

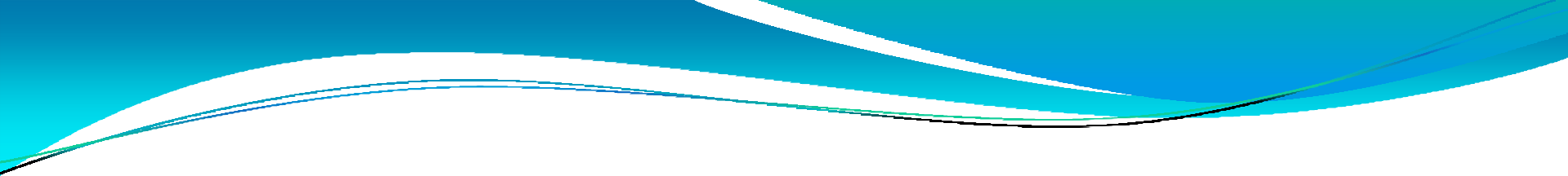
JENIS-JENIS & TYPE SCAFOLDING

PEMBAGIAN JENIS SCAFFOLDING DAPAT DIBAGI MENURUT :

- MATERIAL/ BAHAN SCAFFOLDING
- BENTUK SCAFFOLDING
- FUNGSI SCAFFOLDING
- TYPE ATAU KARAKTERISRIK SCAFFOLDING
- CARA/TEKHNIK MEMBANGUN SCAFFOLDING

JENIS dan TYPE PERANCAH

- **JENIS SCAFFOLDING**: adalah Pembagian atau Pembeda Perancah menurut Material yang digunakan dan Karakteristik Pemasangan Perancah
- **TYPE SCAFFOLDING**: adalah Pembagian atau Pembeda Perancah menurut Fungsi, teknik membangun, dan model perancah



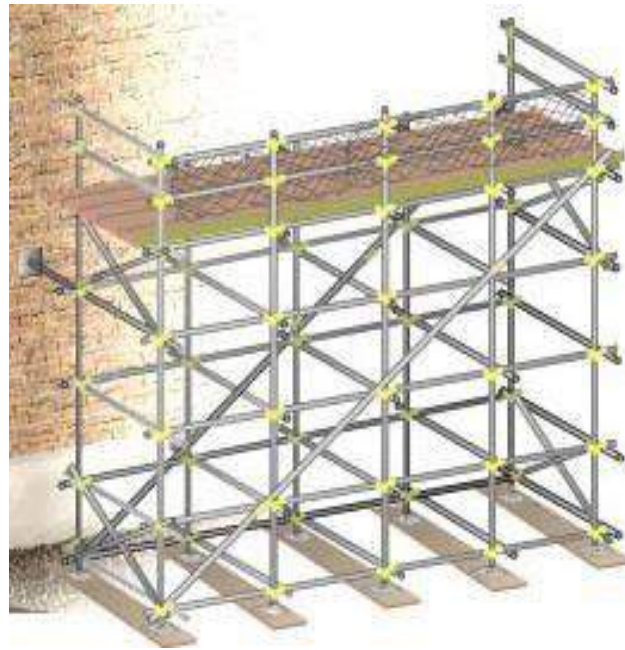
JENIS-JENIS SCAFFOLDING

JENIS SCAFFOLDING

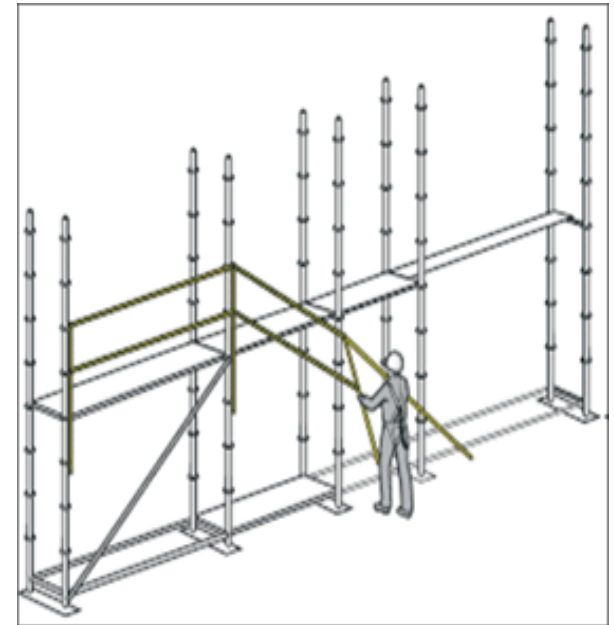
- METAL SCAFFOLDING



FRAME SCAFFOLDING
Perancah Rangka Besi



TABULAR SCAFFOLDING
Tube & Clamb SCAFFOLDING
Perancah Pipa



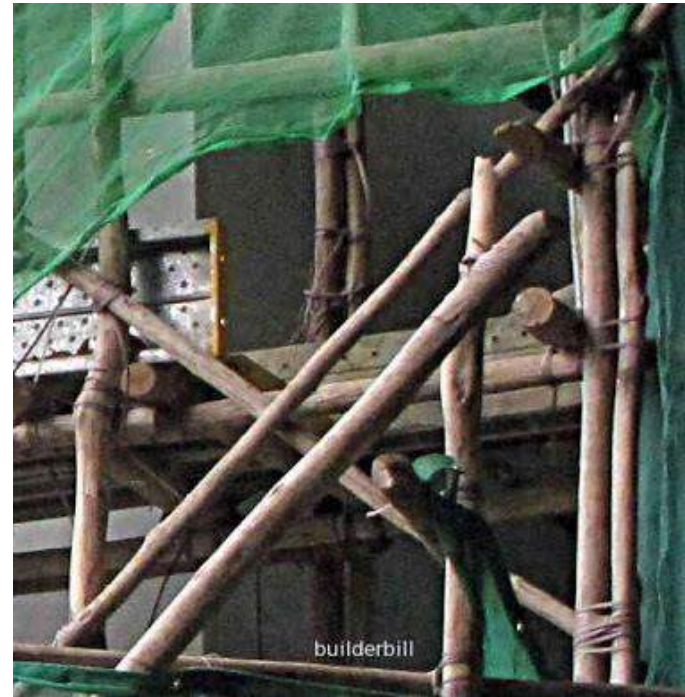
MODULAR SCAFFOLDING
Prefabrication Scaffold

JENIS SCAFFOLDING

- WOODS SCAFFOLDING (PERANCAH KAYU)



PERANCAH KAYU PERSEGI

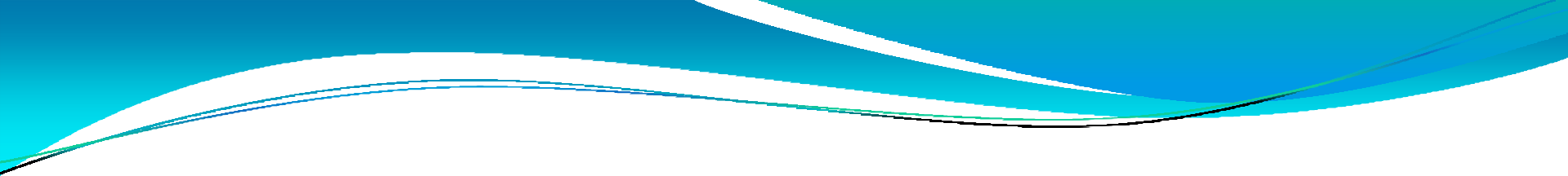


PERANCAH KAYU BULAT

JENIS SCAFFOLDING

- BAMBOO SCAFFOLDING (Perancah Bambu)





TYPE – TYPE SCAFFOLDING

TYPE SCAFFOLDING

- INDEFENDENT / TOWER SCAFFOLDING
(Perancah Berdiri Sendiri)



Perancah yang didirikan/
dibangun
tanpa terikat
dengan
konstruksi
permanen

INDEPENDENT/ TOWER SCAFFOLD



TYPE SCAFFOLDING

- MOBILE/ MOVEBLE SCAFFOLD (Perancah Beroda)



Perancah yang berdiri sendiri yang dan tiang vertikal diberi Roda agar penggunaan perancah dapat dipindah-pindah

MOBILE/ MOVEBLE SCAFFOLD (Perancah Beroda)



TYPE SCAFFOLDING

- HUNG SCAFFOLDING (Perancah Gantung Diam)



Perancah yang berpasang tergantung pada struktur permanen di atasnya karena tidak memungkinkan didirikan dari bawah/landasan

HUNG SCAFFOLDING (Perancah Gantung Diam)



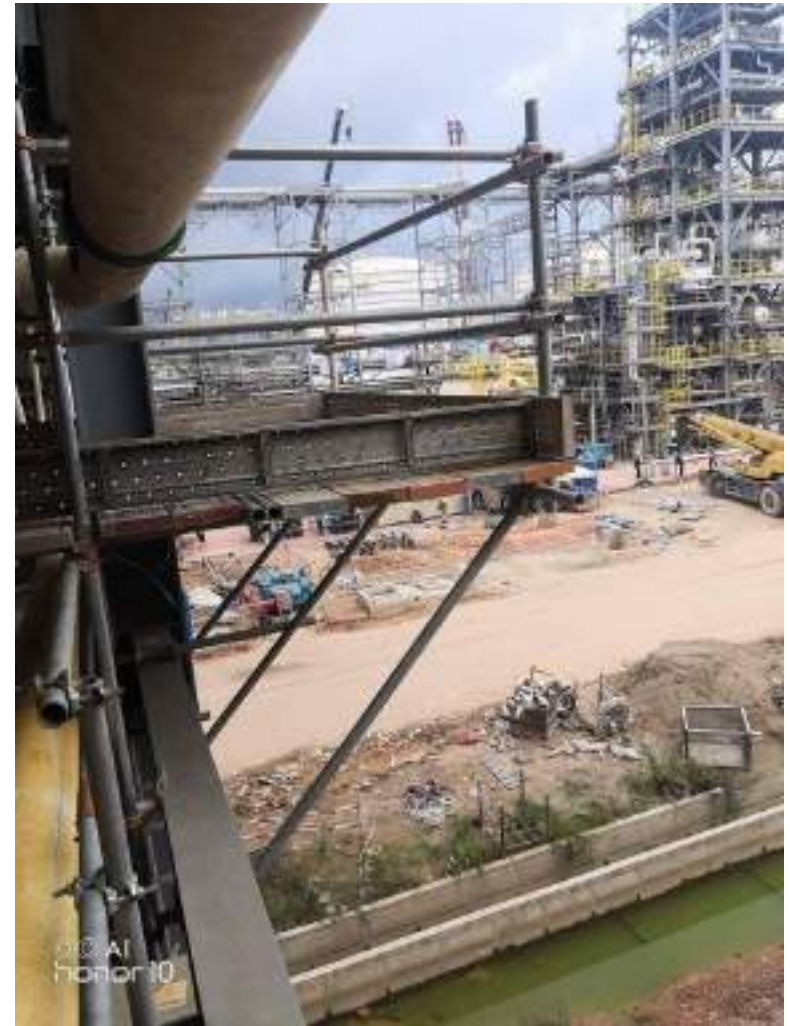
TYPE SCAFFOLDING

- CANTILEVER SCAFFOLDING (Perancah Menjulang Keluar Struktur Permanen)



Perancah yang berpasang tergantung dan menjulang menjauh dari penopang perancah/struktur permanen

CANTILEVER SCAFFOLDING



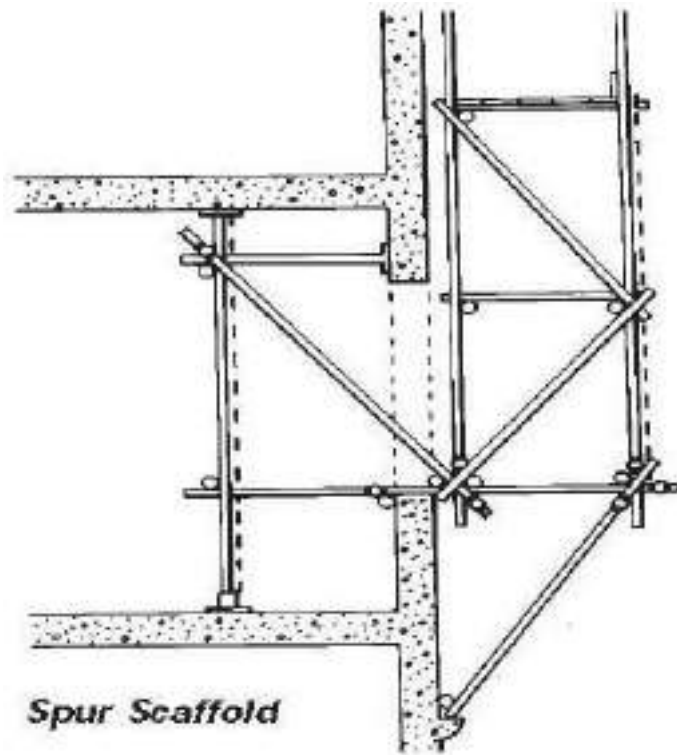
TYPE SCAFFOLDING

- Ji SCAFFOLD



TYPE SCAFFOLDING

- SPUR SCAFFOLD



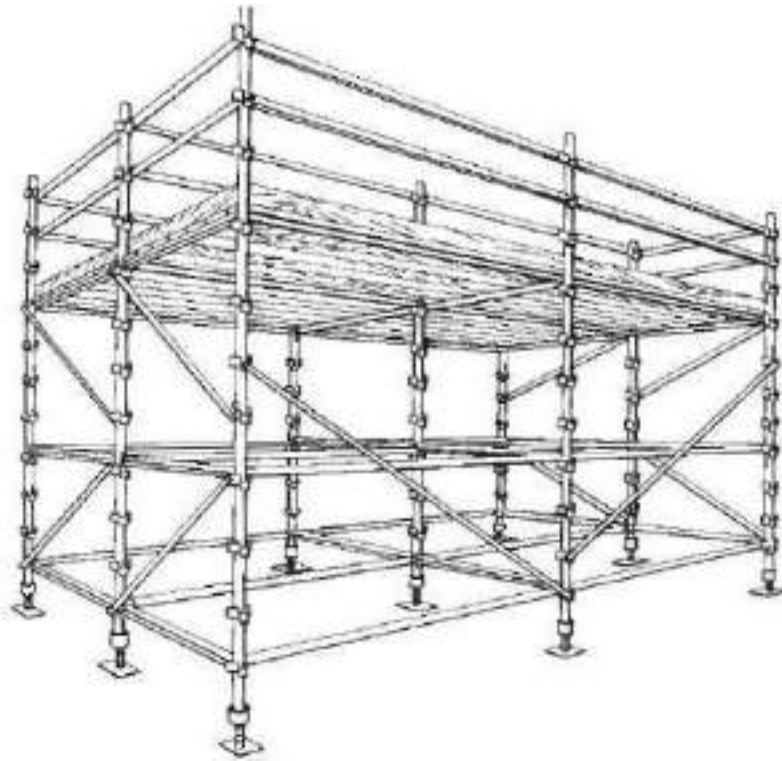
Perancah yang
Kekuatan Strukturnya
bertumpu pada
Konstruksi Permanen
dengan
mengandalkan
Batang Diagonal

