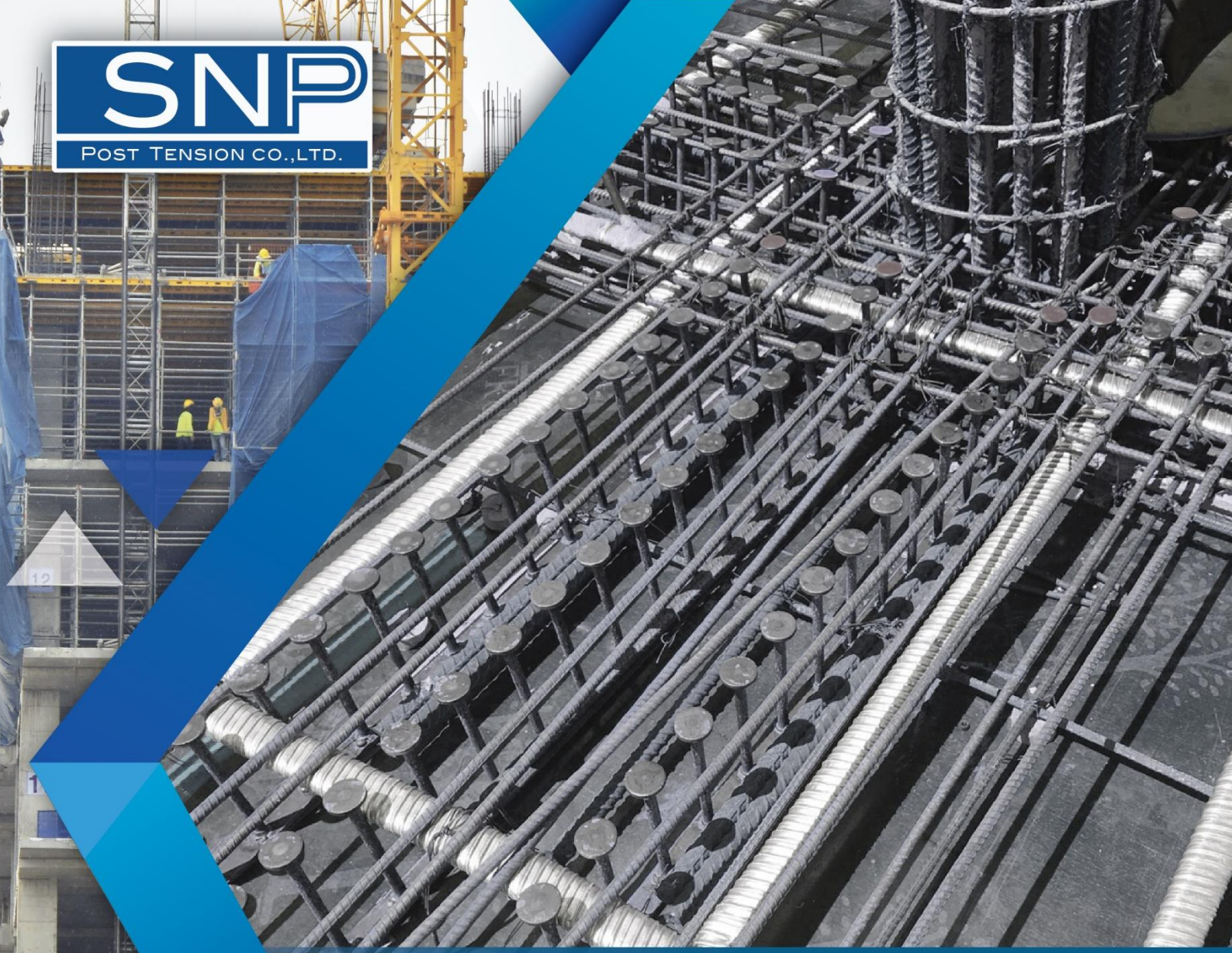
SNP
POST TENSION CO.,LTD.



SNP POST TENSION CO.,LTD.



SNP Punching Shear Stud

Product of Post-Tensioned System

02-985-2357 WWW.SNP-POST.COM

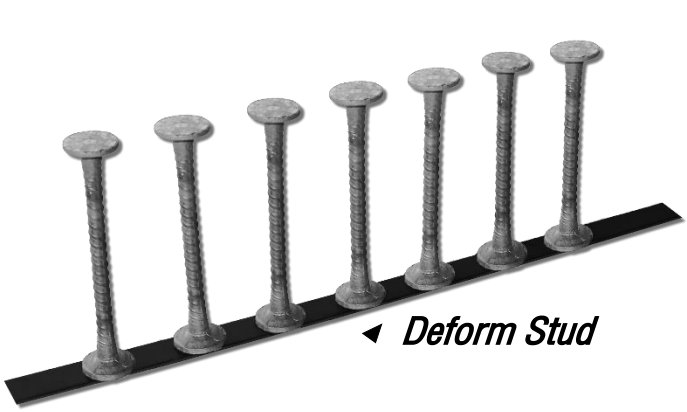
110/18 ม.2 ต.มหาสวัสดิ์ อ.บางกรวย จ.นนทบุรี 11130

