

FUGRO TECHNICAL SERVICES LIMITED

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Materialab

Client Ref. : --
Report No : 124675ST130008(11)

Page 1 of 3

REPORT ON TENSILE STRENGTH TEST OF E12 ANCHOR BOLT EMBEDDED IN NON-CRACKED CONCRETE

Sample Description

Information Supplied by Client

Client : Sunway Metal Manufactory Limited
Project : Tensile Strength Test of Anchor Bolt
Sample Description : E12 Anchor Bolt
Client's Sample I.D. : --

For Expanding Anchor

Supplier Name : Sunway Metal Manufactory Limited
Reference Number : E12
Location of the Fixings in the Base Specimen : (Please refer to the diagrams)
Embedded Length : 60 mm Minimum requirement of BS 5080 : 180 mm
Hole Diameter : 12 mm for distance of fixing from the edge
Bolt Diameter : 12 mm Minimum requirement of BS 5080 : 300 mm
Hole Depth : 60 mm anchor spacing of fixing
Concrete Grade : 22 N/mm²

For Concrete

Mix Proportions : Not provided
Location of Reinforcement : Not applicable
Type of reinforcement : Not applicable
Cast Unit Shape : Square
Dimensions of Cast Unit : 500 x 500 x 192 mm
Concrete Age : 30 days
Compressive Strength (Average) : 224 kgf/cm²

Laboratory Information

Location of Test : Product Testing Laboratory of Materialab
Lab. Sample I.D. : ST130008/62-66
Date Received : 03 January 2013
Date Specimens Fixed : 17 April 2013
Date Tested : 24 April 2013
Span of Reaction Support : 240 mm
Test Method : BS 5080 : Part 1 : 1993 and ETAG-001-Annex-A
Loading Method : Increment Loading

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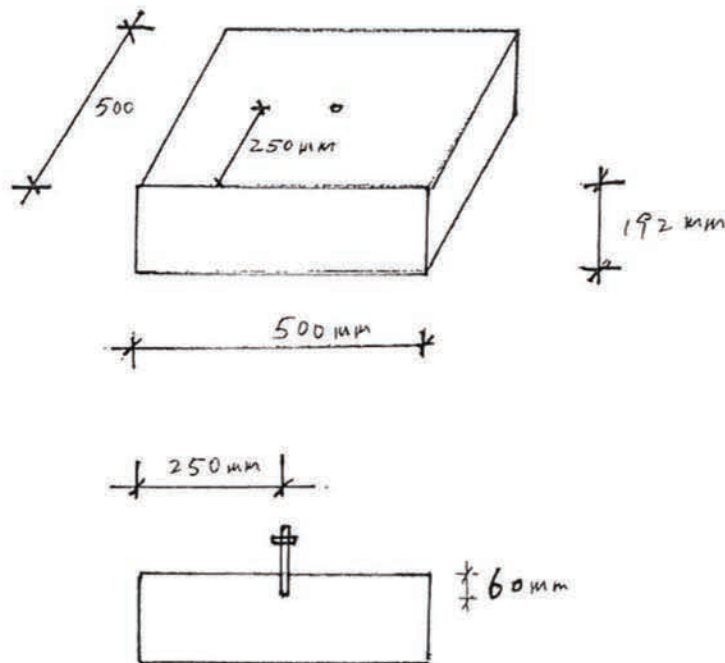
Page 2 of 3

Report No : 124675ST130008(11)

REPORT ON TENSILE STRENGTH TEST OF E12 ANCHOR BOLT EMBEDDED IN NON-CRACKED CONCRETE

Test Method

石矢強度: 25/20D \pm 5 MPA, 28 天
數量 42 件



Sketch 1 : The specified concrete structure

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Page 3 of 3

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REPORT ON TENSILE STRENGTH TEST OF E12 ANCHOR BOLT EMBEDDED IN NON-CRACKED CONCRETE

Summary of Test Results

Lab. Sample I.D.	Applied Force at Initial Relative Movement of 0.2mm (kN)	Force Interval (kN) / Displacement (mm)													Ultimate Force (max.) (kN)
		3 kN	6 kN	9 kN	12 kN	15 kN	18 kN	21 kN	24 kN	27 kN	30 kN	33 kN	36 kN	39 kN	
ST130008/62	5.16	0.10	0.45	0.73	0.92	1.10	1.34	1.61	1.94	--	--	--	--	--	24.23
ST130008/63	7.19	0.02	0.14	0.34	0.58	0.83	1.07	1.33	1.60	1.91	--	--	--	--	27.18
ST130008/64	4.48	0.19	0.23	0.37	0.55	0.73	0.91	1.10	--	--	--	--	--	--	23.48
ST130008/65	4.35	0.16	0.36	0.59	0.82	1.05	1.37	1.77	2.37	--	--	--	--	--	24.35
ST130008/66	4.75	0.11	4.30	0.64	0.86	1.08	1.38	1.76	--	--	--	--	--	--	23.21
Mean	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.49
Standard Deviation	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.58

Remark : The test results relate only to the samples tested.