SPUR SCAFFOLD



TYPE SCAFFOLDING

- SQUER/ BIRDCAGE SCAFFOLDING
(Perancah Persegi/ Sangkar Burung)



Perancah yang berpasang tergantung pada struktur permanen di atasnya karena tidak memungkinkan didirikan dari bawah/landasan

TYPE SCAFFOLDING

- ROUND SCAFFOLDING (Perancah Melingkar)

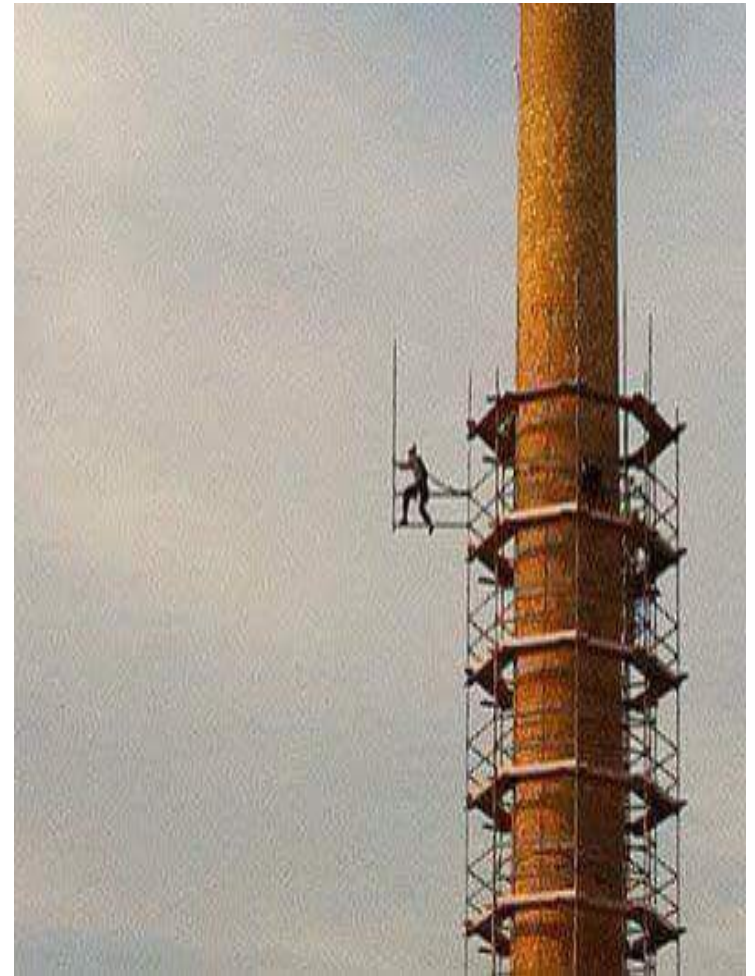


Perancah yang didirikan melingkar atau mengelilingi dinding struktur/ bangunan yang melingkar

ROUND SCAFFOLD



ROUND SCAFFOLD



TYPE SCAFFOLDING

OVERSTAGE SCAFFOLDING (Perancah Cantiliver yang tergantung dengan Perancah Indefenden)



TYPE SCAFFOLDING

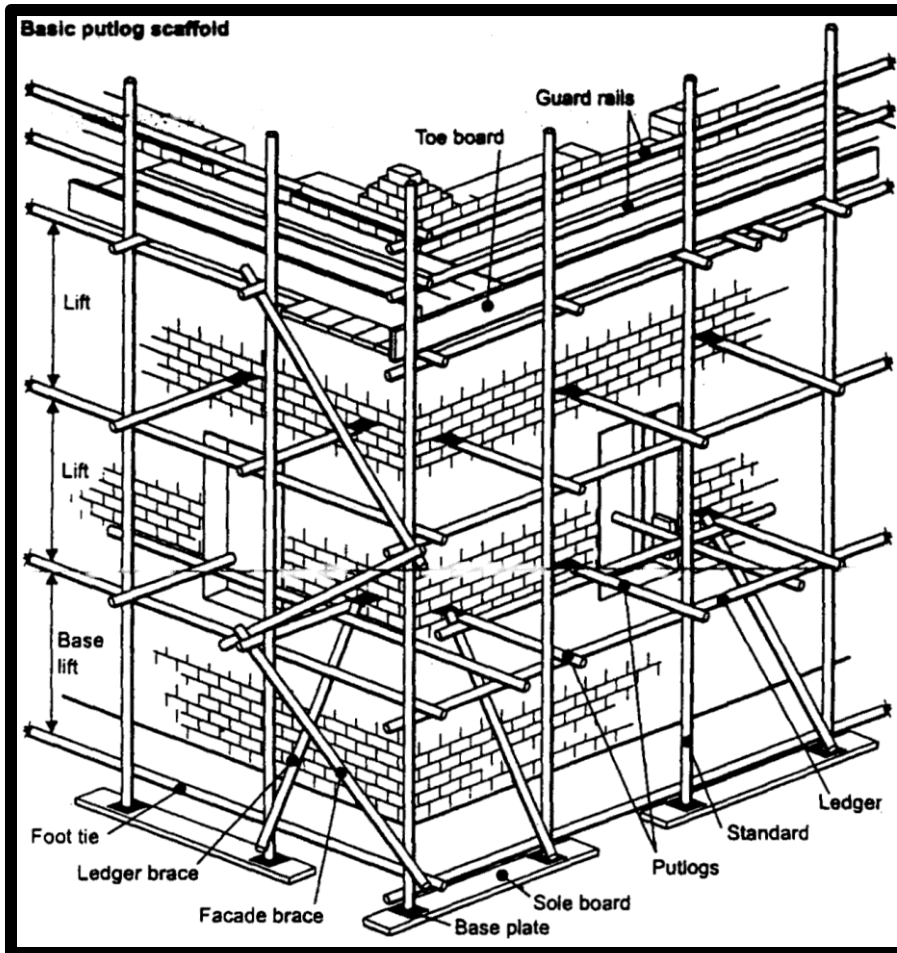
- BRITH SCAFFOLD (Perancah Jembatan)



TYPE SCAFFOLDING

- SINGLE POLE SCAFFOLD (Perancah Tiang Tunggal)

Perancah yang didirikan hanya menggunakan satu sisi Tiang (standard)



SINGLE POLE SCAFFOLE (Perancah Tiang Tunggal)



JENIS-JENIS PERANCAH

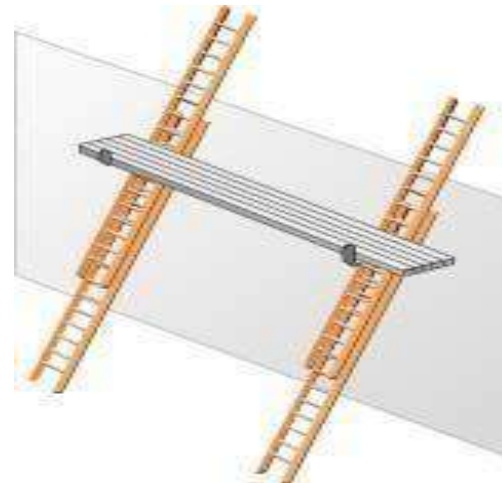
menurut Per-Men No.1 Thn 1980

- Pasal (1) Point (h), (i), (j), (k), (l)
- Perancah Tangga (Ledder Scaffold), Perancah yang menggunakan tangga sebagai tiang untuk menyangga peralatan



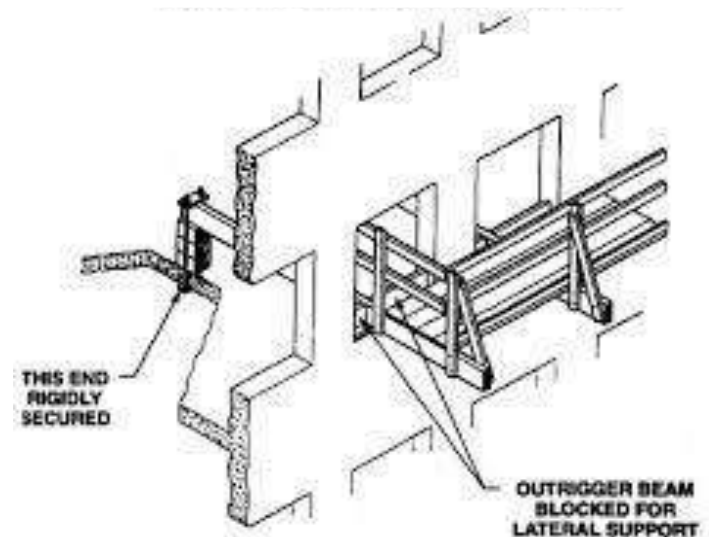
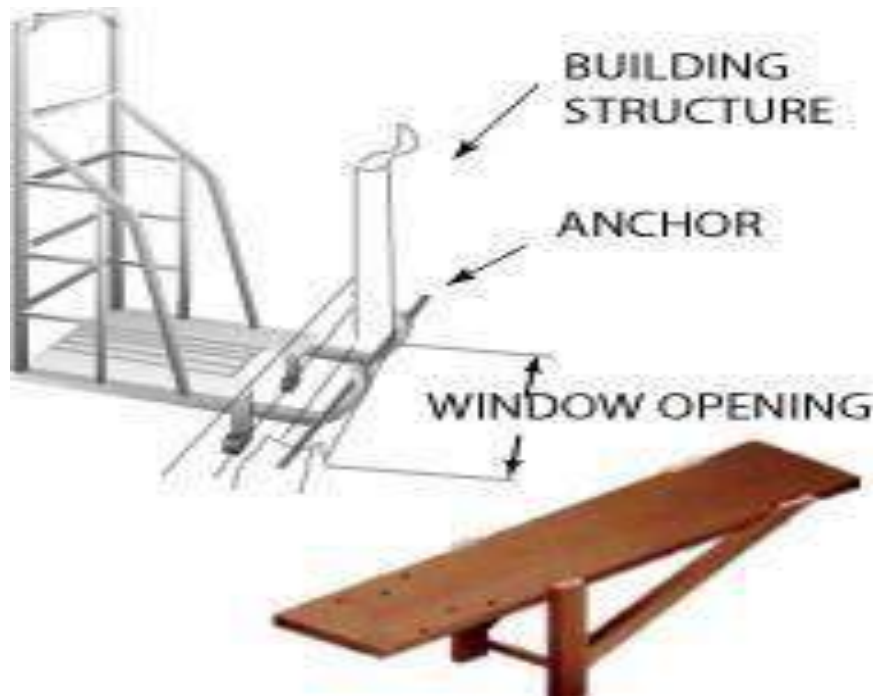
menurut Per-Men No.1 Thn 1980

- > Perancah Kursi Gantung (Beatswains chair), Perancah yang berbentuk tempat duduk yang digantung dengan kabel atau tambang (Gondola)
- Perancah Dongkrak Tangga, Perancah yang peralatannya mempergunakan dongkrak untuk menaik dan menurunkan dan dipasang pada tangga



menurut Per-Men No.1 Thn 1980

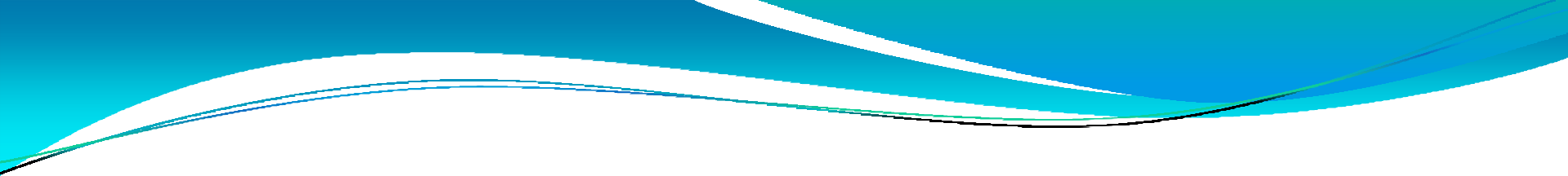
- > Perancah Topang Jendela (Window Jack Scaffold)
Perancah yang pelatarannya dipasang pada balok tumpu yang ditempatkan menjulur dari jendela terbuka.