Dowload file

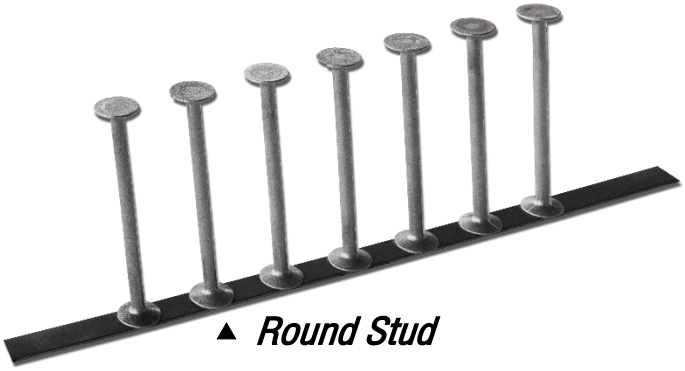
Snp-post.com

Project Reference Facebook Fanpage

SNP shear stud

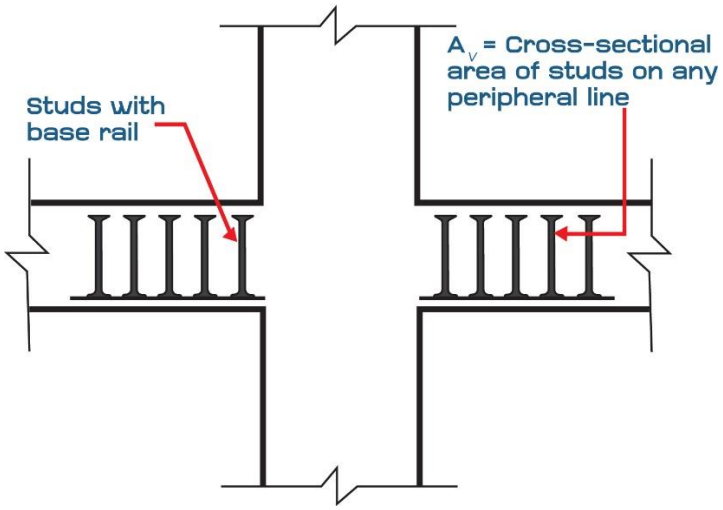


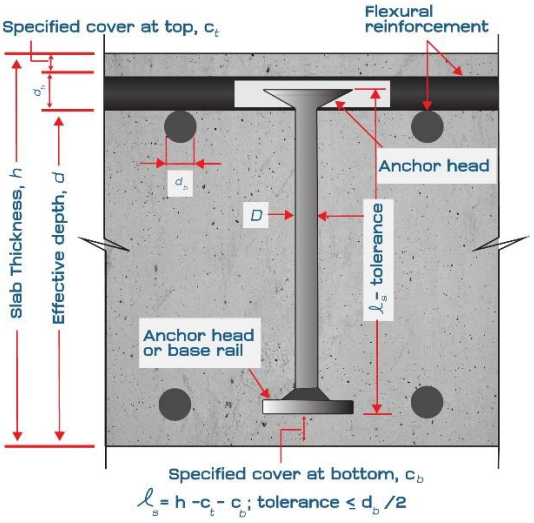
◄ *Deform Stud*



▲ *Round Stud*

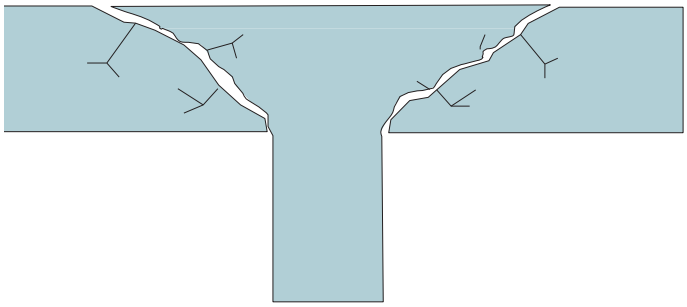
Standard specification for steel stud assemblies for shear reinforcement of concrete ASTM A1044 has also allowed the use of double-headed studs produced from ribbed steel. SNP STUDS are produced from ribbed reinforcement, which has higher yield strength more than 3,500 ksc. Diameter of stud 12.7 mm. and 15.2 mm. Special studs can be supplied on request.



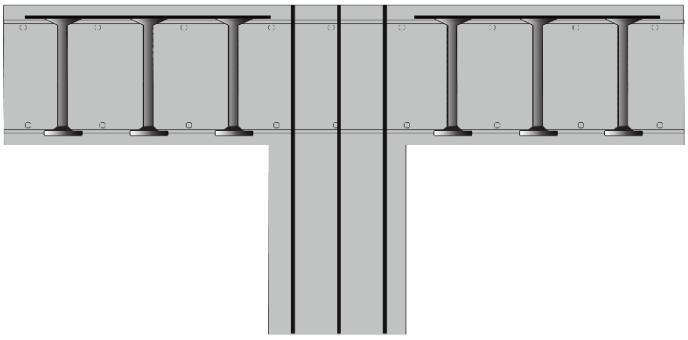


SNP punching shear stud rail.

The design of flat slab in the concrete frame buildings is becoming more and more popular. it offers great advantages such as reduced floor height and flat appereance, oprimised use of the space etc..However, due to the weight of the slab, if without an addtional proper



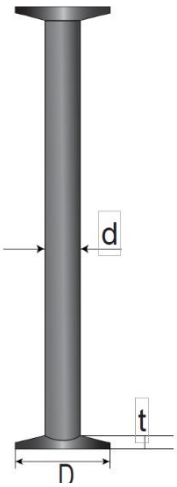
SNP punching shear reinforcement is composed of double headed studs welded on the strip rail. it is an ideal solution to the problem of punching shear stresses around the column head. Placed around the column head or base, The SNP stud anchors provide an additional reinforcement around the column so the shear load from the slab is transferred throuhg the anchors into the column.



Double Headed Studs

in acc. w/t EN 1992-1-1:2011-01 (Eurocode 2)

The heads of punching shear stud are hot-forged to 3 times of the shaft diameter to ensure the best performance of the slip resistance in accordance with DIN 1045 & EN 1992-1-1, the material of the stud is rebar BS500 or equivalant with a characteristic yield strength of 500Mpa. The length of the studs is according to the design of the depth of the slab.



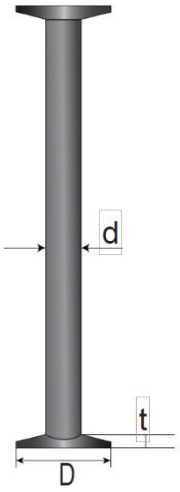
Stud Technical data

Stud Dia. Ød	Head Dia. ØD	Head thickness	Stud cross section	Head Cross section	Characteristic Yield Strength
mm	mm	mm2	mm^2	mm^2	Mpa
10	30	5	79	707	500
12	36	6	113	1,018	
14	42	7	154	1,385	
16	48	7	201	1,810	
20	60	9	314	2,827	
25	75	12	491	4,418	

Double Headed Studs

in acc. w/t ASTM A1044

The head cross section of punching shear stud is hot-forged to 10 times of the cross section of shaft to ensure the best performance of the slip resistance in accordance with ASTM A1044, the material of the stud is ASTM A29 grade 1020 or equivalent with minimum yield strength 51,000 PSI (350 MPa). The length of the studs is according to the design of the depth of the slab.



