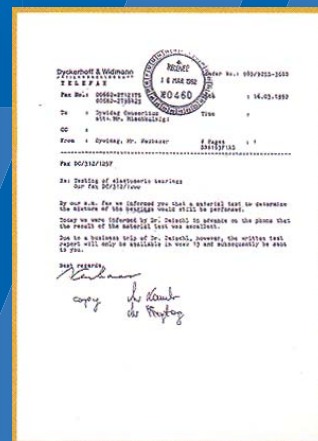
Go Forward to Win



ISO CERTIFICATE



TEST REPORT, UNIVERSITY OF MUNICH (GERMANY)



THAI INDUSTRIAL STANDARD FOR BRIDGE BEARING

MESSAGE FROM THE PRESIDENT

Advance Polymer J.T. Co., Ltd. was founded in 1977. Under the motto "GO FORWARD TO WIN" and strong determination, we had achieved the success of being the first manufacturer in Thailand to design, produce, and test the laminated elastomeric bridge bearing conforming to the international standards and specifications.

Over the past 30 years, the company has gained valuable experiences and expanded its operation to serve several prestigious mega projects in Thailand such as Bangkok Transit System (BTS), Don Muang Toll Way (DMT), Ramindra-At Narong Expressway (Contract 1-10), Pakkret Bang Pa-In Expressway, Second Stage Expressway (Contract SC-2 and Sector B), Suvarnabhumi International Airport, Southern Outer Bangkok Ring Road (SOBRR), etc.

Advance Polymer has been riding the wind of change. We have manufactured and supplied such other bridge components as bridge expansion joints, sound barrier systems, lock-up devices, and railing systems to our bridge society. Internationally, Advance Polymer J.T. Co., Ltd. has been certified to since the year 2001 for "Manufacturer of Elastomeric Bridge Bearings, Rubber Seals, and Rubber Parts". We also have expanded our exportation for laminated elastomeric bearings as well as expansion joints to South East Asia countries, especially for Vietnam, to Singapore, to Australia, to USA, to Canada, to Pakistan as well as in Middle East region.

The company's over all success has been achieved through its trusted reputation and regular business transaction with the customers. We would like to express our sincere thanks to all our customers for their supports and we can assure you our commitment to further improvement on efficiency and services for your total satisfaction.



(Ratchakorn Nutayakul)
President



Certificate of Registration

This certificate has been awarded to

ADVANCE POLYMER J.T. CO., LTD.

56 Soi Ronnasitpichai 13, Sanambinnam Rd., Nonthaburi, 11000, Thailand

in recognition of the organization's Quality Management System which complies with

ISO 9001:2015

The scope of activities covered by this certificate is defined below

**Manufacture of Elastomeric Bridge Bearing,
Rubber Seals and Rubber Parts**

Certificate Number:

Date of Issue: (Original)

Date of Issue:

09431/A/0001/UK/En

17 February 2010

08 March 2019

Issue No:

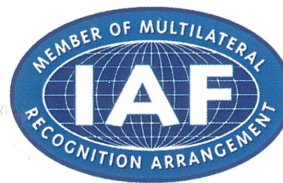
Expiry Date:

5

16 February 2022

Issued by:

On behalf of the Schemes Manager





Company Profile

***Over 250,000 Pads of
Advance Polymer's Elastomeric Bridge Bearing
were already installed as of August, 2003.***



Suvarnabhumi International Airport Project

**"Entire package of 6,000 laminated bearings, 636 steel bearings,
5,000 lm of expansion joints, and 22 km of aluminum railing."**

ADVANCE POLYMER J.T. CO., LTD. was established 1977. We started to produce plain elastomeric bearing pad to serve the short span bridges. At that time, most of the bridges in Thailand were minor bridges with a span length of not greater than 10.00 meters.

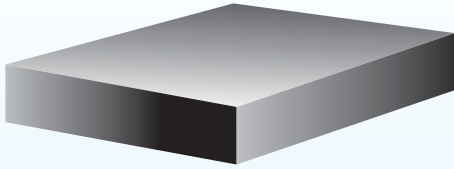
During the year of our establishment, the Expressway and Rapid Transit Authority of Thailand started constructing the first stage expressway project, namely, the Din Daeng - Port, Bangna - Port, and Dao Kanong - Port. The design called for the use of Laminated Elastomeric Bridge Bearings which was imported from United Kingdom.

For seeing the potential of this product to serve the market, we started our R&D to produce laminated elastomeric bridge bearings in order to suit this rapid growth in restructuring expansion of the country, and to compete with the expensive imported products. Then in year 1985, we had become the first local manufacturer to be able to design, test, and manufacture the laminated elastomeric bridge bearings conforming to the international specification of BS, AASHTO and DIN. In year 1986, the first installation of our laminated bridge bearing had been officially approved by Department of Highways in the construction of the Rangsit - Bangpoon bridges over the railway crossing to replace the imported products.