menurut Per-Men No.1 Thn 1980

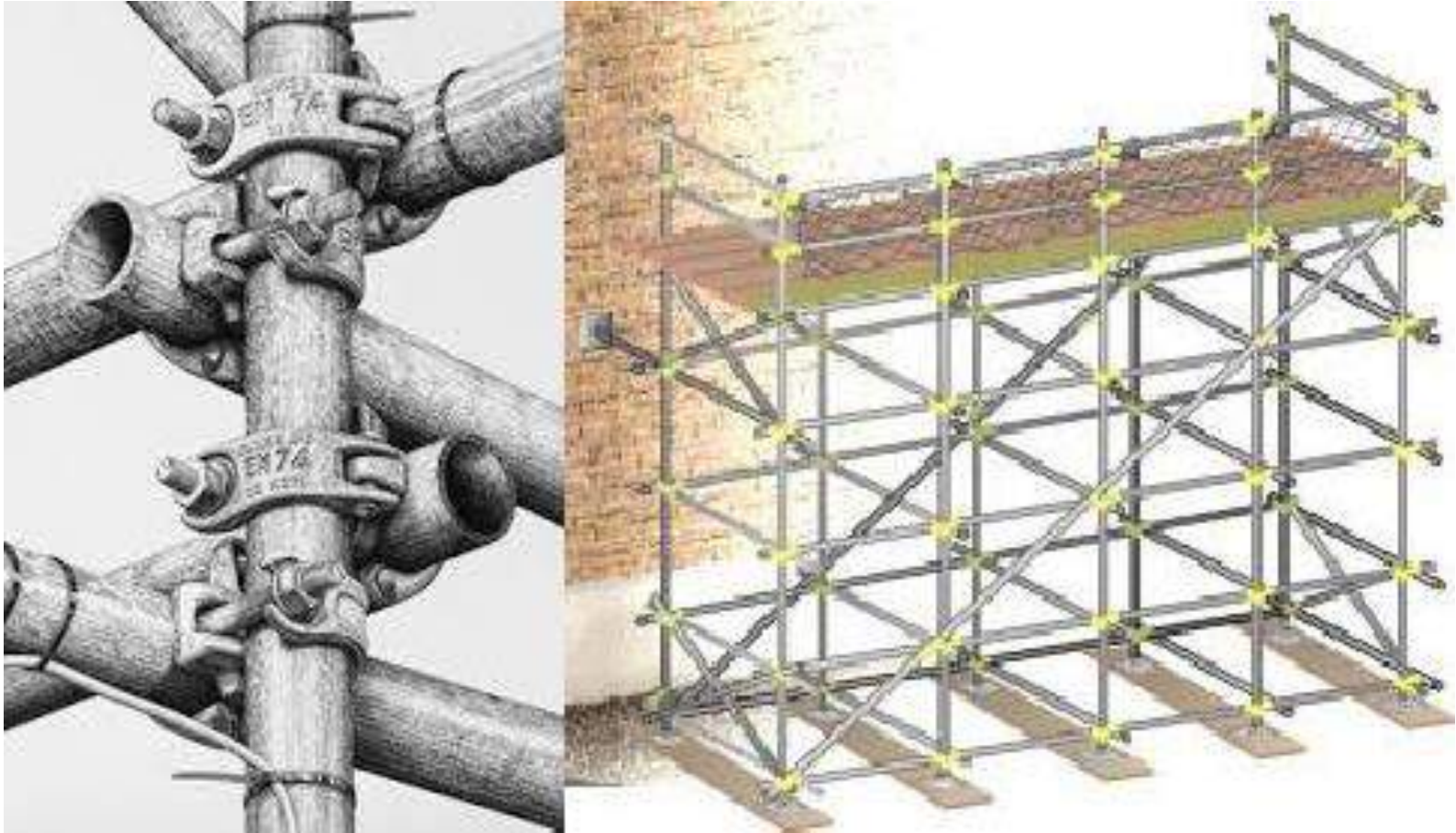
- > Perancah Kuda-Kuda (Trestle Scaffold), Perancah yang disangga oleh kuda-kuda





MATERIAL SCAFFOLDING

1. TUBULAR SCAFFOLDING



PIPA



JENIS PIPA	DIMENSI	BS 1139 : 82/85	AS 1576.3 / 91	JIS G3444 STK 51
BLACK STEEL TUBE	Diameter Luar	48,3 mm ($\pm 0,5$ mm)	48,3 mm ($\pm 0,5$ mm)	
	Tebal Pipa	4,0 mm ($\pm 0,5$ mm)	4,0 mm ($\pm 0,5$ mm)	
GALVANIS STEEL TUBE	Diameter Luar	48,3 mm ($\pm 0,5$ mm)	48,3 mm ($\pm 0,5$ mm)	48,6 mm ($\pm 0,5$ mm)
	Tebal Pipa	4,0 mm (± 10 %)	3,2 mm $\pm 0,48$ mm	2,4 mm
	Dimensi Berat	4.37 – 4,50 Kg/m	4.37 – 4,50 Kg/m	2,84 Kg/m
	Kelas/ Grade	Grade 4		Material Kelas 3

FITTINGS / CLAMB



**Fix Clamb/ Rigid
Clamb/ Double Clamb**



Dengan sudut tetap 90°,
untuk pengikatan persilangan (Crossing Clamb)
Ledger, Transom, Putlog, guardrail, dll.

(SWL)-Slip : 6,3 kN atau 642 Kgf
(British Standard) BS 1139.2

(SWL)-Slip: 0 - 1500 Kgf (Japanese Standard) JIS G3444
(**safety factor 4 SKB 174/86**)

(SWL)-slip actual = 1500 : 4 = **325 kgf**

1 Newton = 0,001 kN, 1 Newton = 0,1019 Kgf , 1 kN = 101,97 Kgf

FITTINGS / CLAMP



- (SWL)-Slip: 0 - 1500 Kgf (Japanese Standard) JIS G3444
 - (safety factor 4 *SKB 174/86*)
 - (SWL)-slip actual = $1500 : 4 = 325 \text{ kgf}$



Universal Clamb, Swivel Clamb, Rotation Fitting



Dengan sudut putar 360°

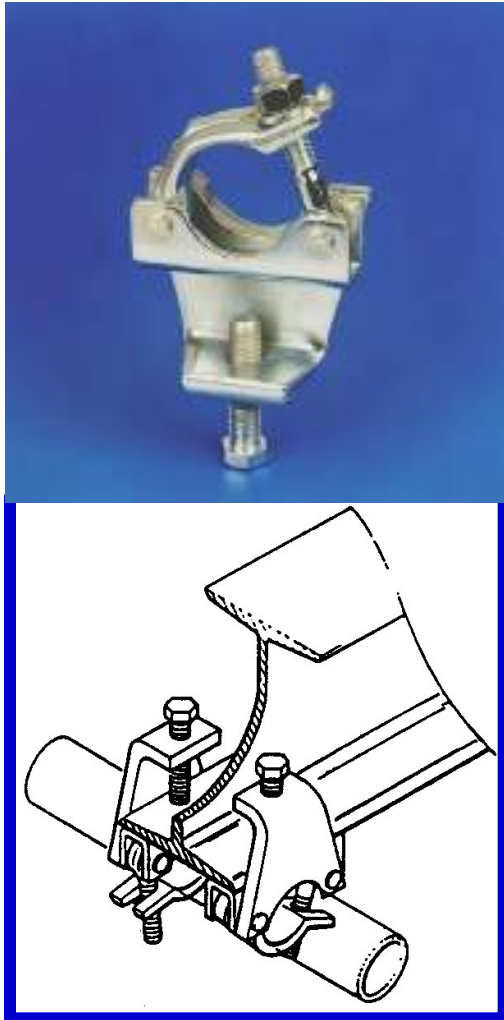
Pengikatan Breacing, Pipa Support, Overlap connection,
Palang pengaman pintu (gateway).

(SWL)-Slip : 6,3 kN atau 642 Kgf
(British Standard) BS 1139.2

(SWL)-Slip: 50 - 1000 Kgf (Japanese Standard) JIS G3444
(**safety factor 4** SKB 174/86)

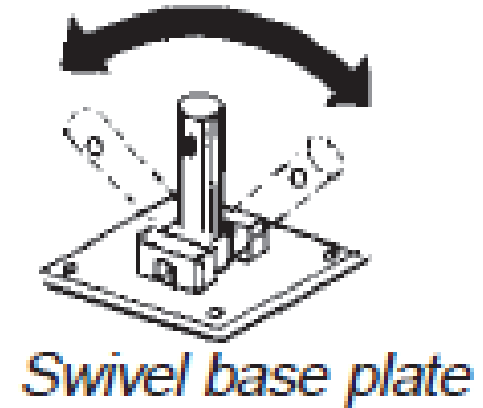
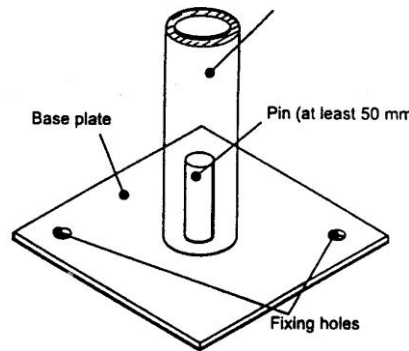
(SWL)-slip actual = 1000 : 4 = **250 kgf**

BEAM CLAMB



- BS 1139 / EN 74 :
 - Minimum Slip Load :
 - X-Ax : 1,0 KN
 - Y-Ax : 6,5 KN
 - Z-Ax : 3,0 KN
 - Berat : 1,4 Kg

BASE PLATE (Non Adjustable)

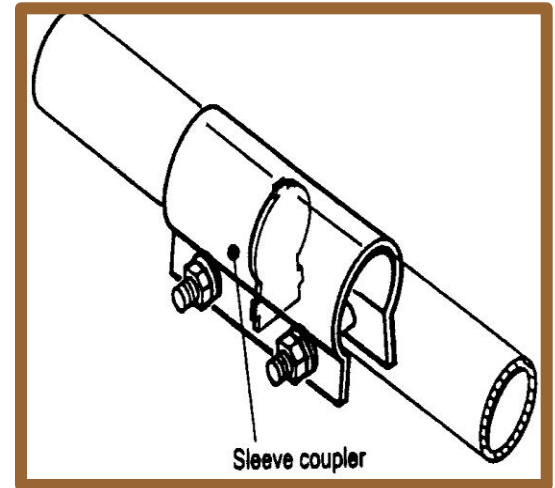


- **BS 1139 / EN 74 & AS 4576 :**
 - **Lebar Plat = 150 x 150 mm**
 - **Tebal Plat = 6 mm**
 - **Tinggi Pin : 100 mm, OD pin : 36 - 50 mm**
 - **Berat : 0,85 kg**
 - **SWL : Axiac Loads : 3 Ton**

CONNECTIONS



**Sleeve
Coupler**



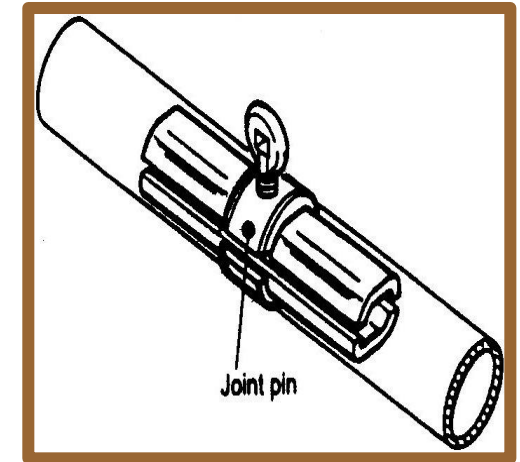
Sambungan Pipa untuk memperpanjang
Standart atau Ledger

- BS 1139 (EN 74) dan AS/AZS 1576:
 - Max. Slip Load (SWL) : $3,0 \text{ kN} = 290 \text{ Kg}$
 - Berat : $1,20 \text{ kg}$

CONNECTION



**Joint Pin/
Inner Joint**



Sambungan Pipa untuk memperpanjang
Handrail

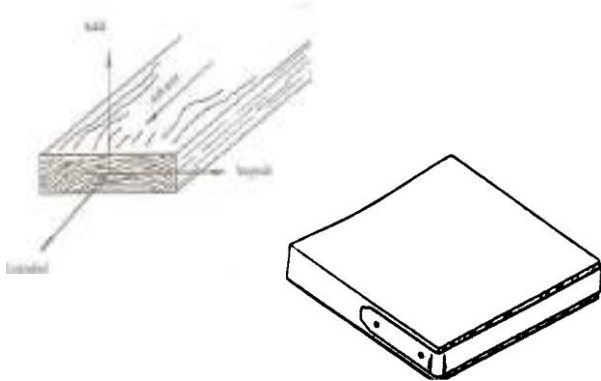
- **BS 1139 / EN 74 :**
 - Max. Slip Load (SWL) : $3,0 \text{ kN} = 290 \text{ Kg}$
- SWL – shear strength (tegangan geser) : $2,1 \text{ kN} = 2000 \text{ Kg}$**
- Berat : $0,85 \text{ kg}$

PLATFORM Plank (Papan kerja)

Wooden Planks Ketentuan SKB Menakertrans RI & PU
No: 174/Men/1986 & 104/Kpts/1986