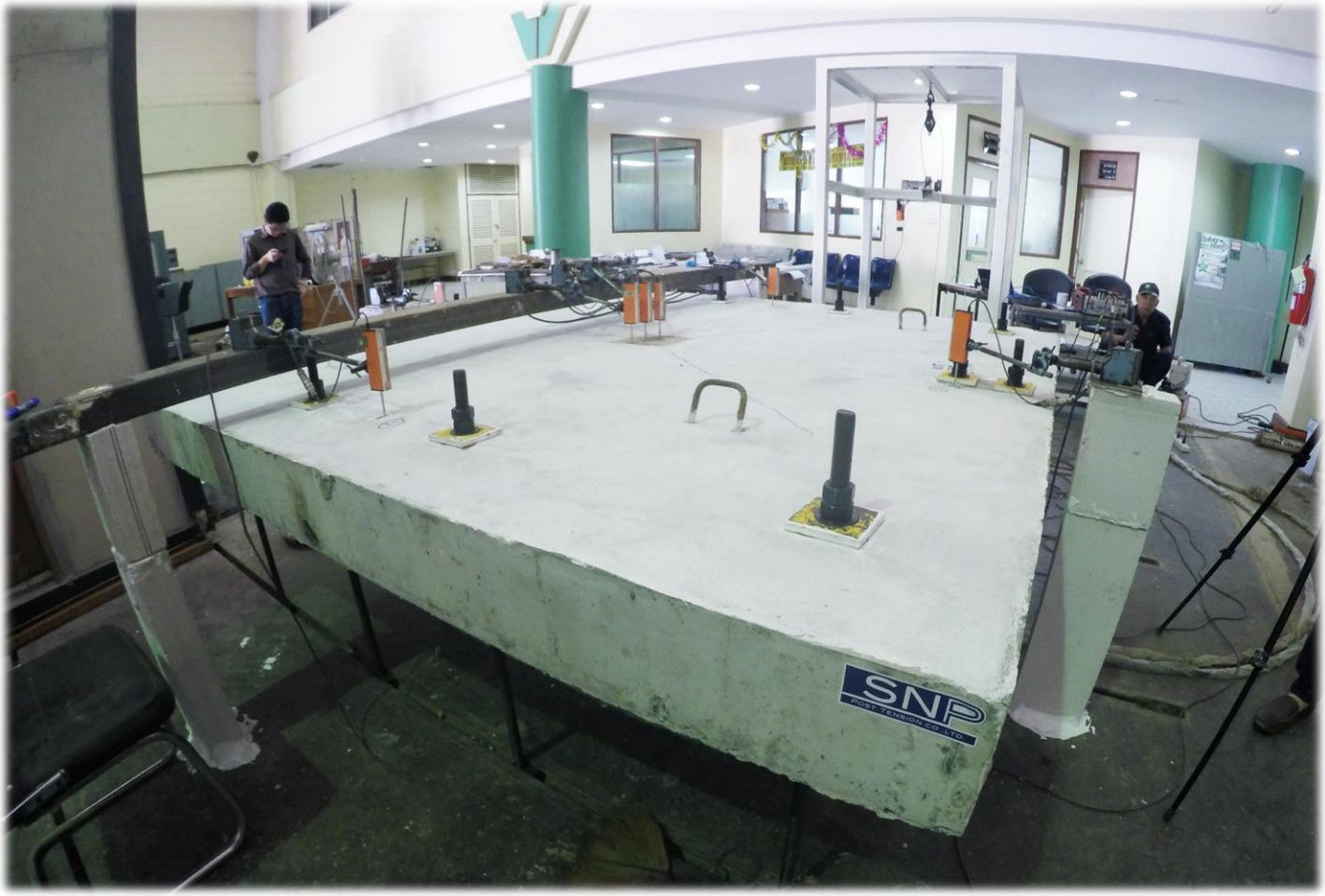
Stud Technical data

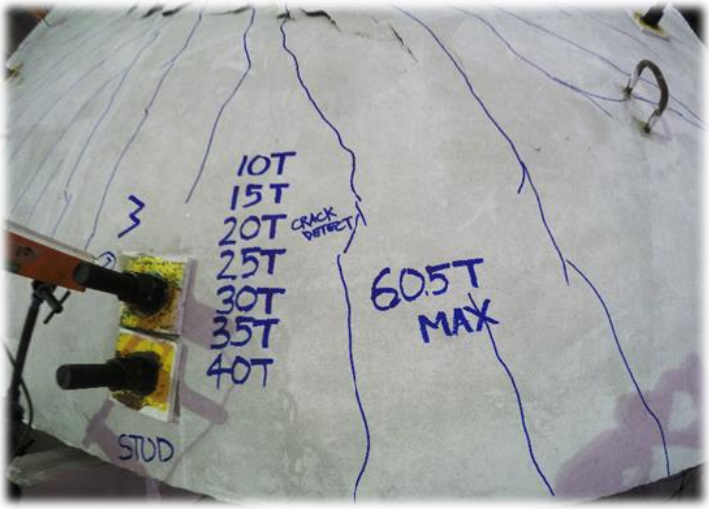
Stud Dia. Ød		Head Dia. ØD		Head thickness		Stud cross section		Head Cross section		Characteristic Yield Strength	
In.	mm	In.	mm	In.	mm	In. ^2	mm^2	In.^2	mm^2	KSI	Mpa
3/8	9.5	1.19	30.2	0.21	5.3	0.110	71	1.11	718	51	350
1/2	12.7	1.58	40.1	0.28	7.1	0.196	127	1.96	1,265		
5/8	15.9	1.98	50.3	0.35	8.9	0.307	199	3.08	1,986		
3/4	19.1	2.37	60.2	0.42	10.7	0.442	287	4.41	2,846		

To prevent punching failure of concrete slabs

1. Punching Shear capacity **Vu max** = $\emptyset 2.12\sqrt{f c'}$ **b_o d according to ACI318**
2. Make PT. Slab thinner
3. Not require column capital and drop panel
4. Easy to delivery and package
5. Faster installation

Concrete Flat Slab Punch Test





SE Laboratory
Structural Engineering Laboratory,

AIT
Asian Institute of Technology

Technical Report on Concrete Flat Slab Punch Test

Project:

Concrete Flat Slab Punch Test

Owner:

SNP Post Tension Co., Ltd.

Doc. No. S0910-15

CONTENT

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WITNESSED BY:

MR. SAMWAI SORNSRIDA
TECHNICIAN

CHECKED BY:

MR. EKKACHAI YOOPRASERTCHAI
LABORATORY SUPERVISOR

CHECKED BY:

MR. MICHAEL COO
RESEARCH ASSOCIATE

APPROVED BY:

PROFESSOR PENNUNG WARNITCHAI
FIELD COORDINATOR OF STE/SET
December 9, 2015

AIT
Asian Institute of Technology

School of Engineering and Technology

Postal Address:
P.O. Box 4, Klong Luang
Pathumthani 12120
Thailand

Street Address:
Km. 42 Paholyothin Highway
Klong Luang, Pathumthani 12120
Thailand

Tel: (66-2) 524-6427, 5527
Fax: (66-2) 524-5544
http://www.ait.ac.th

Synopsis

The Structural Engineering Laboratory, School of Engineering and Technology, Asian Institute of Technology (AIT) was requested by SNP Post Tension Co., Ltd., to test the load bearing capacity of two flat slabs. The two specimens delivered in the laboratory were in the form of 2500 mm x 2500 mm x 180 mm reinforced concrete flat slabs with one marked as "SNP Shear Stud" and the other "Ordinary Stirrup". Loading on these specimens commenced on December 3, 2015 with both parties from SNP and AIT present to witness the operation.

AIT
Asian Institute of Technology

School of Engineering and Technology

Postal Address:
P.O. Box 4, Klong Luang
Pathumthani 12120
Thailand

Street Address:
Km. 42 Paholyothin Highway
Klong Luang, Pathumthani 12120
Thailand

Tel: (66-2) 524-6427, 5527
Fax: (66-2) 524-5544
http://www.ait.ac.th

Type of Test: Concrete Flat Slab Punch Test

Date of Test: December 3, 2015

Test Specimen:

Two specimens of concrete flat slabs are supplied by the client. One specimen is shear reinforced with ordinary stirrup reinforcement bars and the other with SNP shear studs.