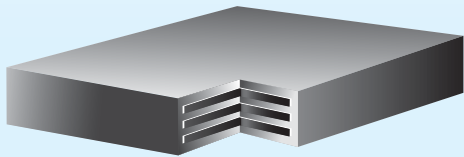
Up to now, Advance Polymer has employed in numerous Thailand's mega bridge construction projects such as follows:

- ◆ Owned by the Expressway Authority of Thailand;
 - ◆ Southern Outer Bangkok Ring Road Project (SOBRR)
 - ◆ The Connection of Bangphli-Suksawat Expressway with Buraphawithi Expressway Project
 - ◆ The Third (3rd) Stage Expressway (S1 Part 1 and 2)
 - ◆ The Second (2nd) Stage Expressway (Contract SC-2 and Sector B)
 - ◆ Ramindra-At Narong Expressway (Contract 1-10)
 - ◆ Bang Pa In-Pakkret Expressway
 - ◆ Ramindra Outer Ring Road Expressway (Contract 1 and 2)
- ◆ Owned by the Department of Highways;
 - ◆ Don Muang Toll Way (DMT)
 - ◆ Bhromrajchonni Viaduct
 - ◆ Southern Outer Bangkok Ring Road Project (Southern Section)
- ◆ Owned by the Bangkok Metropolitan Administration;
 - ◆ Bangkok Transit System (BTS)
 - ◆ BMA's 15 Steel Flyover Bridges
 - ◆ Rama VIII Bridge
 - ◆ Jaturatit Section A, B, and C

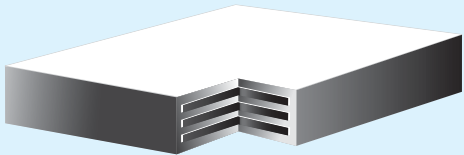
ADVANCE POLYMER'S ELASTOMERIC BRIDGE BEARINGS



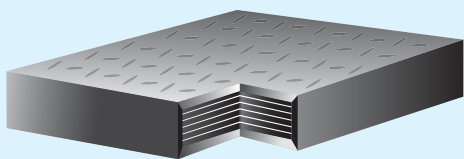
***Plain Bearing Pad or
Plain Bearing Strip***



Laminated Bearing Pad



Laminated Sliding Bearing



***Laminated Bearing Pad
with External Steel Plates***

Plain Bearing Pads are capable of carrying compressive loads, at the same time allowing small movement and rotational capacity.

Standard size :

Width (mm.) 100, 125, 150, 200

Thickness (mm.) 10, 15, 20, 25

Laminated Bridge Bearings are made up of multi-elastomer layers with reinforced steel plates vulcanized to the individual layers. It can be produced with a rectangular or circular design to meet individual design requirements. These products are simple, robust and corrosion free as the steel inserts are covered entirely by rubber. Easy to install and they will provide long problem-free service.

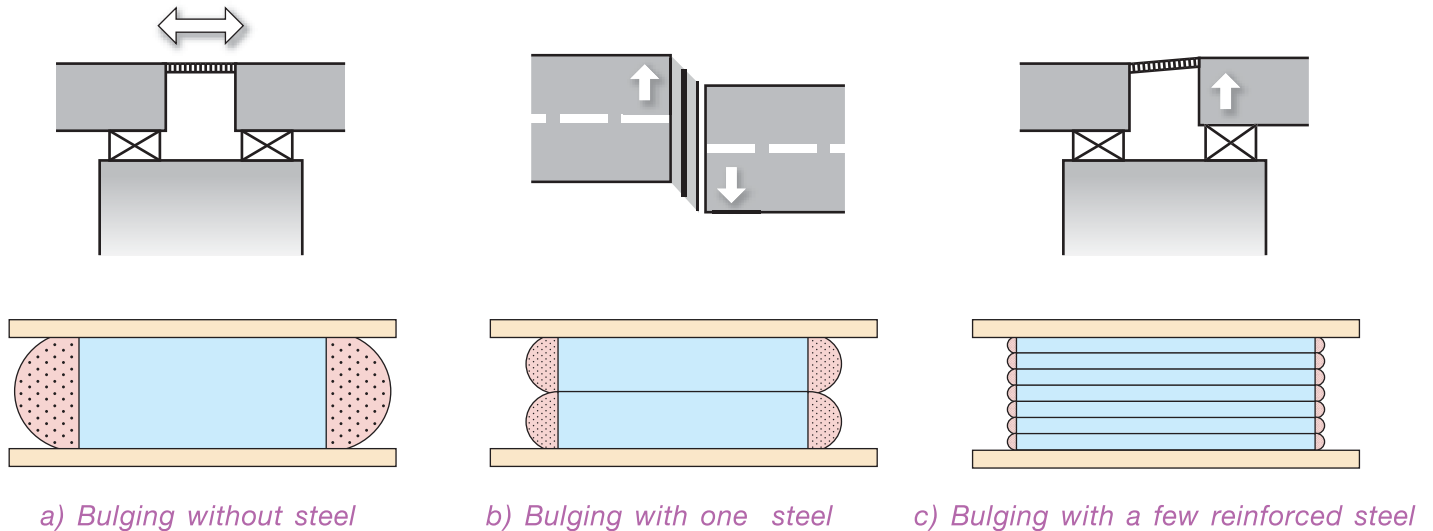
With an introduction of PTFE, slide bearings offer greater movement capacity with a lower cost when compared to pot or disk bearings. A sheet of PTFE can be vulcanized directly to simple reinforced elastomeric bearings during production. By sliding on a special counter plate with an attached stainless steel sheet, slide bearing offers an extremely low coefficient of friction and allows bearing to move in one or all directions depending on whether or not the guided components are featured.

Two external steel plates can be vulcanized directly to elastomeric bearings during production so that the bearings can be secured to the structure by mechanical anchoring or gluing in order to reduce the risk of slipping.