Kayu yang digunakan harus berurat lurus, padat, Tidak ada mata kayu yang besar, kering, tidak melintir, tidak membusuk, tidak ada lubang ulat dan kerusakan lain yang dapat membahayakan



Papan lantai kerja dari kayu harus diberi plate metal yang biasa disebut *hoop iron* (*End Hoops*) dengan ketentuan Plate Seng (Zinc-coated), tebal plate 0,6 mm, min. Lebar 20 mm maximum tidak melebihi tebal papan. Dan panjang minimum 150 mm

Dimensi Papan Kayu (Wooden Planks)

Standard	Tebal (min)	Lebar	Panjang	Kelas/Jenis	Jarak Putlog	SWL
BS 2482:1981	38 mm (±3)	225 mm	2,5 m	Larix decidua	Max. 1,5 m	25 Kg/m ² #1)
	50 mm (±5)	225 mm		Picea Abies	Max. 2,0 m	40 Kg/m ²
	63 mm (±5)	225 mm		(White wood)	Max. 2,5 m	60 Kg/m ²
AS 1576 / 1577	38 mm (±2)	225 mm	2,4 m	Pinus sylvestris #2)	Max. 1,5	25 Kg/m ² #3)
JIS/Japanese #4)	25 mm	300 - 400 mm	2,2 m	Larix Kaempferi #2)	Max. 0,75 m	20 Kg/m ² #4)
	28 mm	300 - 400 mm	2,85 m		Max. 0,5 m	30 Kg/m ² #4)
SKB 174 & 104/86 Indonesian	JIS Referen	JIS Referen	JIS Reperen	Kayu Kelas 1 & 2 #5)	Max. 0,9 m	SNI Kayu/ 2002 #5)

Ref :

- 1) BS 5973:1993, Access & worked scaffold
- 2) BS 2482: 1981, Timber scaffold board
- 3) AS/NZS 1576: Guideline for scaffold
- 4) Training Book JICA-NAKERTRANS
- 5) SNI Kayu Indonesia, Konsensus 2002

KLASIFIKASI KAYU PLANKS

Peraturan Konstruksi Kayu Indonesia (SNI Kayu 2002, Bahan Konsensus)

- **KELAS I: CEMARA, ULIN, PETALING, KRANJI, MERBAU**

Tegangan lentur izin = 150 kg/cm^2

Tegangan tarik/tekan izin = 130 kg/cm^2

Tegangan tekan tegak lurus serat izin = 40 kg/cm^2

Tegangan geser izin = 20 kg/cm^2

- **KELAS II: KAYU KELAS II: JATI, MERANTI PUTIH, MERAWAN**

Tegangan lentur izin = 100 kg/cm^2

Tegangan tarik/tekan izin = 85 kg/cm^2

Tegangan tekan tegak lurus serat izin = 25 kg/cm^2

Tegangan geser izin = 12 kg/cm^2

- **KELAS III: CEMPAKA, MELUR, WARU GUNUNG.**

Tegangan lentur izin = 75 kg/cm^2

Tegangan tarik/tekan izin = 60 kg/cm^2

Tegangan tekan tegak lurus serat izin = 15 kg/cm^2

Tegangan geser izin = 8 kg/cm^2

Papan Kerja Metal (Metal Planks)



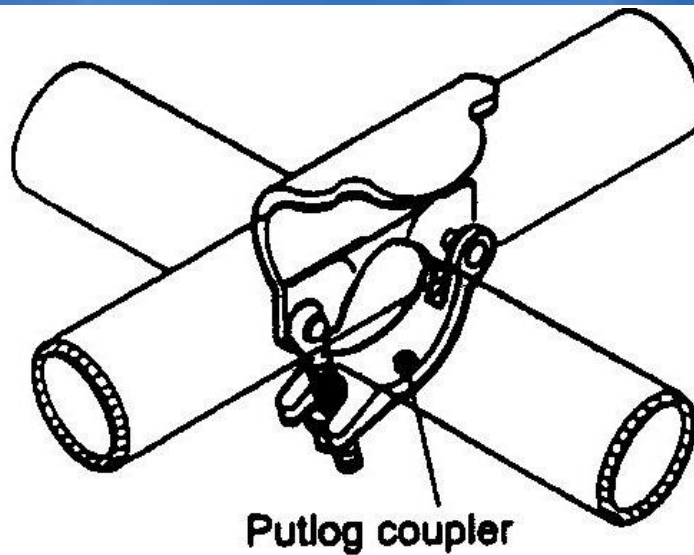
Penggunaan material metal (steel atau alumunium) untuk lantai kerja juga di izinkan baik di Indonesia atau pun dibeberapa negara

Referensi Standard :

British Standard BS 1139 part.2
EN74, Australian Standard AS/NZS
1577, AS/NZS 4576 & NZS 3620,
American Standard ANSI 10.8,
Singapore Standard SS 280

FITTINGS

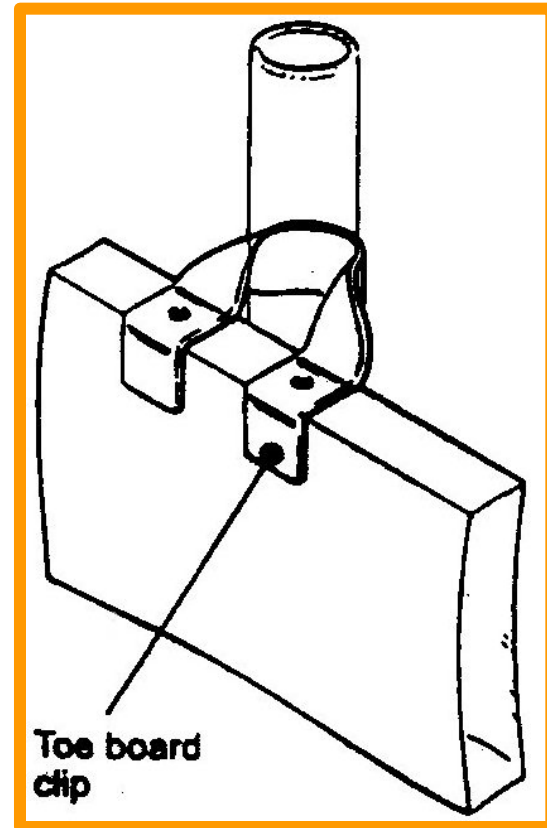
Put log Fitting



- Berat : 1 Kg

FITTINGS

Toe board Clip



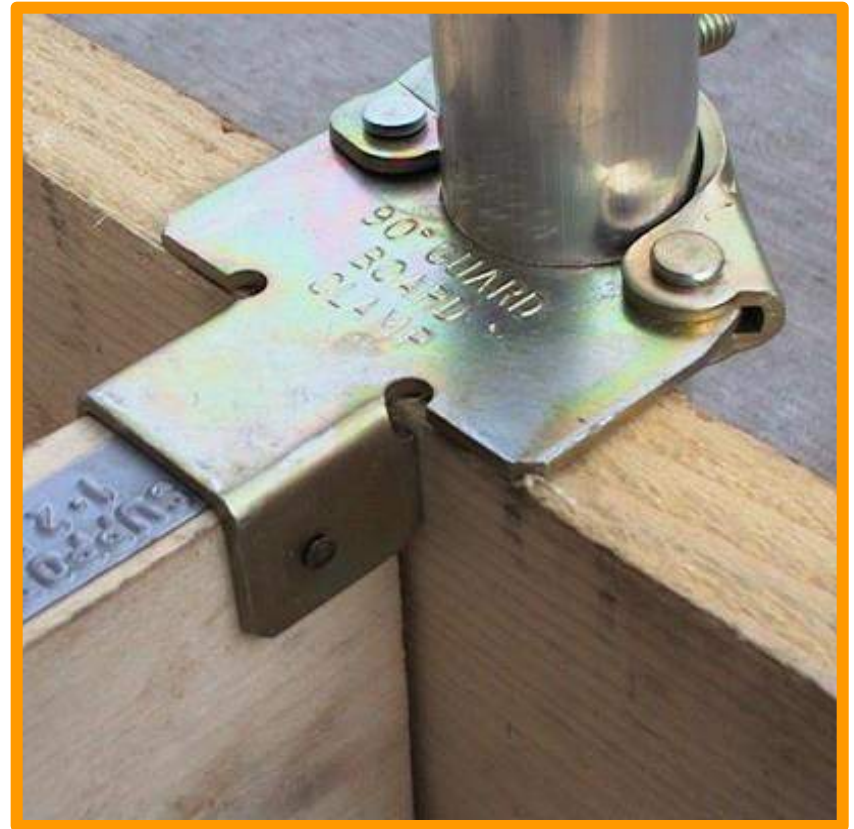
FITTINGS

Toe board Clip



FITTINGS

Toe board Clip

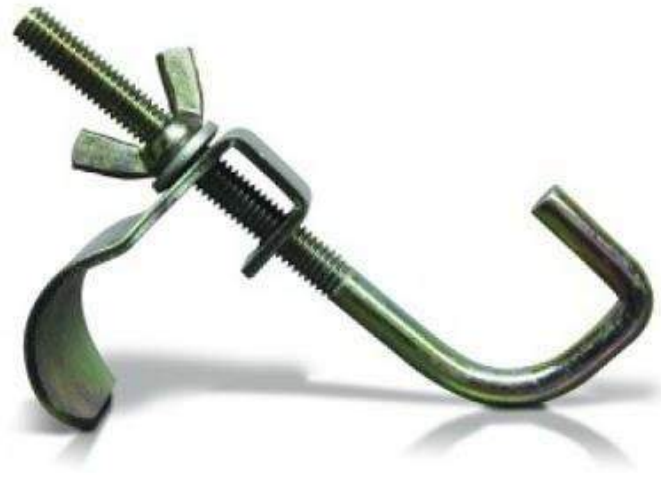


FITTINGS

Plank Clamp



TANGGA & CLAMB TANGGA





CLAMB COVER



SAFETY END PIPE

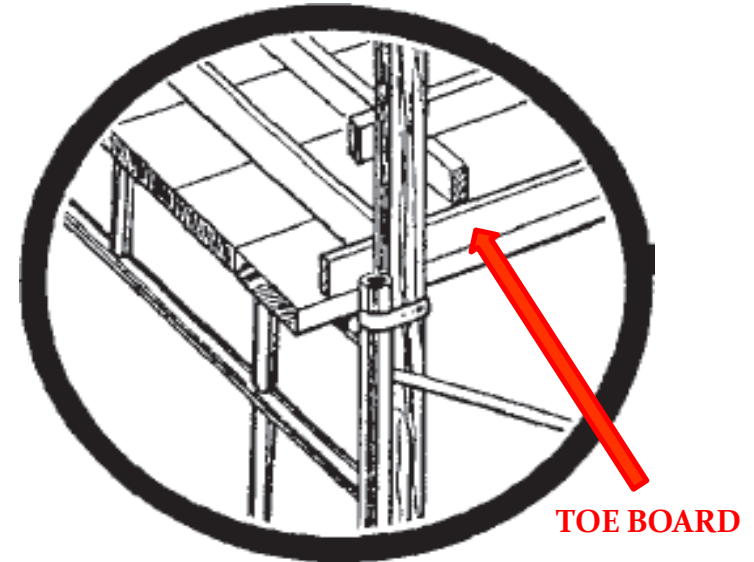
WOODEN SOLE BOARD (TIMBER) & TOE BOARD

SOLE BOARD



- BS 1139 / EN 74 :
 - Lebar 225 mm
 - Tebal Min. 3,8 cm (BS 2482: 1981)

TOE BOARD

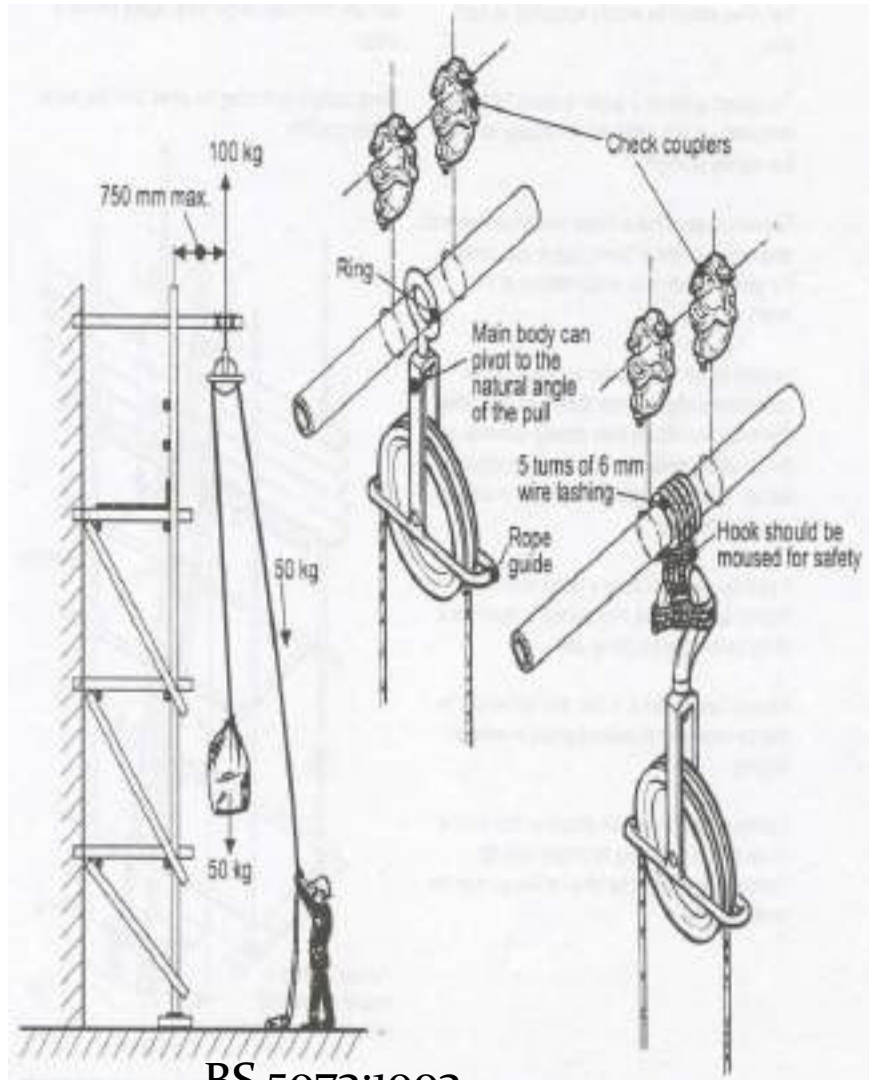


Standard	Tebal (min.)	Lebar (min)	Panjang
BS 2482:1990	15 mm	200 -250 mm	2,4 m
AS 1576	15 mm	200 mm	2,5 m
JIS	25 mm	100 mm	
SKB 174 & 104/86	25 mm	150 mm	