Test Arrangement:

The same testing arrangement is done on the two flat slab specimens. Specimens are restrained to the strong floor using high strength bolts as shown through the yellow steel plates in Figure 1.

Displacement transducers are set up on the center of the specimen to measure deflection and at the midspan of each slab edge, in line with the restraints, to measure restraint displacements. Transducers are shown in Figure 2 as installed in the center of the specimen.

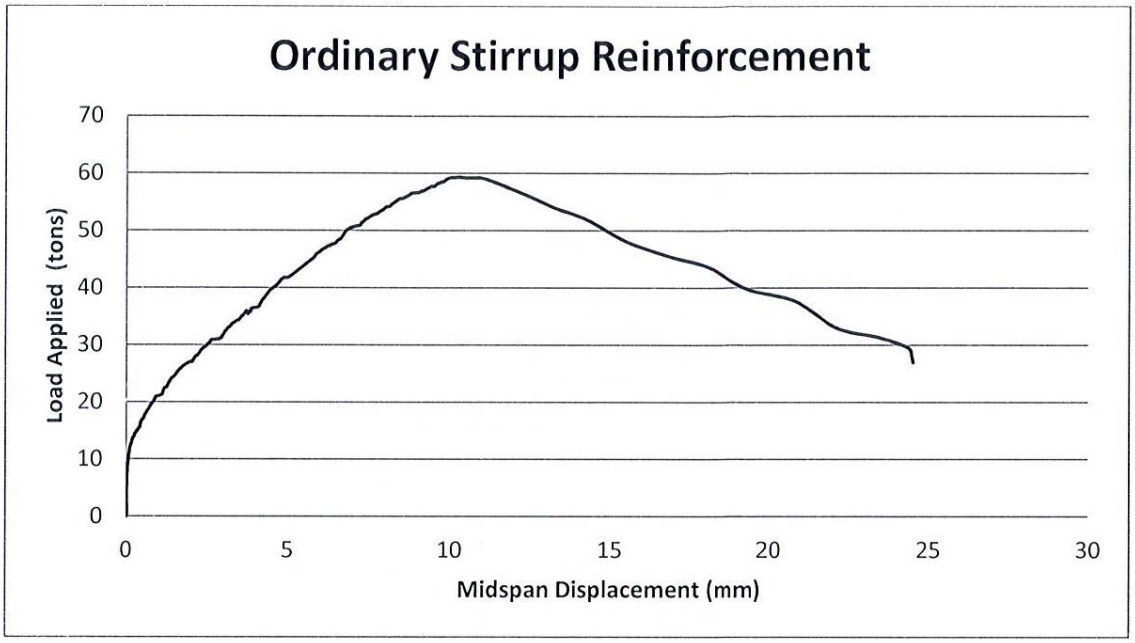
Loading is applied and measured by a pneumatic jack and load cell respectively. This set of loading and measurement system is located under the slab directly below the specimen center as shown in Figure 3. 200 mm square steel plates are used to distribute loading onto the slab specimens.

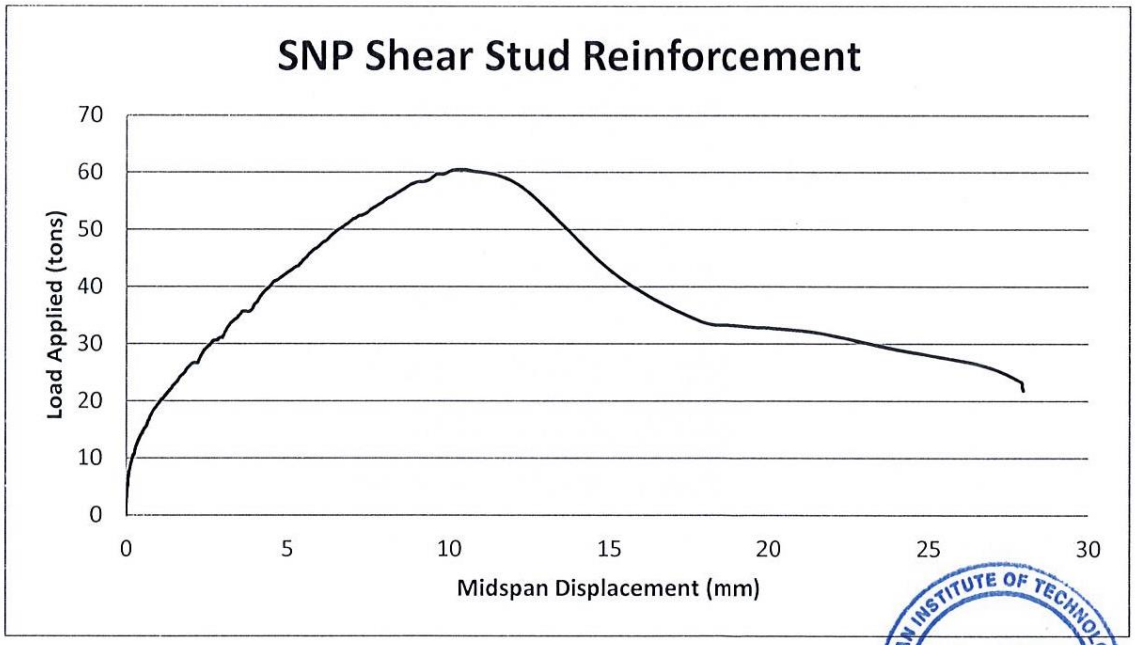
Test Procedure:

(1) Loading was applied vertically to the slab specimen with incremental pauses at approximately 5 ton increments to mark and document specimen cracking.
(2) Data recording of the load applied and specimen displacements are done in a continuous manner throughout the loading period.

Test Results:

Measured load and midspan displacements are shown on the figures below. Final crack patterns of both slab specimens are shown in Figure 4 and 5.