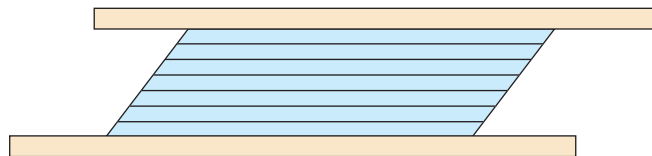
FUNCTIONS OF ELASTOMERIC BRIDGE BEARING

Elastomeric Bridge Bearings are designed to accommodate vertical load, horizontal movement, and rotation of the superstructure created by thermal effect, traffic loads, structural load itself, wind load, earthquake load, etc. The bearings absorb movement and rotation of superstructure by deformation of rubber.

1) Movement (Longitudinal, Transverse and Vertical)

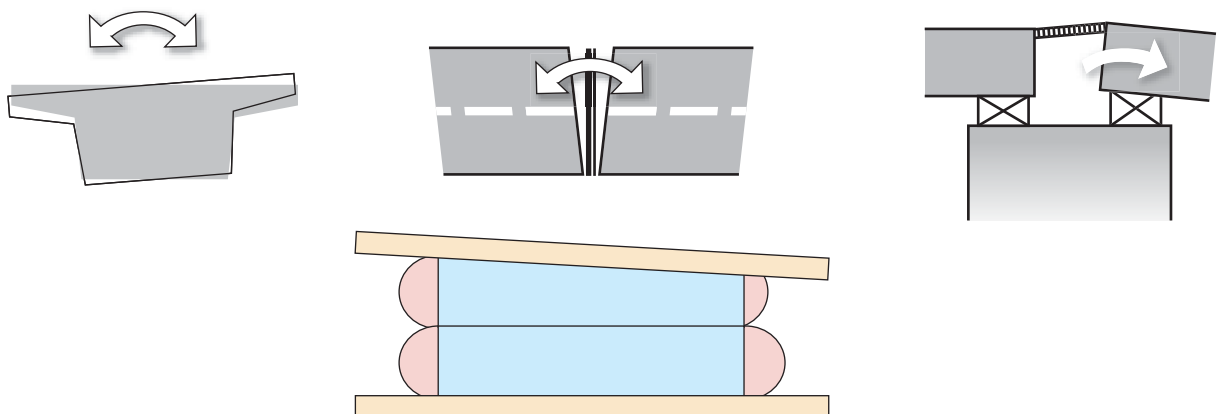


To accommodate vertical load, Elastomeric Bearings are designed to consist of rubber and multi-reinforced steel plate with restricting the rubber deformation and enlargement of load capacity.



Elastomeric Bearing accommodates the horizontal, longitudinal, and transverse loads by rubber shear's deformation.

2) Rotation



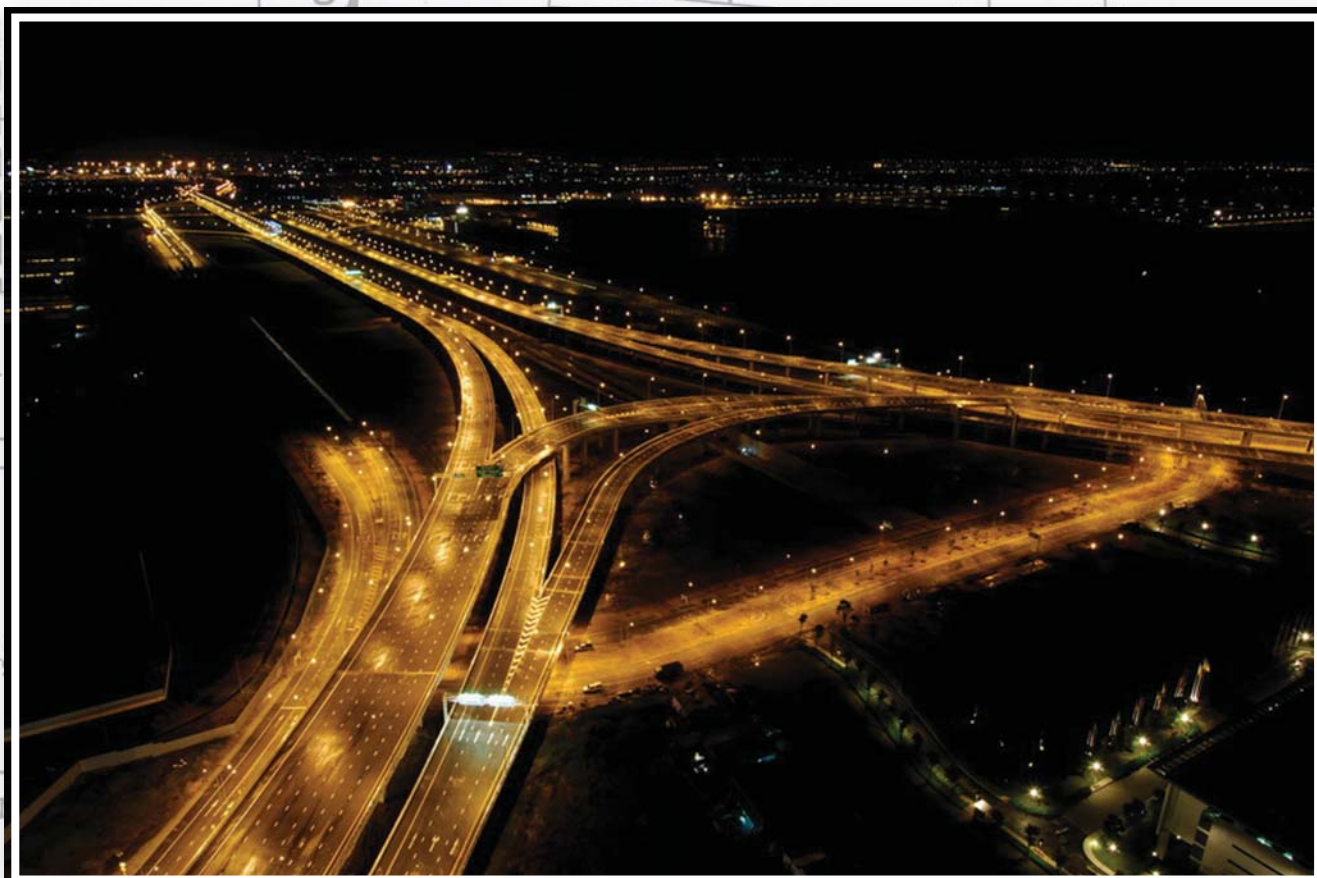
Rotation can be absorbed by rubber's elasticity.