Kayu Kelas 2 atau 3 diizinkan

FITTINGS

Gin Wheel/ Katrol

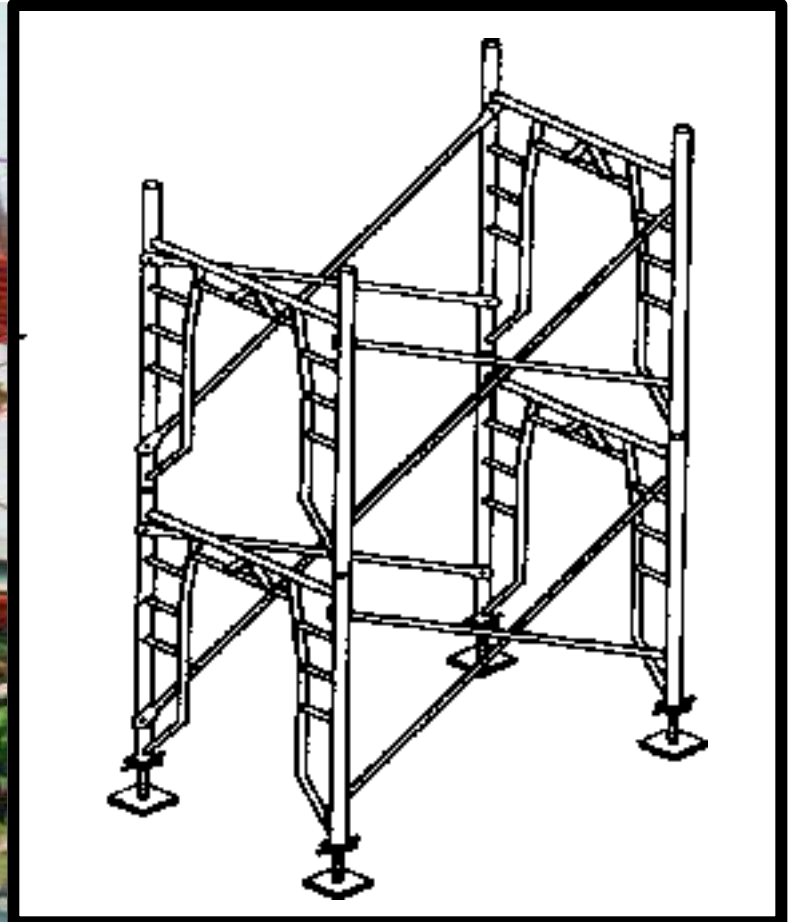


BS 5973:1993

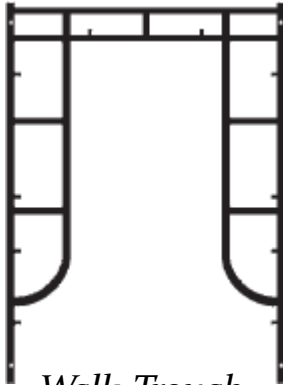


- AS/NZS 1576:
 - Maximum Load: 50 Kg
(pada Outrigger/ overhang panjang max 60 cm dan tinggi max. 25 m)

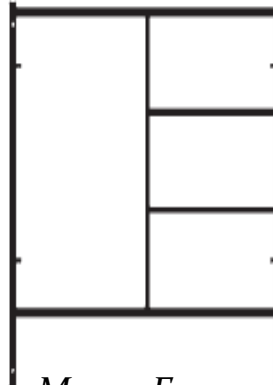
2. STEEL FRAME SCAFFOLDING



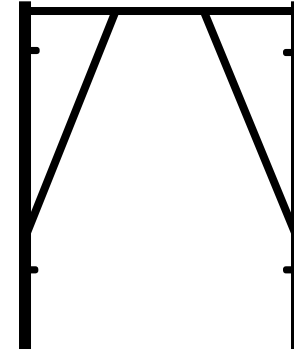
Jenis-Jenis Main Frame



*Walk-Trough
Frame*



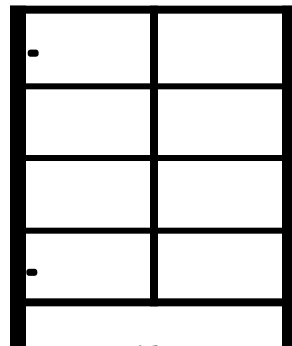
Mason Frame



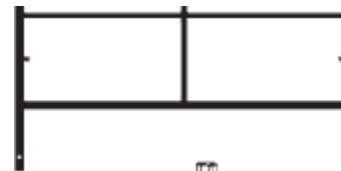
A-Trough Frame



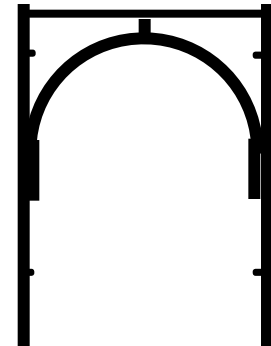
Single Box Frame



*Double Box
Frame*



*H-Walk Railing
Frame*



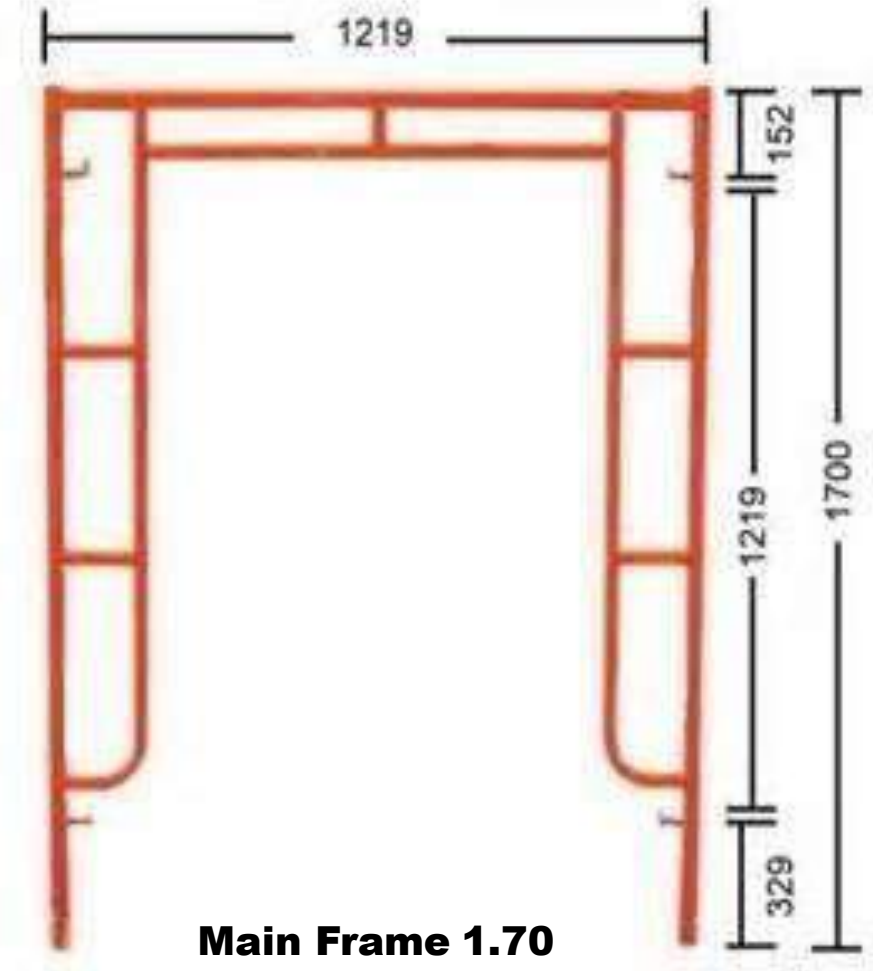
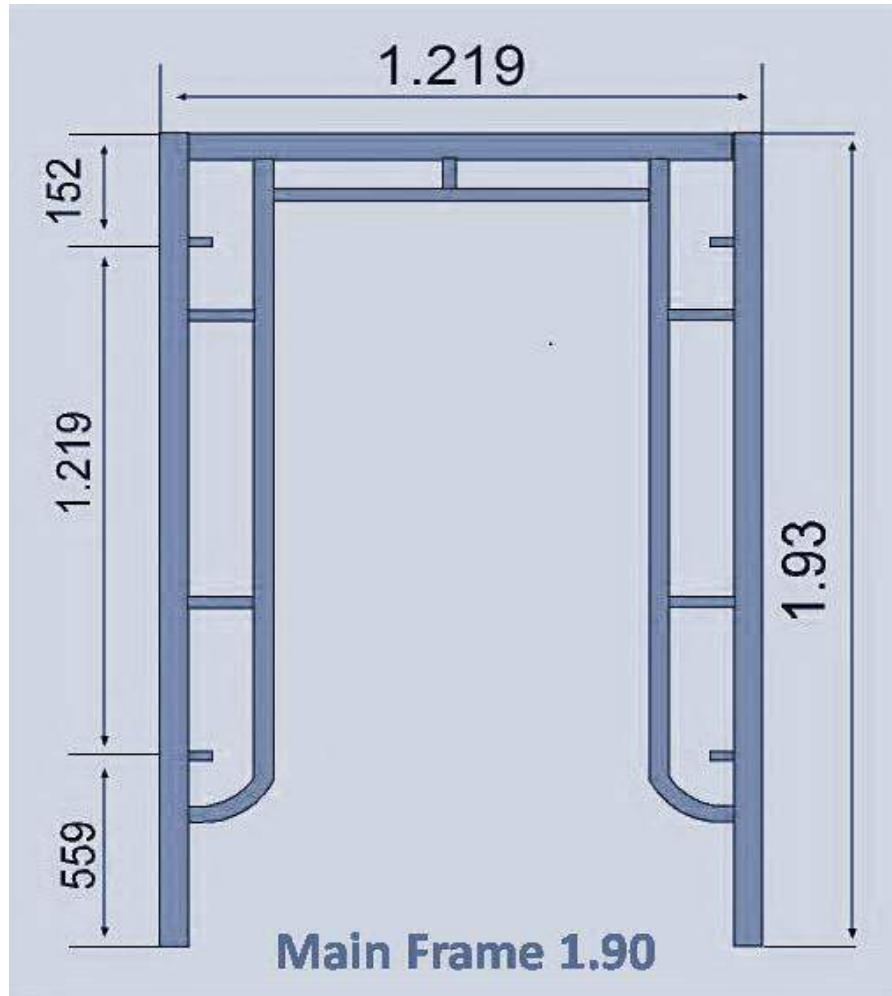
*Classic Door
Frame*

UKURAN-UKURAN MAIN FRAME

Realitas di Indonesia

NO	LEBAR	TINGGI	JARAK ANTAR CLEAT
1	762 mm: 914 mm	1524 mm	1219 mm
2	914 mm; 1219 mm	1700 mm	1219 mm
3	914 mm; 1219 mm	1930 mm	1219 mm
4	914 mm; 1219 mm	984 mm	487 mm