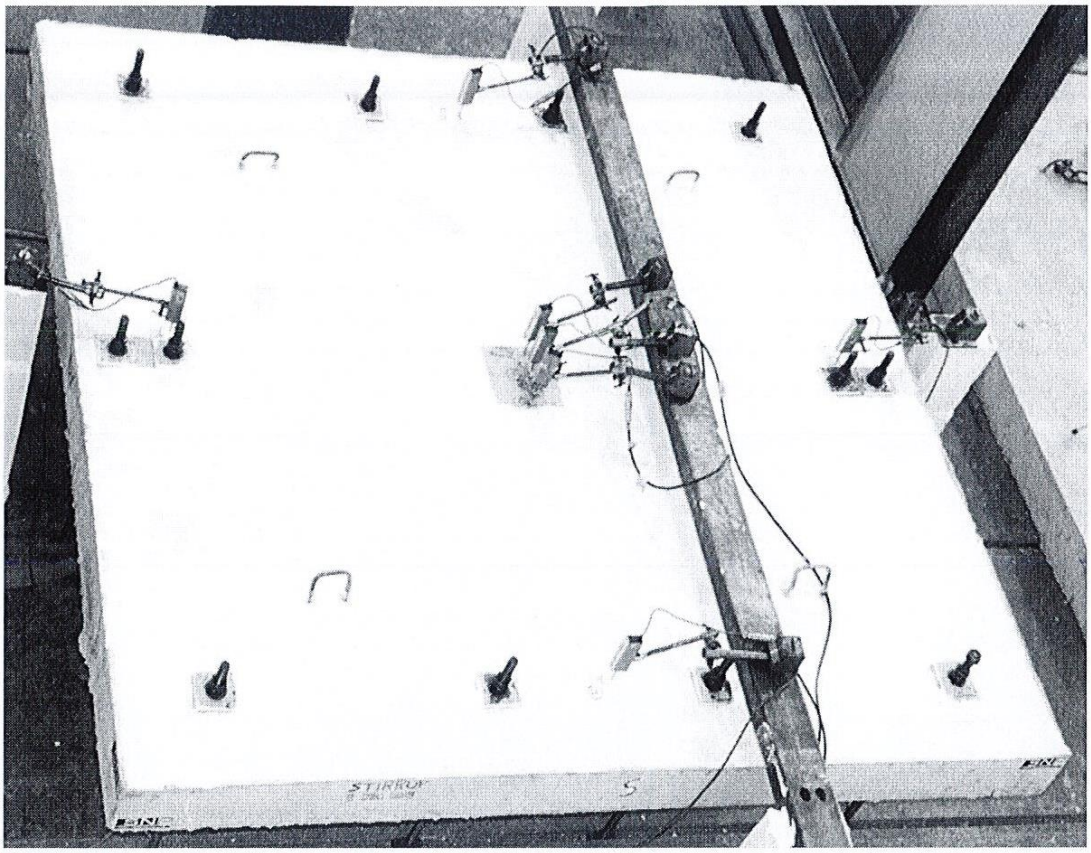


Figure 1: Load Test Setup

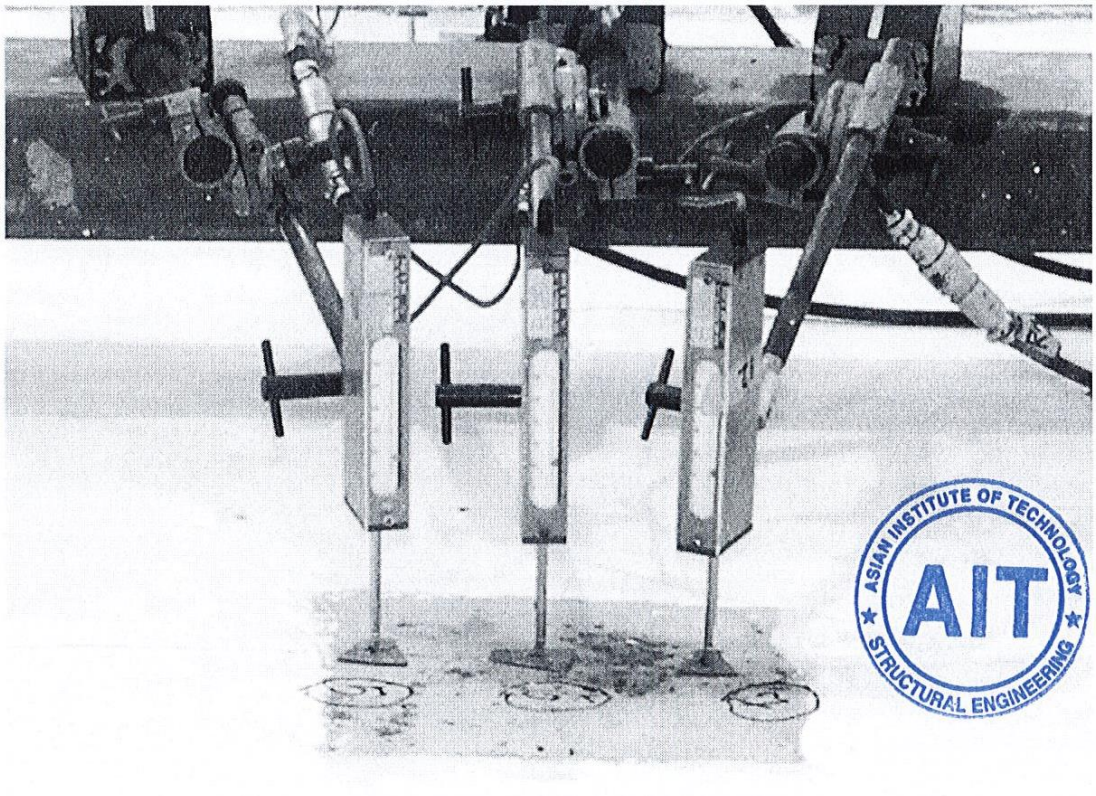


Figure 2: Displacement Measurement Transducers at Specimen Center

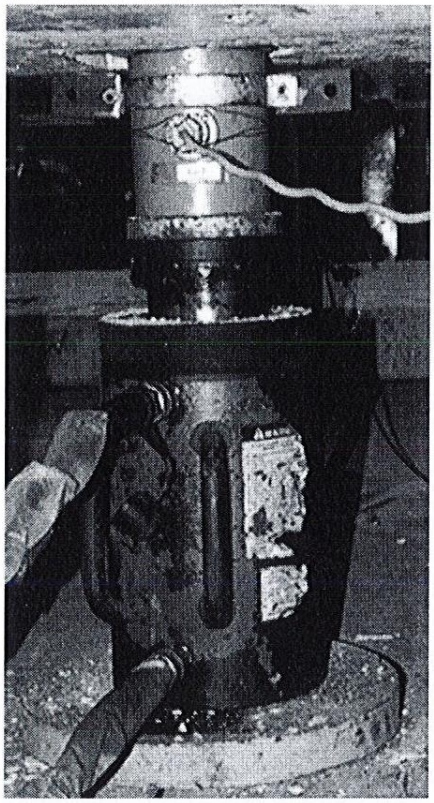