LAMINATED BRIDGE BEARING LIST

<i>Dimension (mm.)</i>	<i>Min. Load (tons)</i>	<i>Max. Load (tons)</i>	<i>Max. Horizontal Movement (mm.) Longitudinal Axis</i>	<i>No. of Steel Plate</i>	<i>Compressive Stiffness (kN/mm.)</i>	<i>Shear Stiffness (kN/mm.)</i>
230/205/49	15.0	35.8	11.0	4	152.0	1.2
250/200/30	18.0	65.0	13.0	2	185.0	1.9
250/200/39	30.0	65.0	18.5	4	400.0	1.7
250/220/47	15.0	42.5	12.5	4	262.0	1.4
250/250/30	18.0	74.5	15.5	2	243.0	1.6
250/250/38	12.5	55.5	11.5	3	373.0	1.9
280/250/43	26.0	2.5	23.5	3	26.0	1.9
280/250/51	25.0	65.0	11.0	4	337.0	1.6
280/280/54	35.0	91.5	23.0	5	595.0	1.8
300/250/39	16.0	92.5	13.5	4	1037.0	2.5
300/250/54	25.0	75.5	22.5	4	308.0	1.6
300/280/50	35.0	97.0	24.0	4	515.0	2.0
300/280/50	40.0	97.0	26.0	4	515.0	2.0
340/250/47	48.0	94.5	10.5	3	321.0	2.0
350/200/23	20.0	83.0	9.0	2	1073.0	3.7
350/250/70	34.0	102.5	34.0	6	444.0	1.5
350/250/97	54.0	97.0	50.5	8	276.0	1.1
350/325/105	66.0	120.5	56.0	7	252.0	1.2
355/250/45	20.0	77.0	25.0	3	386.0	2.2
400/250/30	36.0	98.0	15.0	2	788.8	3.8
400/250/54	25.5	112.0	20.5	4	518.0	2.1
400/270/32	25.0	114.5	5.9	2	790.0	3.7
400/300/41	46.0	102.5	21.5	3	721.0	2.3
400/300/55	50.0	108.5	17.0	3	335.0	2.4
400/300/62	47.0	134.5	31.5	5	801.0	2.3
400/300/75	100.0	141.5	42.0	5	396.0	1.8
400/300/36	39.0	125.5	10.5	2	731.0	3.8
400/315/40	38.0	113.0	10.5	2	510.0	3.3
406/279/42	17.0	127.5	21.5	3	845.0	3.1
406/279/49	10.0	127.5	24.5	4	955.0	2.8
406/279/49	10.0	127.5	24.5	4	955.0	2.8
425/270/50	40.0	107.0	50.0	4	827.0	2.7
425/270/63	40.0	106.0	60.0	5	635.0	2.2
425/270/89	40.0	100.5	80.5	7	434.0	1.5
425/280/78	20.0	112.0	35.5	5	346.0	1.7
430/200/34	30.0	74.5	11.0	2	361.0	2.8
430/200/45	17.0	83.0	12.0	3	342.0	2.2
450/250/33	32.0	124.5	16.5	3	1743.0	4.2
450/250/88	32.0	124.5	45.5	7	439.0	1.5
450/300/52	37.0	149.5	26.5	4	1045.0	3.0

<i>Dimension (mm.)</i>	<i>Min. Load (tons)</i>	<i>Max. Load (tons)</i>	<i>Max. Horizontal Movement (mm.) Longitudinal Axis</i>	<i>No. of Steel Plate</i>	<i>Compressive Stiffness (kN/mm.)</i>	<i>Shear Stiffness (kN/mm.)</i>
450/300/75	61.5	149.5	42.0	5	488.0	2.0
450/300/120	20.0	93.5	65.0	7	192.0	1.2
450/350/138	59.5	106.5	49.2	8	230.0	1.2
450/400/125	80.0	225.0	37.0	9	580.0	1.7
450/450/99	92.0	272.0	12.0	7	916.0	2.3
450/450/109	99.0	301.0	12.0	9	1175.0	2.2
500/450/121	93.5	272.0	37.0	8	772.0	2.1
522/480/120	100.5	301.0	36.0	8	888.0	2.3
530/280/165	20.0	89.0	65.0	11	238.0	1.0
600/400/122	37.0	363.0	36.0	9	1059.0	2.3
600/400/150	99.0	300.0	41.0	10	676.0	1.8
650/450/154	166.0	342.0	54.0	9	690.0	2.1

- * Notes:
1. Maximum rotation of 0.003 rads is used.
 2. Maximum load is subject to design criteria provided individual projects.
 3. Maximum load and maximum movement are calculated.
 4. More dimensions are available but not illustrated due to unenclosed design information.