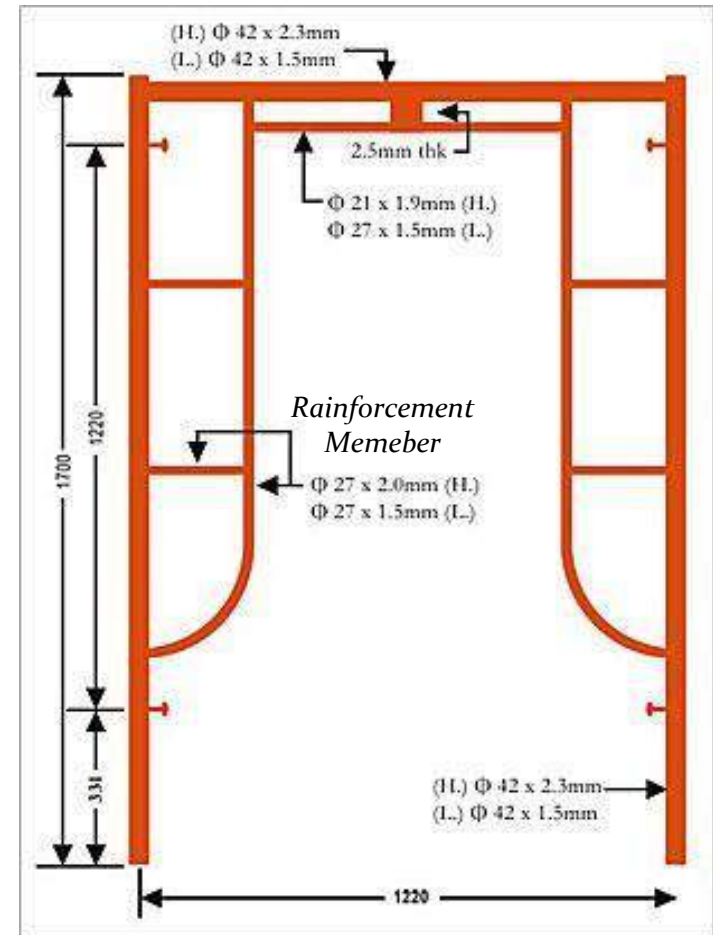
WALK-TROUGH FRAME



SPESIFIKASI PIPA MAIN FRAME SCAFFOLDING

Ref. JIS G3444 dan Standard Teknis Kekuatan (STK 51) JICA-NAKER Training Book

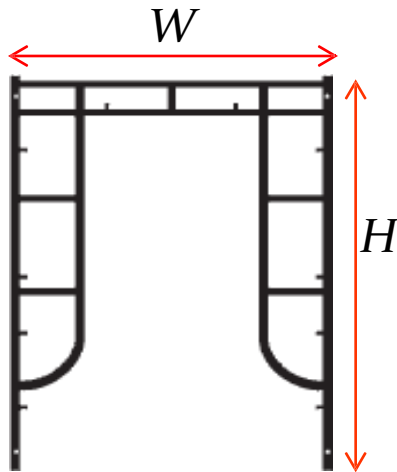
- Pipa Baja Karbon (Black Steel) atau Pipa berlapis Timah (galvanize Steel)
- Pipa Vertical & Horizontal dengan Diameter **35 mm** atau **1¼ inch**, Ketebalan min. 2.4 mm (toleransi= - 0.1 mm)
- Diameter 27 mm (1 inchi) untuk Pipa (Rainforcement Member) Pendukung, Tebal 2,0 mm



SPESIFIKASI MAIN FRAME SCAFFOLDING

Ref. [ASTM A 1011/A 1011M-05a](#) & [ANSI/SSFI SC100-5/05](#)

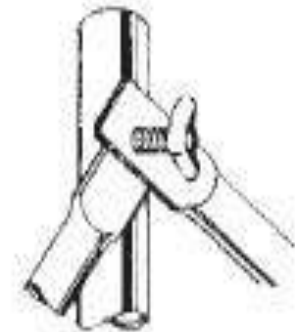
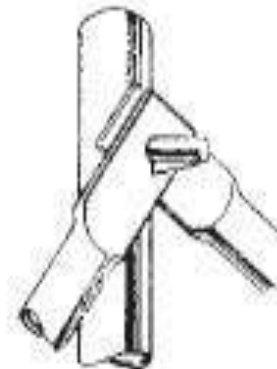
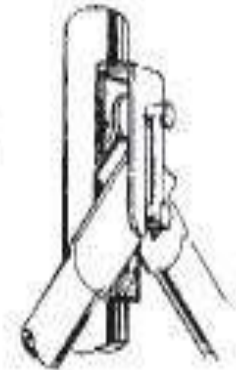
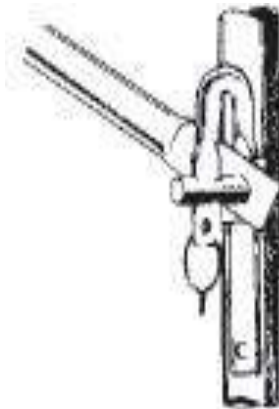
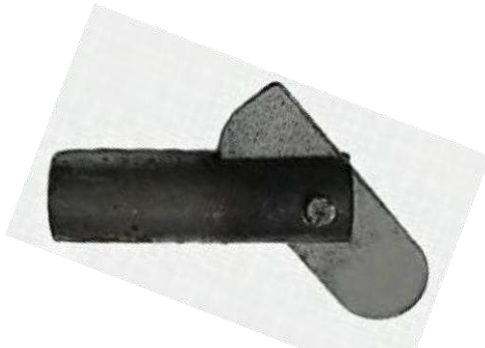
- Material Steel Grade Q345B (astm)
- Diameter luar **1,77 Inch = 45 mm**
- Tebal Pipa 0,165 Inch = 4,19 mm
- Yield Strength (Tegangan Luluh) 50.000 psi = 3515 Kg/m²
- Tensile Strength (Tegangan Tarik) 68.000 psi = 4780 Kg/m²



Specificat ion (W – H)	Allowable Working Load	Berat Frame
	(multi-tier configuration)	
762 – 1270 mm	3075 Kg	21,4 Kg
762 – 1727 mm	6830 Kg	26,9 Kg
762 – 1981 mm	3060 Kg	32,6 Kg
762 – 2235 mm	2680 Kg	35,6 Kg

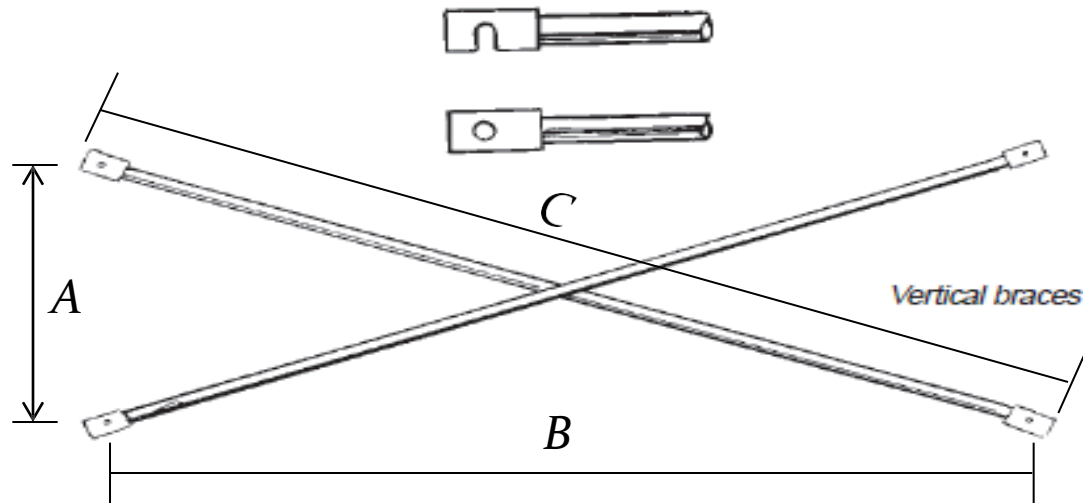
CLEAT/ FLIP LOCK

(PENGAIT CROSSBREACED)



SPESIFIKASI CROSS BRACED (FRAME)

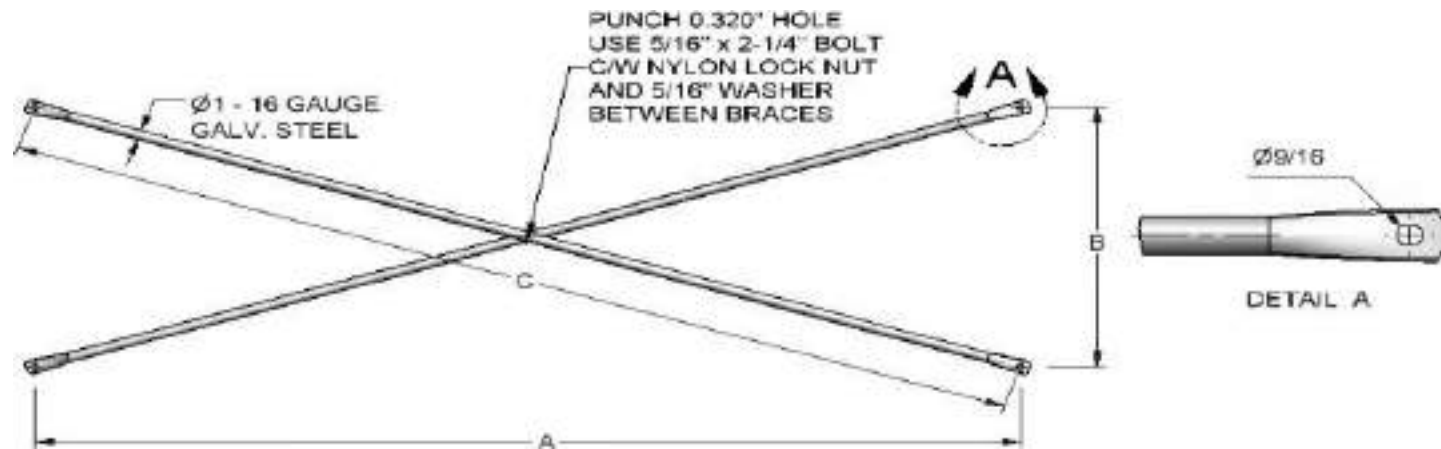
Ref. *JIS G3444 (JICA-MENAKERTRANS Book)*



NO	DIAMETER	PANJANG 'C'	JARAK CLEAT 'A'	SPAN OF BAY 'B'
1	21, 7 mm 27,2 mm	1657 mm	1219 mm	1122 mm
2		1911 mm	1219 mm	1471 mm
3		2197 mm	1219 mm	1829 mm

SPESIFIKASI CROSS BRACED (FRAME)

Ref. *ASTM A 1011/A 1011M-05a & ANSI/SSFI SC100-5/05*

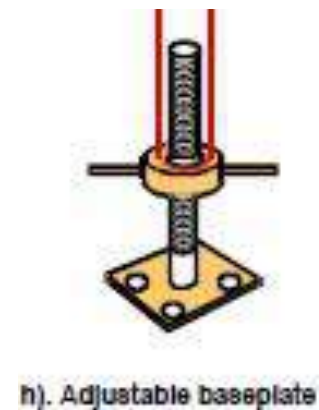
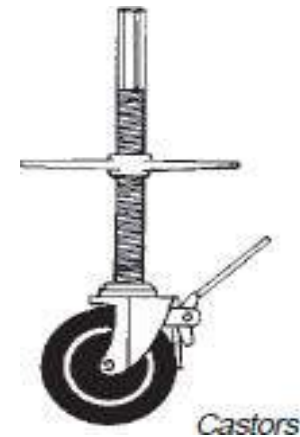
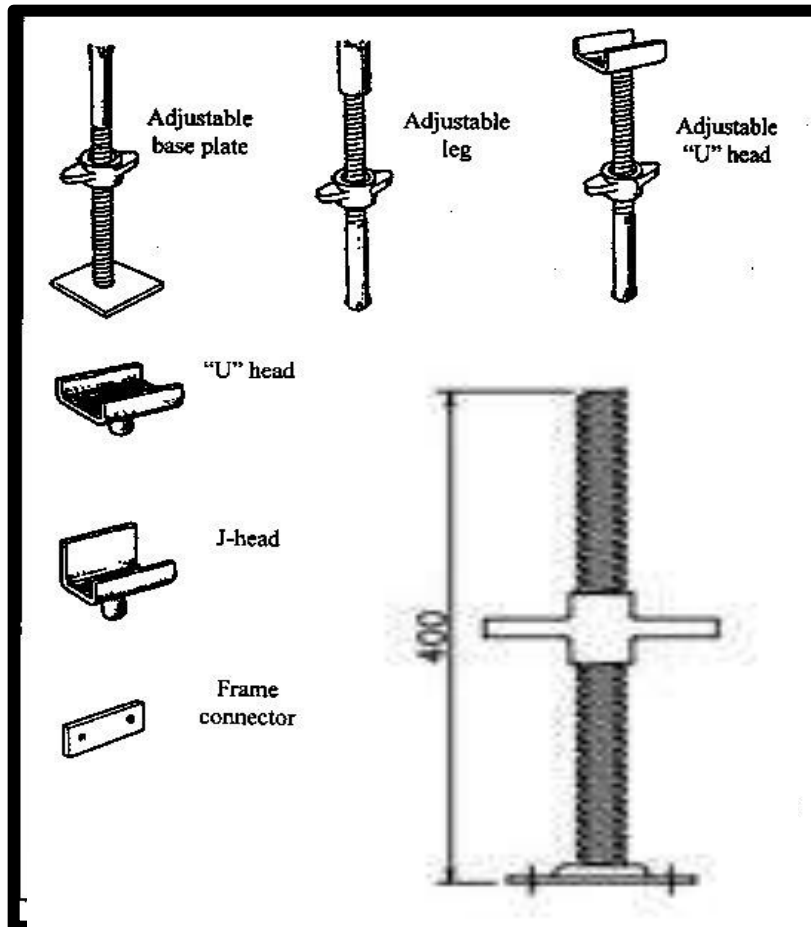


Specification (A – B)	Berat Cross Braced
1010 mm – 1010 mm	3,8 Kg/ Pcs
1270 mm – 1010 mm	4.3 Kg/ Pcs
1524 mm – 1010 mm	4.8 Kg/ Pcs
1778 nmm – 1010 mm	5.4 Kg/ Pcs

Dimameter luar : 1 Inch = 25 mm
 Tebal Pipa : 0,073 inch = 1,8 mm
 Steel Grade : Q235 (astm)

Yield Strength : 34.000 psi =
 (Tegangan Luluh:15.300 Kg/m²)
 Tensile Strength : 54.000 psi
 (Tegangan Tarik : 24.300 Kg/m²)