Figure 3: Load Application and Measurement System

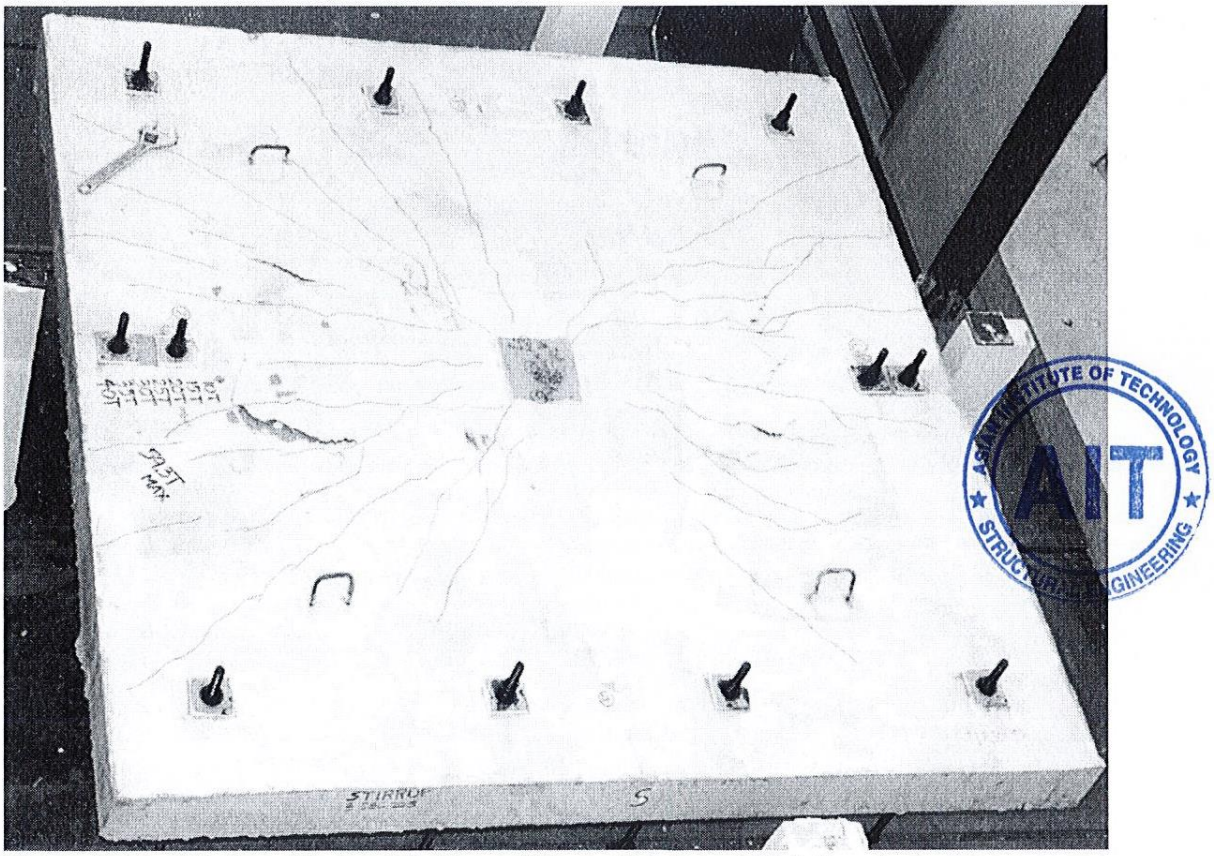


Figure 4: Final Failure Mode of Ordinary Stirrup Reinforced Slab Specimen

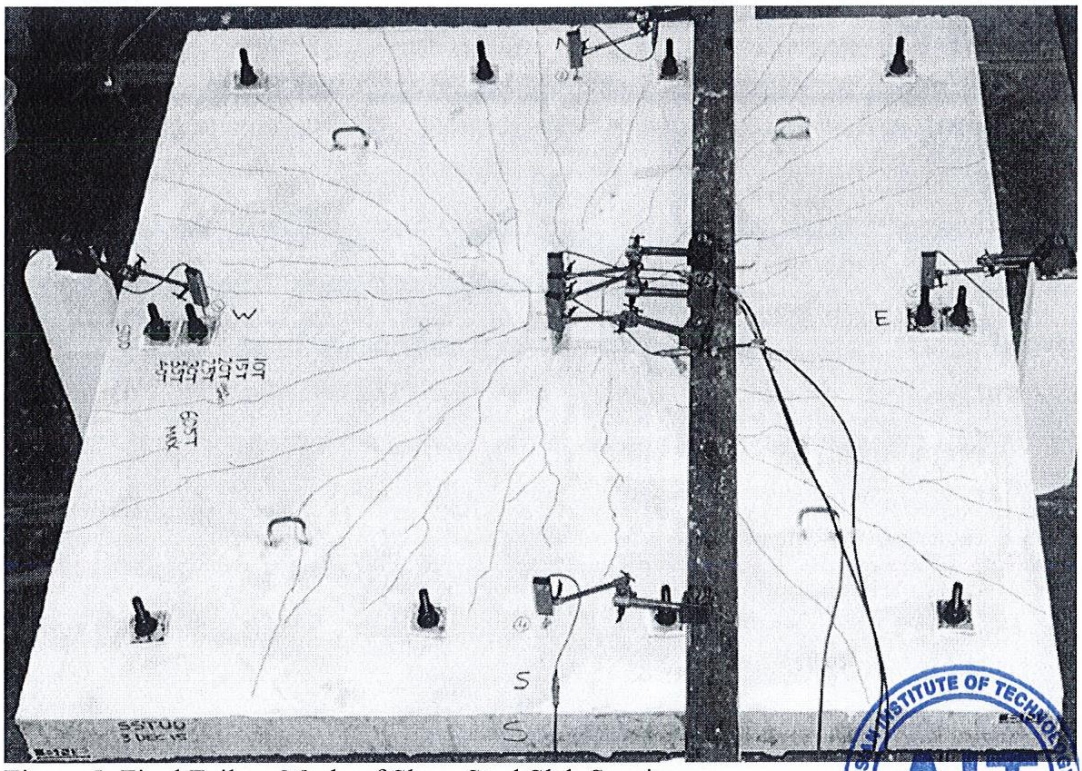
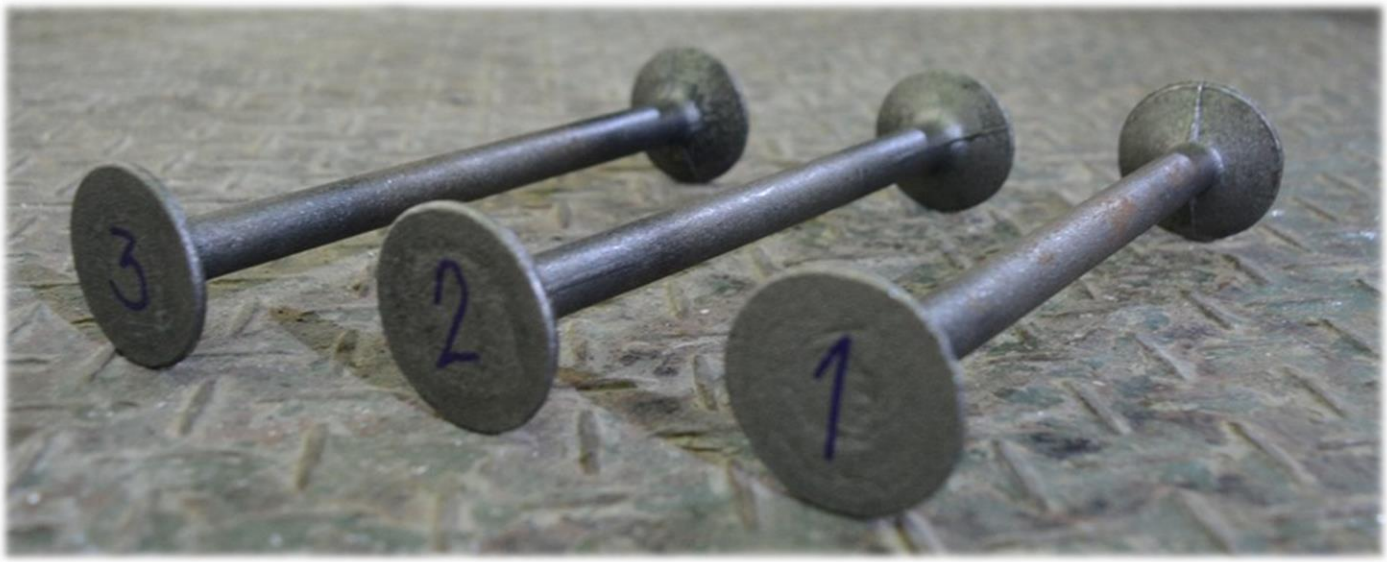