CHECKED : S BARAWI

PROJECT MANAGER : MANAT C.

ELASTOMERIC BEARING DESIGN

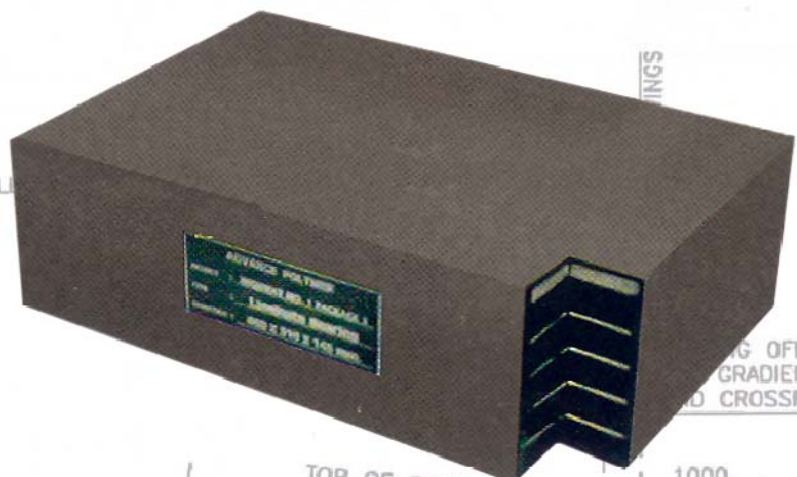
For the best result, Elastomeric Laminated Bearing should be a so-called "tailor made" to suit particular vertical load, horizontal load, horizontal movement and rotation of the superstructure. This is, therefore, impossible that "manufacturer standard types" can perfectly accommodate all the requirements. If the client comes to us with detailed drawing and criteria load data, we will serve them in the detailed design by our expertise designer.

General Required Data

- Maximum and Minimum vertical loads.
- Maximum positive and negative movements in longitudinal and transverse directions.
- Longitudinal and transverse horizontal loads.
- Angular rotation.
- Available plan dimension.

Standard

Advance Polymer can produce Elastomeric Bearings in conformity to the following international standards: European EN 1337.3, British BS 5400, German DIN 4141 and American AASHTO. The elastomer used is usually in form of Natural Rubber (Polyisoprene), or Polychloroprene (Neoprene), depending on specifications.



STANDARD SPECIFICATIONS

Physical Properties

BS 5400: Section 9.2:1983

AASHTO Standard Specification for Highway Bridges

Physical Properties	Natural Rubber	Chloroprene	ASTM Standard	Physical Properties	Table 18.2.3.1 Chloroprenc	Table 18.2.3.1B Natural Rubber
Tensile Strength, Minimum (see 3.7.3.2)	15.5 N/mm2	15.5 N/mm2	D2240	Hardness (Shore A Durometer)	50±5 60±5 70±5	50±5 60±5 70±5
Elongation at break, minimum (see 3.7.3.2)			D412	Tensile Strength, Psi.(min.)	2250 2250 2250	2250 2250 2250
45 IRHD TO 55 IRHD	450%	400%		Ultimate Elongation	400 350 300	450 400 300
56 IRHD TO 65 IRHD	400%	350%		%(min.)		
66 IRHD TO 75 IRHD	300%	300%		Heat Resistance		
				CR 70 hours at 212°F		
				NR 70 hours at 158°F		
Aging resistance (see 3.7.3.3)			D573	Change in Durometer	15 15 15	10 10 10
Maximum change from initial values:				Hardness, Max. points		
Hardness	10 IRHD	15 IRHD		Change in Tensile	-15 -15 -15	-25 -25 -25
Tensile strength	15%	15%		Strength, Max.%		
Elongation at break	20%	40%		Change in Ultimate	-40 -40 -40	-25 -25 -25
				Elongation, Max.%		
Compression set maximum (see 3.7.3.4)	30%	35%	D395	Compression set	35 35 35	25 25 25
			Method B	CR 22 hours at 212°F		
				NR 22 hours at 158°F		
			D1149	Ozone	No No No	No No No
			Mounting	CR 100 pphm, 20%	Cracks Cracks Cracks	Cracks Cracks Cracks
			Procedure	Strain, 100 F+2 F, 100 hours		
			D518	NR 25 pphm, 20%		
			Procedure A	Strain, 100 F+2 F, 48 hours		
				Adhesion		
			D429	Bond made	40 40 40	40 40 40
			Method B	during vulcanization, lbs/inch.		

INSTALLATION AND HANDLING

- ♦ During transportation, do not throw or drop the bearing.
- ♦ Bearings should be stored on a smooth, leveling flat floor with a cover. The bearing has to be in a good shape before installation.
- ♦ Bearings shall be installed by a qualified personnel to the positions shown on the plans. The bearing must be horizontally installed.
- ♦ Thin bedding to take up irregularities in the concrete surface must be provided.
- ♦ The strength of the concrete of the bedding should not be less than that of the superstructure (structural concrete).
- ♦ As bearings have to be raised on concrete plinths, it is recommended that the plinths be properly reinforced with mild steel reinforcement bars or by non-shrink grout with the strength of the concrete of the superstructure.
- ♦ As the bridge always has some gradients, a proper shim by non-shrink grout between the top of the bearing and the bottom of the girder (downstand) to generate a perfect load distribution should be provided.
- ♦ It is desired to ensure that there will be no chance of accidental movement of the bearing from its appropriate position during the construction.
- ♦ During installation, a proper cover of the sides of the bearing by paper tapes for cleanliness purpose is recommended to prevent the leakage of unsettled non-shrink grout from the downstand formwork. After completion, the paper tape should be removed.