JACK BASE – CASTOR – U.HEAD



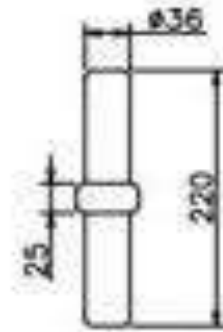
CONNECTION & ARM LOCK



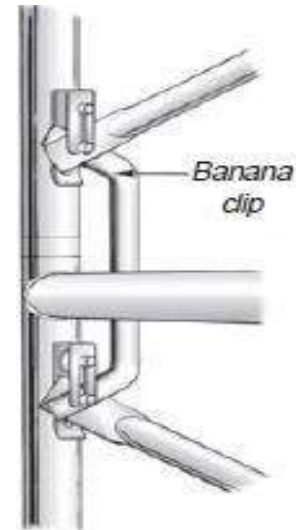
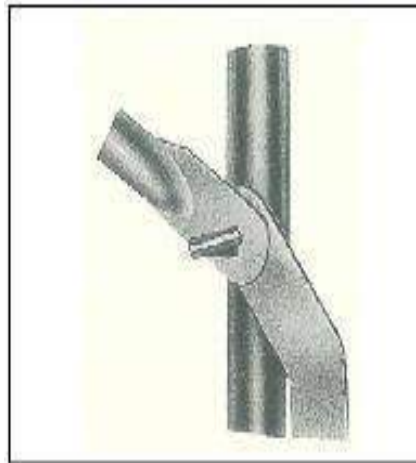
Coupling pins—used to connect frames together



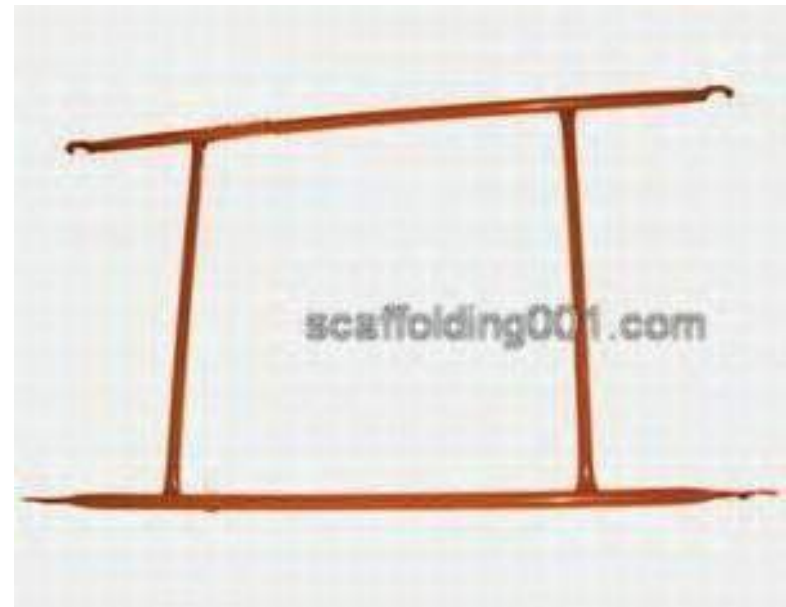
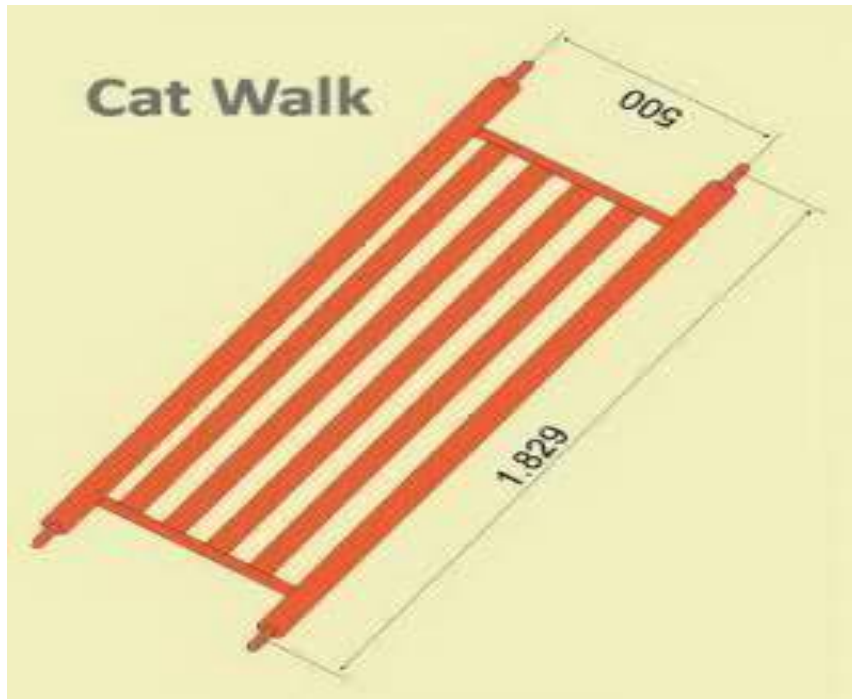
Spring-loaded pin lock



INSERT PIN



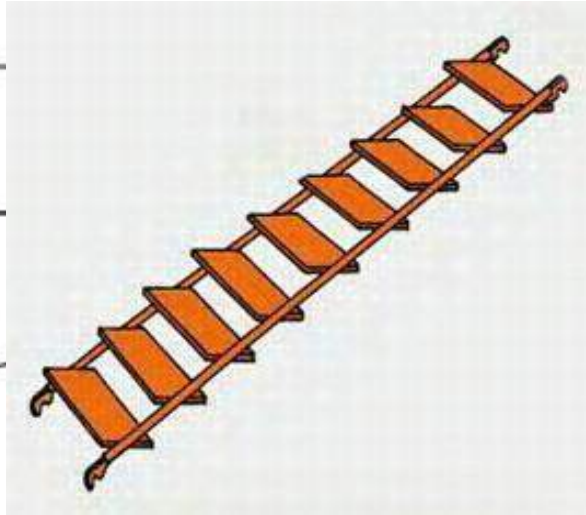
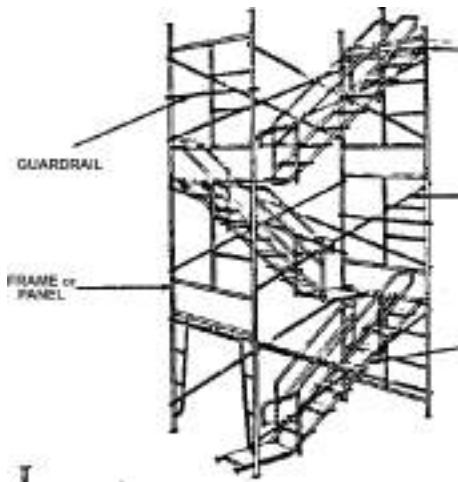
CATWALK / HORIZONTAL LEDGER



PLATFORM/ LANTAI KERJA



TANGGA/ SCAFFOLD LEDDER



- Lebar 40 - 60 cm
- Mampu menahan beban min. 100 Kg/ anak tangga



Lantai Kerja (Platform)

Papan Kayu :Lebar 22,5 - 30cm, Tebal min. 2,3 cm
Kayu Kelas I dan 3,5 cm Kayu Kelas II
Panjang papan kayu min. 2,0 m

Metal Planks (Blacksteel atau Alumunium):
Panjang 1,85 m (Menggunakan HookPlank)
Panjang min. 2,0 m (Tanpa HookPlank)

Catwalk

Harus memiliki Pengunci (Hook-Lock)
Celah min. 3 cm

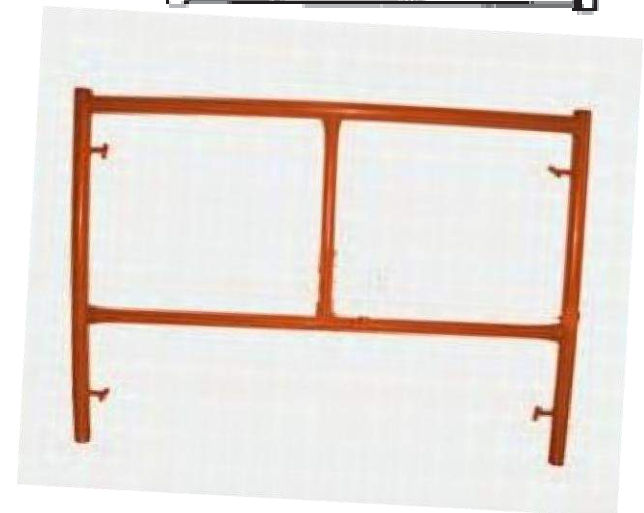
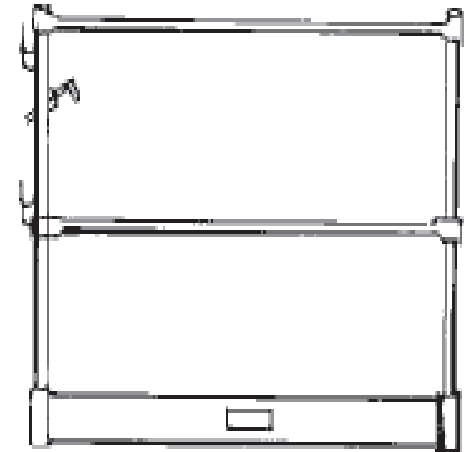
GUARDRAIL PART(PABRICATION)



Guardrail posts



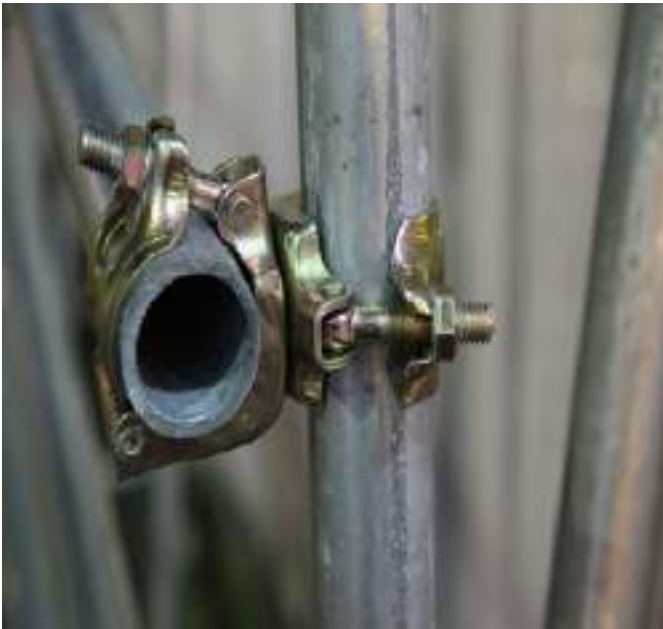
Manufactured guardrail section



Member	Constitutional part	Dimensions (mm)	Load test requirement
Vertical frame	Standard and horizontal member	42.7 x 2.5	Vertical deflection under 9.81 kN = 10 mm max.
	Reinforcement member	27.2 x 2.0	Compressive strength of standard = 73 kN min. for for 1.8 m and 68 kN for higher than 1.8 m. height.
	Cross brace pin	14.0	
Cross brace	Brace member	21.7 x 2.0	Compressive strength = 7.3 kN minimum
	Hinge pin	7.5	Strength of hinge pin = 5.88 kN minimum
Horizontal frame	Tube member	42.7 x 2.5	Vertical deflection = 10 mm max.
	Transverse member	34.0 x 2.3	Bending strength = 4.9 kN min.
	Grip fitting or hook	8.0	
Catwalk	Catwalk member	500 x 1.2	Vertical deflection = 10 mm max. Bending strength = (width in mm x 0.0108) kN min.
	Clamp or hook	8.0	Shearing strength =(width in mm x 0.0353) kN min.
Base plate	Shank	35	Compressive strength = 59.8 kN min.
	Baseplate	140 x 140	
Bracket			Under strength test, slip = 10 mm max. Strength = 39.2 kN (fixed type), 22.76kN (adj.type)
Armloack			Elongation = 2 mm max. Strength = 5.88 kN min.
Wall tie			Tensile and compressive strength = 8.883 kN min

The national standard specification for steel frame scaffolding is being drafted by the Standard Writing Organisation (SWO) technical committee of the Malaysian Iron and Steel Industry Federation (MISIF) for the Standard Industries and Research Institute of Malaysia (SIRIM). The committee is represented by government departments,