Figure 5: Final Failure Mode of Shear Stud Slab Specimen

Shear Stud Tension Test



Doc. No. S0161-18

AIT
Asian Institute of Technology
Km. 42 Paholyothin Highway, Klong Luang, Pathumthani, Thailand 12120
P. O. Box 4 Klong Luang, Pathumthani 12120 Thailand. Tel. (66-2) 524-5527, 524-6427 Fax. (66-2) 524-5544

STRUCTURAL ENGINEERING LABORATORY
STRUCTURAL ENGINEERING FIELD OF STUDY
SCHOOL OF ENGINEERING AND TECHNOLOGY

TYPE OF TEST: **TENSION TEST**

TEST SPECIMEN: Three (3) specimens of double head stud " Shear Stud " having a diameter of 12 mm. were given by the client.

CLIENT: **SNP POST TENSION CO., LTD.**

TEST DATE: March 20, 2018

TEST MACHINE: The 200-ton "Shimadzu" Universal Testing Machine of Model Type: UMH 200A.

TEST RESULTS:

Specimen No.	Type of Specimen	Maximum Load (kgf)	Mode of Failure
1	Shear Stud 12 mm.	7,640	Stud broken in the middle portion.
2	Shear Stud 12 mm.	7,400	Stud broken in the middle portion.
3	Shear Stud 12 mm.	7,680	Stud broken in the middle portion.

Note : This report certifies the adequacy and representative character of the test sample(s) only.

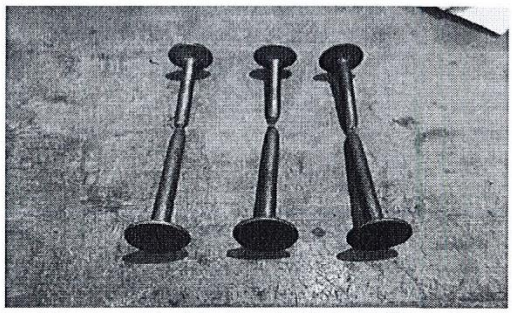


Figure 1 Stud broken in the middle portion.

TESTED BY:

MR. NIKOM TANIL
TECHNICIAN

CHECKED & APPROVED BY:

DR. ANAWAT CHOTESUWAN
SENIOR LABORATORY SUPERVISOR
March 28, 2018

Doc. No. S0351-18

AIT
Asian Institute of Technology
Km. 42 Paholyothin Highway, Klong Luang, Pathumthani, Thailand 12120
P. O. Box 4 Klong Luang, Pathumthani 12120 Thailand. Tel. (66-2) 524-5527, 524-6427 Fax. (66-2) 524-5544

STRUCTURAL ENGINEERING LABORATORY
STRUCTURAL ENGINEERING FIELD OF STUDY
SCHOOL OF ENGINEERING AND TECHNOLOGY

TYPE OF TEST: **TENSION TEST**

TEST SPECIMEN: Three (3) specimens of double head stud " Shear Stud " having a diameter of 12 mm. were given by the client.

CLIENT: **SNP POST TENSION CO., LTD.**

TEST DATE: May 18, 2018

TEST MACHINE: The 200-ton "Shimadzu" Universal Testing Machine of Model Type: UMH 200A.

TEST RESULTS:

Specimen No.	Type of Specimen	Maximum Load (kgf)	Mode of Failure
1	Shear Stud 12 mm.	10,750	Stud broken in the middle portion.
2	Shear Stud 12 mm.	10,790	Stud broken in the middle portion.
3	Shear Stud 12 mm.	10,670	Stud broken in the middle portion.

Note : This report certifies the adequacy and representative character of the test sample(s) only.

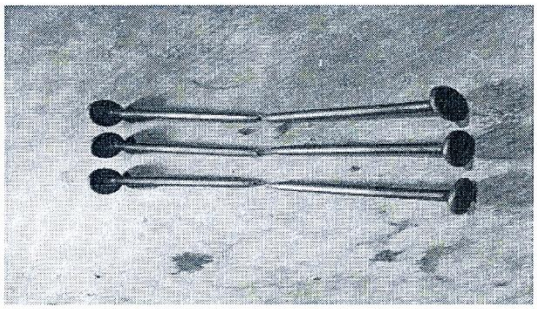


Figure 1 Stud broken in the middle portion.