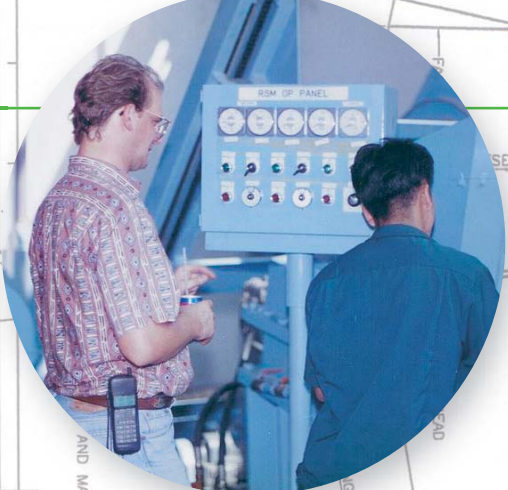
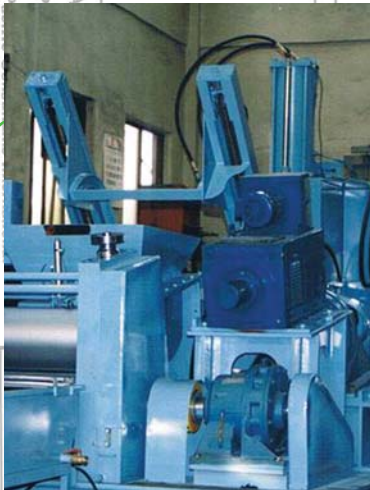
QUALITY ASSURANCE

APD TRANSIT AUTHORITY OF THAILAND
MRT PURPLE LINE PROJECT
BANG YAI TO RAT BURANA



PIER CHAINAGE
ON S.O.L.

Part of Laboratory

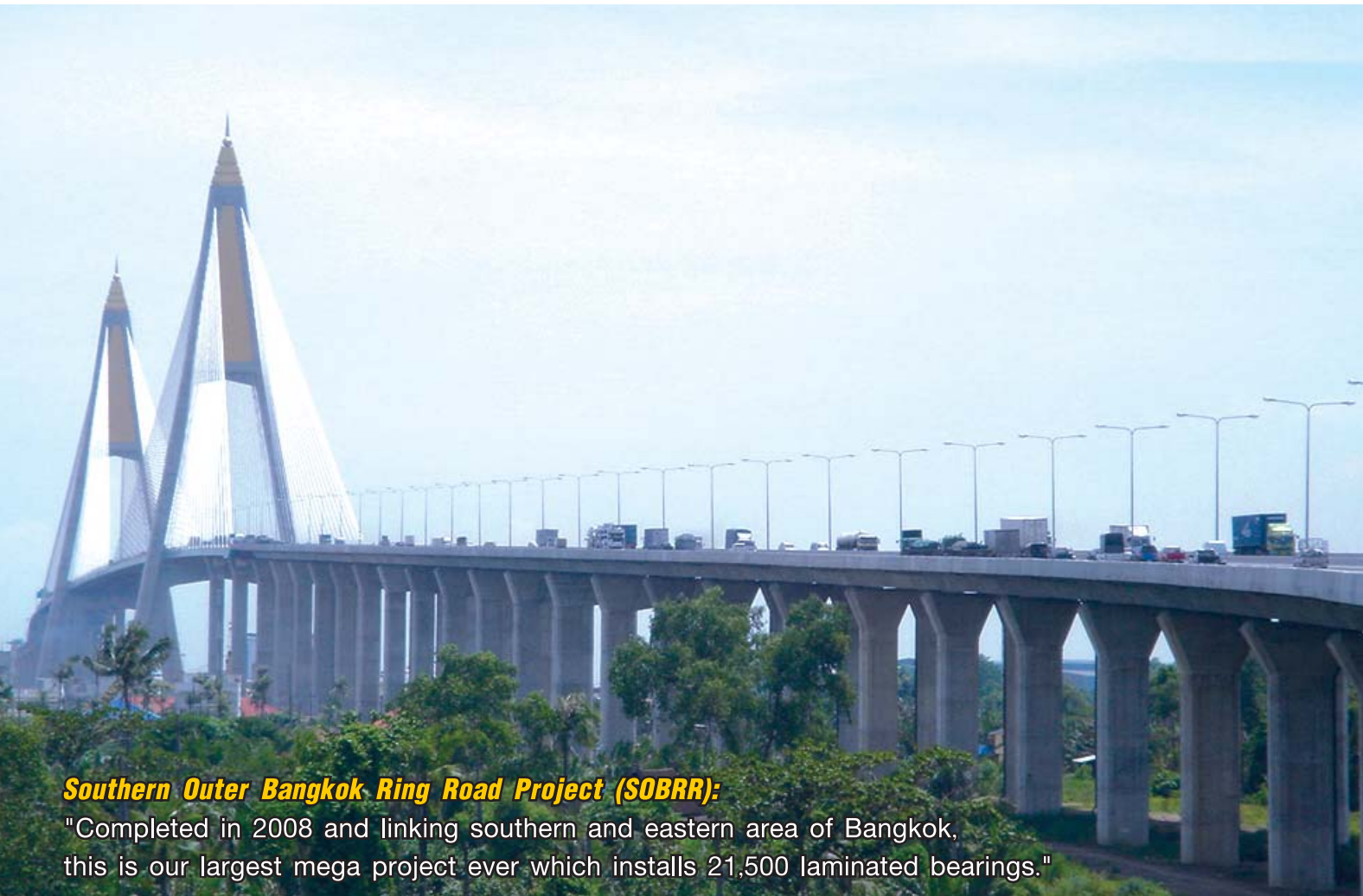


Machines for each step of production are automatically controlled by computer.