Material Pendukung PIPA & CLAMB

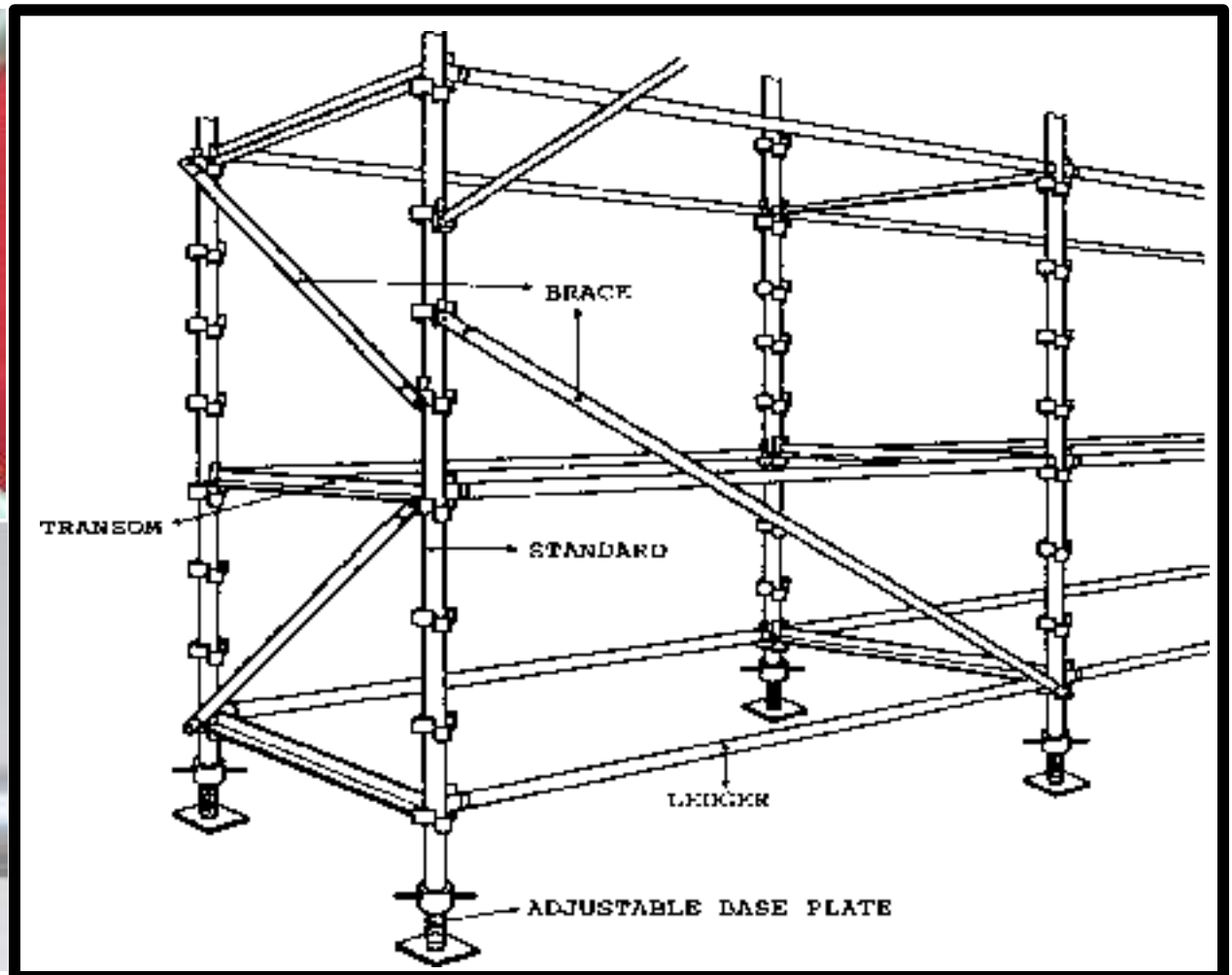


Pipa dan Clamb adalah Part/ Material TAMBAHAN namun merupakan material yang **penting** baik sebagai pendukung maupun sebagai alat untuk Meperkuat/ Rekayasa Engineering dari Perancah yang tidak aman/ tidak lengkap, contoh: Support, Ledge Frame,dll.

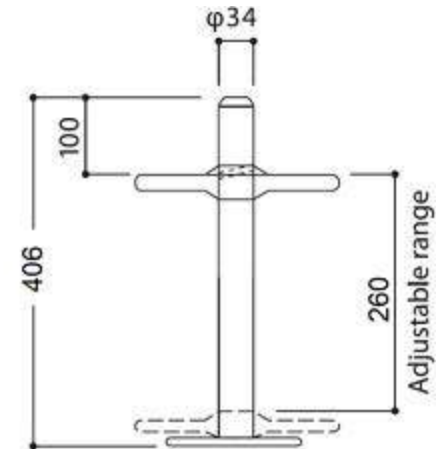
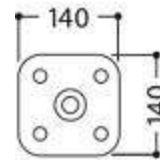
Pipa : Diameter Luar = 1 ½ inci (38 mm) Tebal: 2,4 cm (JIS Std)

Clamb : Japan Industrial Standard/ Singapore Standard

3. SYSTEM FREPABRICATION SCAFFOLDING/ MODULAR SCAFFOLD



JACK-BASE/ JACK SCREW



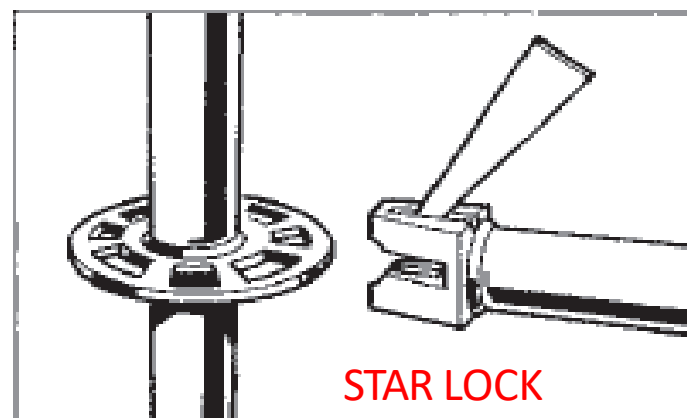
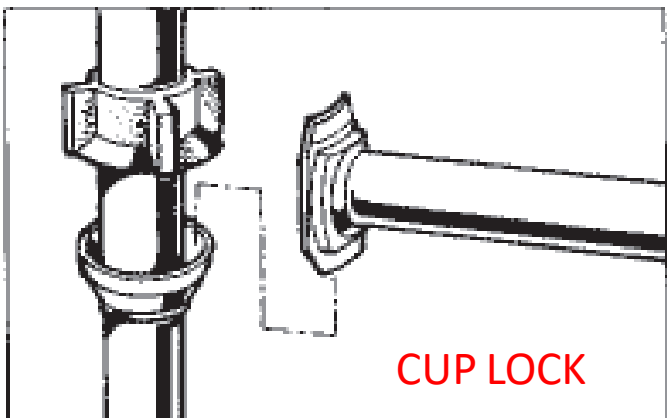
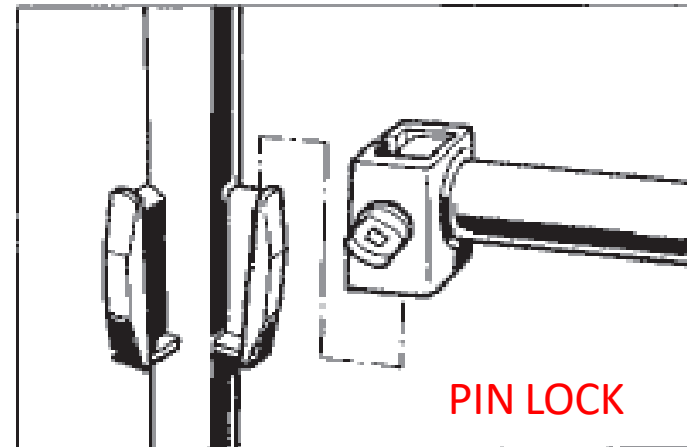
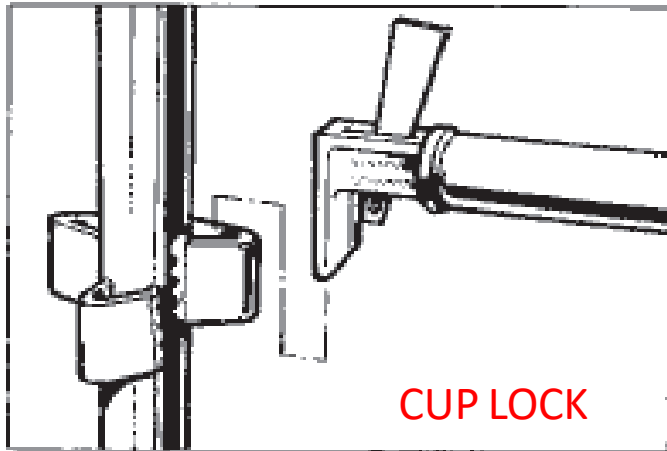
BASED COLAR



STANDARD



JENIS-JENIS PENGUNCI (Colar)



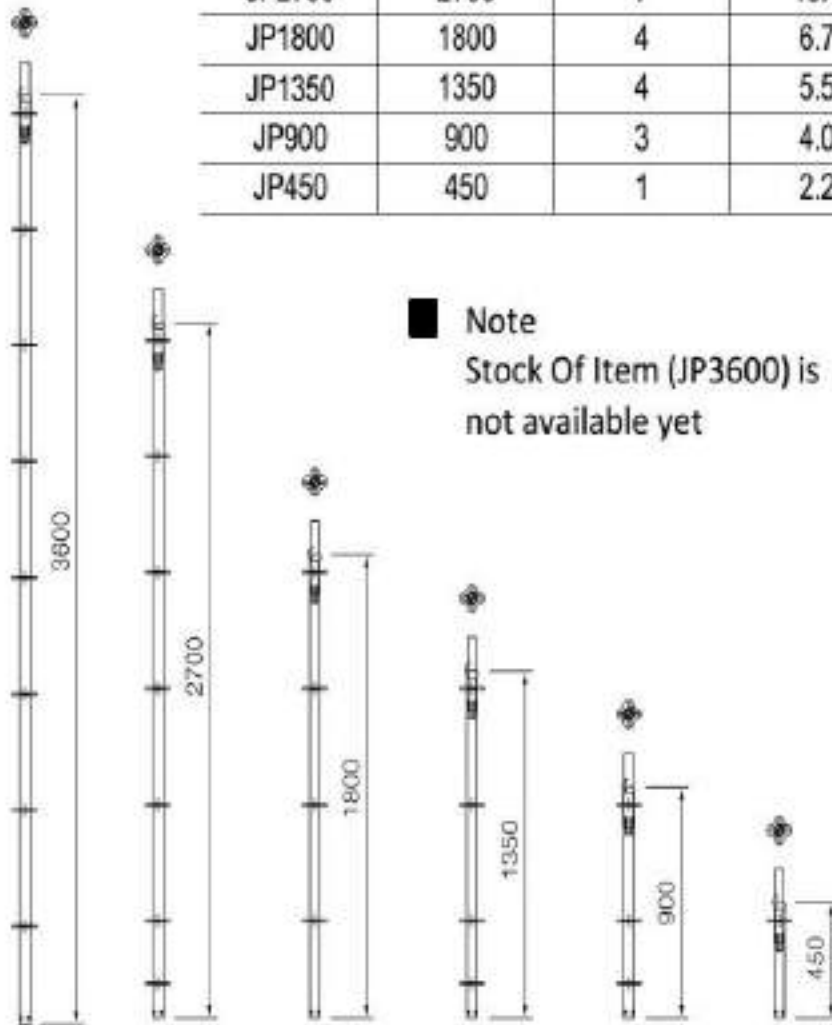
JENIS-JENIS COLAR/ SOCKET



STANDARD (VERTICAL)



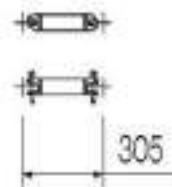
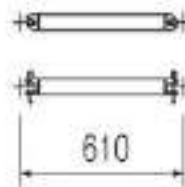
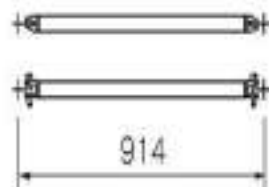
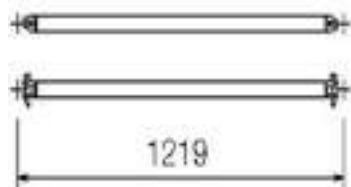
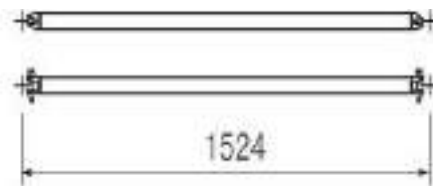
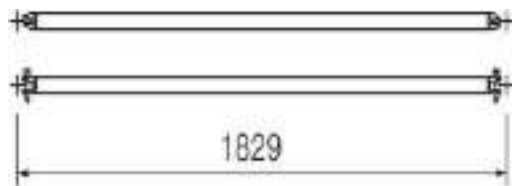
Model	L (mm)	Number of plates	Weight (Kg)
JP3600	3600	8	12.6
JP2700	2700	7	10.1
JP1800	1800	4	6.7
JP1350	1350	4	5.5
JP900	900	3	4.0
JP450	450	1	2.2



Note
Stock Of Item (JP3600) is
not available yet



LEDGER / TRANSOM (HORIZONTAL)



Model	L (mm)	Weight (Kg)
JR1829	1829	4.4
JR1524	1524	3.7
JR1219	1219	3.0
JR914	914	2.3
JR610	610	1.6
JR305	305	1.0

SPRIDER TRANSOM



STANDARD CONNECTION



PLANK/ FLATE FORM



DIMENSI PERLENGKAPAN MODULAR SCAFFOLDING

- UKURAN PANJANG PERLENGKAPAN MODULAR SCAFFOLD SUAH DITENTUKAN DARI PABRIK BAIK STANDARD DAN LEDGER

STANDARD : Panjang diantaranya
4,0 – 3,0 – 2,0 – 1,5 – 1,0 – 0,5 meter

LEDGER : Panjangnya diantaranya
2,4 – 1,8 – 1,2 dan 0,7 meter

Note: Ukuran ledger dapat pula dipergunakan sebagai Transom

Jarak pengunci (Base Colar)berjarak 0,5 meter
antara satu dengan yang lainnya

PLANK : Panjangnya
2,4 – 1,8 dan 1,2 meter

BRACE : Panjangnya
3,6 dan 2,7 meter