TESTED BY:

MR. NIKOM TANIL
TECHNICIAN

CHECKED & APPROVED BY:

ASIAN INSTITUTE OF TECHNOLOGY AIT STRUCTURAL ENGINEERING

DR. ANAWAT CHOTESUWAN
SENIOR LABORATORY SUPERVISOR
May 22, 2018

ใบรับรองผลทางวัสดุงานหล่อ

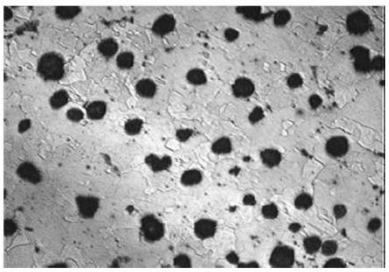
ชื่อลูกค้า :	บริษัท เอสเอ็นพี โพส เท็นชั่น จำกัด
ที่อยู่:	110/18 หมู่2 ถนนปลายบาง ตำบลมหาสวัสดิ์ อำเภอ บางกรวย นนทบุรี 11130
DATE	26/5/2561
วัสดุ(Material)	FCD 500
LOT No.	N/A
NAME	12K13

Sample: SC

Alloy: FCD Mode: PA

Type of Test	Specification		Test Results	Results
Chemical Composition	Carbon	3.5-4	3.5	Passed
	Silicon	2.0-2.5	2.15	Passed
	Manganese	0.4-0.5	0.41	Passed
	Phosphorus	0.05MAX	0.05	Passed
	Sulfur	0.1MAX	0.02	Passed
	Magnesium	0.5MAX	0.04	Passed
Mechanical Property	Tensile Strength (N/mm2)	500 min.	568	Passed
	Yield Strength (N/mm2)	320 min.	375	Passed
	Elongation (%)	7 min.	8	Passed
	Hardness	170-241 HB	198	Passed

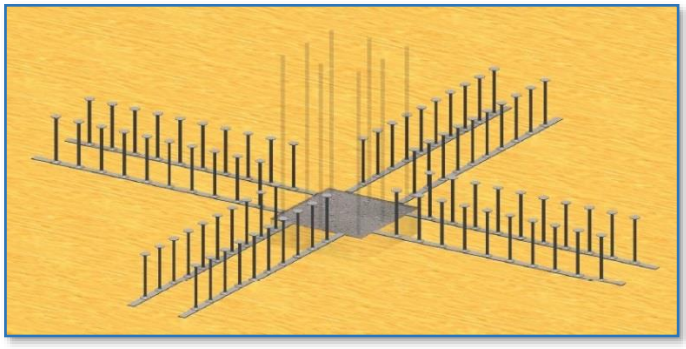
บันทึกรายละเอียด (Record Description):



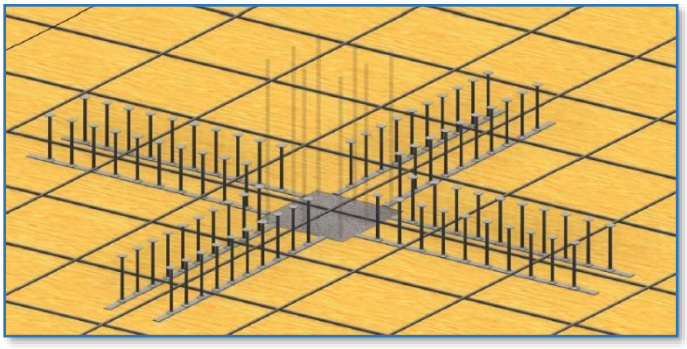
กำลังขยาย 100 ×

Check by:	*Approved by:*
A. Ling	A. Ling

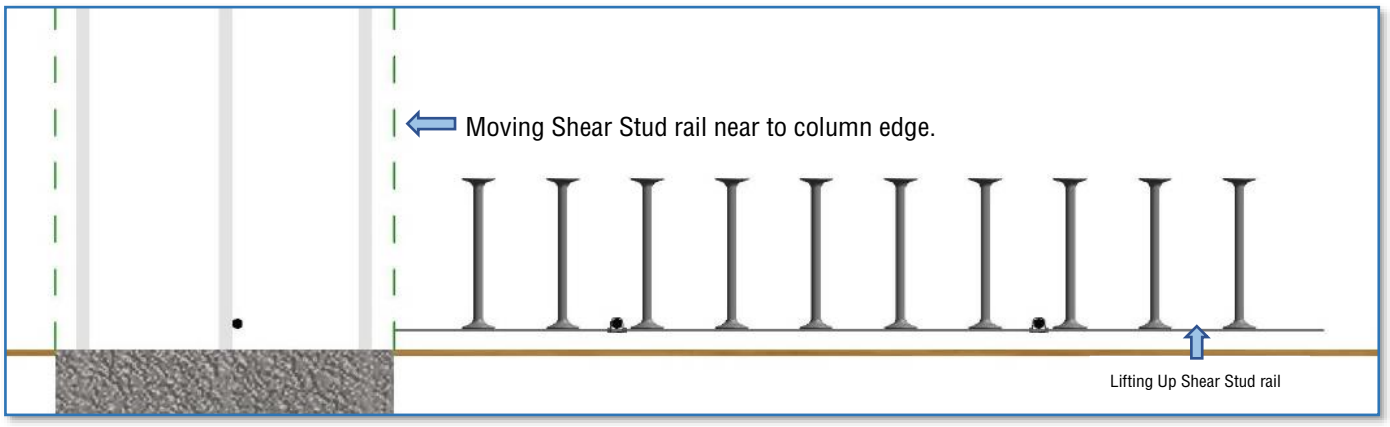
Installation of Shear Stud



1.Installing Shear Stud after finished formwork.

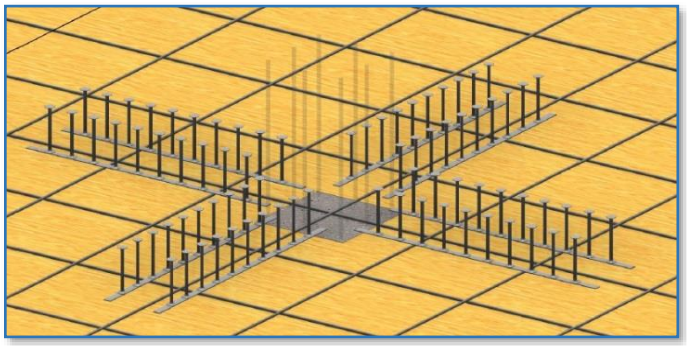


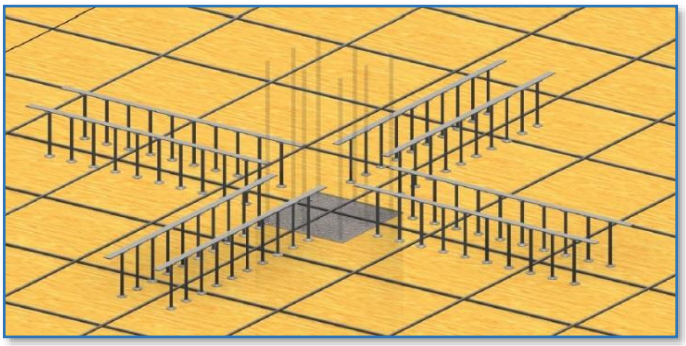
2.Placing lower reinforcement and progressive reinforcement in column



3.Lifting up Shear Stud rail and tied with lower reinforcement.

Note : Shear Stud are able to place on top of lower reinforcement or placing invert considering covering





SNP POST TENSION CO.,LTD.

110/18 M.2 Mahasawat Bangkruai Nonthaburi 11130

Tel : +662-985-2357 , +662-985-0311 , +662-985-2117

Fax : +662-985-0251

E-Mail : Snp.postmarketing@gmail.com

Website : www.snp-post.com

Facebook : @Snp.posttension