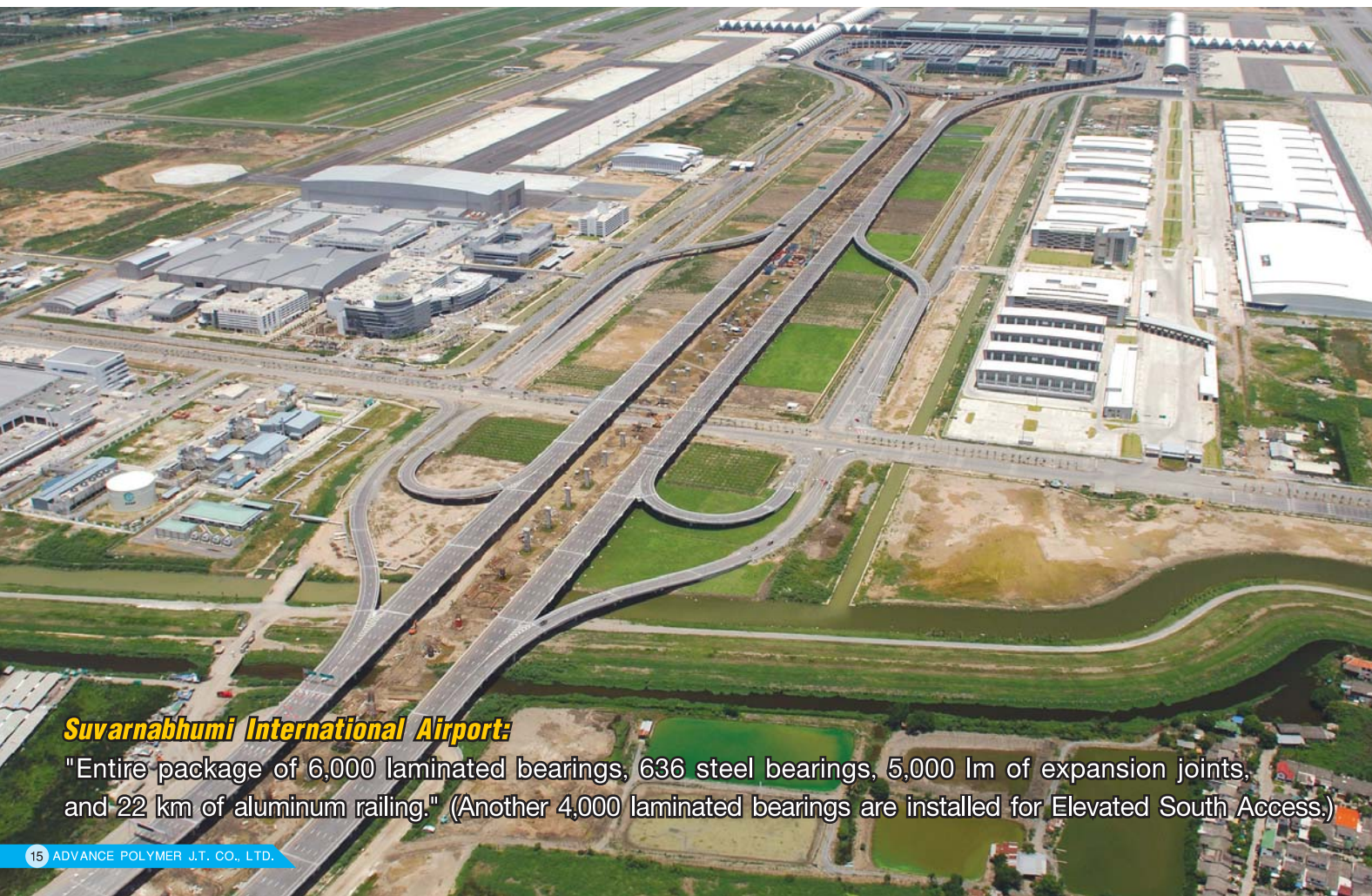
For every bearing, quick production test, compressive and shear stiffness test are conducted prior to dispatching to a job site to meet standard specification.

PERFORMANCE RECORDS



Southern Outer Bangkok Ring Road Project (SOBRR):

"Completed in 2008 and linking southern and eastern area of Bangkok, this is our largest mega project ever which installs 21,500 laminated bearings."



Suvarnabhumi International Airport:

"Entire package of 6,000 laminated bearings, 636 steel bearings, 5,000 lm of expansion joints, and 22 km of aluminum railing." (Another 4,000 laminated bearings are installed for Elevated South Access.)



Industrial Ring Road Project (IRR):

"One of the King's initiative projects with 132 meters of bridge expansion joint, and 20 units of 420-ton LUDs."



Ramindra Outer Ring Road Expressway (Contract 1 & 2):

"Another mega project in which 5,100 laminated bearings are installed."

PERFORMANCE RECORDS



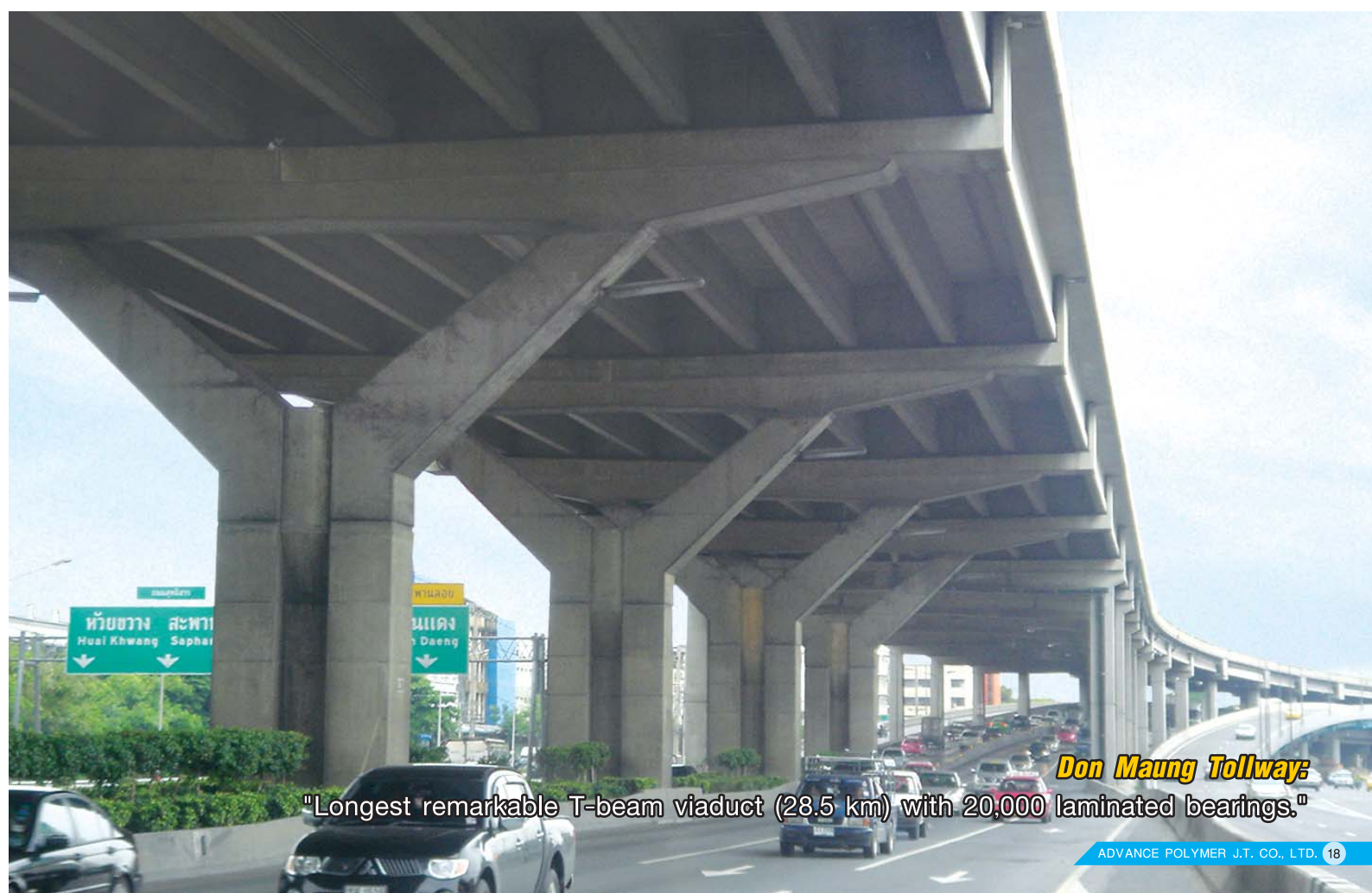
3rd Stage Expressway (S1 Part 1 & 2):

"Another prestigious project with 5,000 laminated bearings."



Bangkok Transit System Project (BTS):

"A mega public transportation project located in the center of Bangkok with 3,200 laminated bearings."



PERFORMANCE RECORDS



Bhromrajchonni Viaduct:

"Another King's initiative project situated in the west side of Bangkok. This 15-km viaduct incorporates 9,000 laminated bearings."



Bang Pa In - Pakkret Expressway (Udorn Rathaya Expressway):

"32 -km segmental box structure expressway equipped with 8,000 laminated bearings."



Thi Nai Bridge, Socialist Republic of Vietnam:

"Current longest sea bridge (3 km) in Vietnam with 1,000 laminated bearings."



The New Government Complex:

"This gigantic complex is to commemorate His Majesty the King's 80th Birthday Anniversary. Our 80 units of steel sliding bearings are installed to support the main roof supertruss."

OTHER BRIDGE COMPONENT PRODUCTS

Bridge Bearings



◆ Pot Bearing



◆ Steel Bearing

Expansion Joints



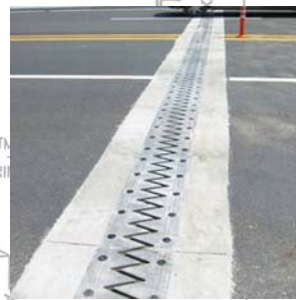
SCALE 1:100
PLAN



◆ Elastomeric Expansion Joint



◆ Strip Seal Expansion Joint



◆ Finger Expansion Joint



◆ Modular Expansion Joint

◆ Compression Seal

Lock-Up Devices (LUD)



Railing Systems



*Suvarnabhumi Int' Airport : The first aluminum railing project(22kms) in Thailand.



"Men Build Too Many Walls And Not Enough Bridges"

Sir Isac Newton

Go Forward to Win



IRR Project

ADVANCE POLYMER J.T.CO.,LTD.

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