Checked by : Igor Date : 28/5/2013 Certified by : Chan Chun Wai Ivan Date : 28.5.2013
Chan Chun Wai Ivan
Manager (Product Testing Laboratory)

**** End of Report ****

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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Client : Sunway Metal Manufactory Limited

Project : Pull-out Test of Anchor Bolt

Report No. : 032154ST50390

Date : 21 April 2005

CONTENTS

- 1.0 Sample Description
- 2.0 Summary of Test Results
- 3.0 Individual Results
- 4.0 Diagram
- 5.0 Record Photographs

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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

1.0 Sample Description

1.1 Information Supplied by Client

Client : Sunway Metal Manufactory Limited
Project : Pull-out Test of Anchor Bolt
Sample Description : "Sunway" SW-E12 Medium Duty Anchor
Client's Sample I.D. : --

For Expanding Anchor

Supplier Name : Sunway Metal Manufactory Limited
Reference Number : SW-E12
Specification of the Material of Fixing : Stainless Steel 304
Actual Diameter of Bit used to Drill the Hole : Before Starting : 12 mm
After Completion : 12 mm
Type of Drilled Employed : Rotary-Percussive
Location of the Fixings in the Base Specimen : (Please refer to the diagrams)
Embedded Length : 50 mm Minimum requirement of BS 5080 : 150 mm
Predrilled Hole Diameter : 12 mm for distance of fixing from the edge
Bolt Diameter : 12 mm Minimum requirement of BS 5080 : 250 mm
Hole Depth : 60 mm for anchor spacing of fixing
Tightening Torque : 42 Nm Concrete Grade : 30 MPa

For Concrete

Mix Proportions : Not Provided
Location of Reinforcement : NIL
Type of reinforcement : NIL
Cast Unit Shape : Cube
Dimensions of Cast Unit : 700 x 700 x 700mm
Concrete Age : 18 days
Compressive Strength (Average) : 32 MPa
Density (Average) : 2345 kg/m³ (Average)

1.2 Laboratory Information

Location of Test : Special Testing Laboratory of MaterialLab
Lab. Sample I.D. : ST50390/1-10
Date Specimens Fixed : 06 April 2005
Date Tested : 06 April 2005
Span of Support : 300 mm
Test Method : BS 5080 : Part 1 : 1993
Loading Method : Increment Increasing

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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT**2.0 Summary of Test Results**

Lab. Sample I.D.	Applied Force at Relative Movement of 0.2mm (kN)	Maximum Applied Force (kN)
ST50390/2	9.56	27.55
ST50390/3	12.26	23.77
ST50390/4	12.98	27.01
ST50390/6	9.02	24.67
ST50390/7	12.08	24.31
ST50390/8	13.88	23.59
ST50390/9	12.80	24.31
ST50390/10	15.86	24.13
Mean	12.31	24.91
Standard Deviation	2.21	1.50

Remark : 1.) The test results relate only to the samples tested.

Checked by : Stewart Uru Date : 22/04/05 Certified by :  Date : 22/4/05
Gary Winstanley

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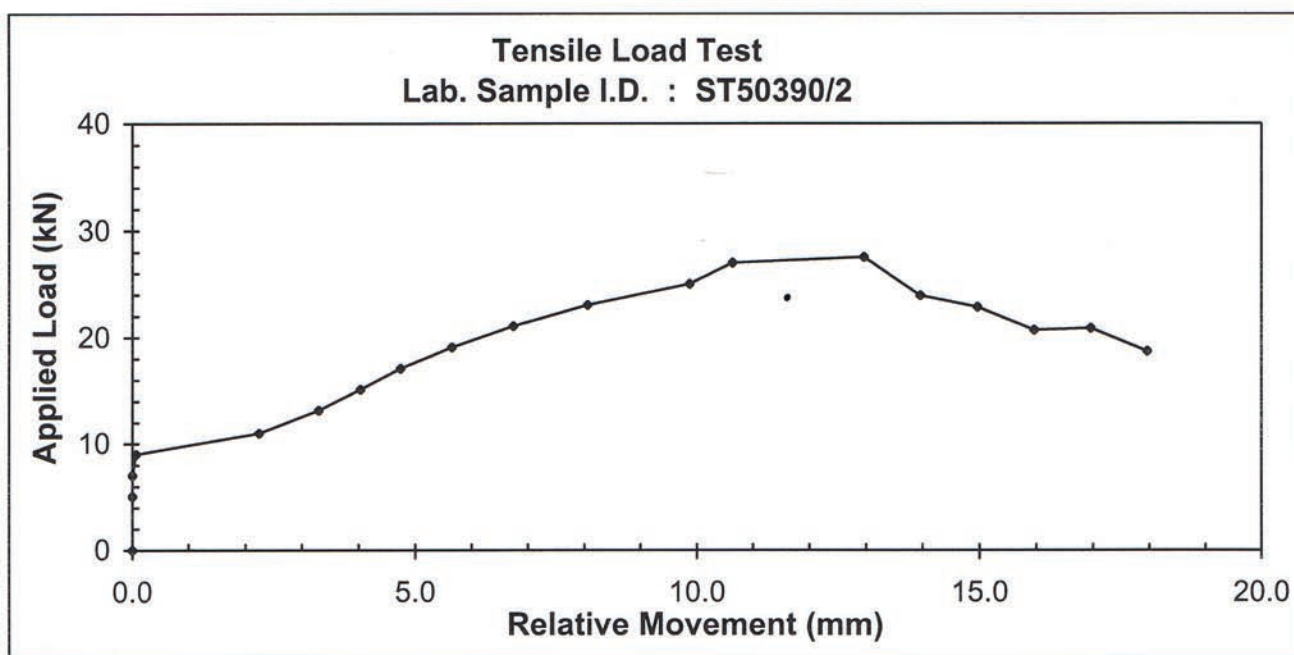
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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/2

Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	23.05	8.06
5.07	0	25.03	9.87
7.05	0	27.01	10.63
9.02	0.06	27.55	12.96
11.00	2.24	23.95	13.96
13.16	3.29	22.87	14.96
15.14	4.03	20.71	15.96
17.12	4.74	20.89	16.96
19.10	5.65	18.74	17.96
21.07	6.74		



Observation : Stripping of the anchor bolt thread was observed at a load of 19.10kN.



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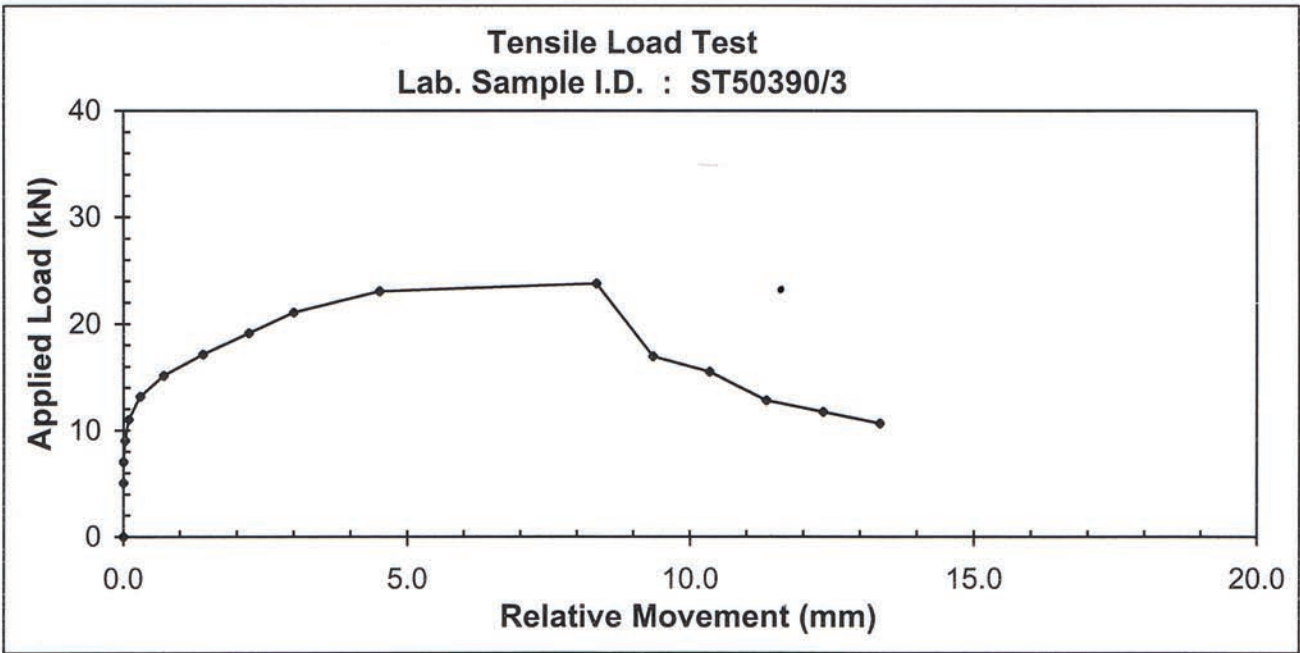


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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/3 Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	21.07	3.00
5.07	0	23.05	4.51
7.05	0	23.77	8.35
9.02	0.03	16.94	9.35
11.00	0.09	15.50	10.35
13.16	0.30	12.80	11.35
15.14	0.71	11.72	12.35
17.12	1.40	10.64	13.35
19.10	2.21		



Observation : Stripping of the anchor bolt thread was observed at a load of 21.07kN.



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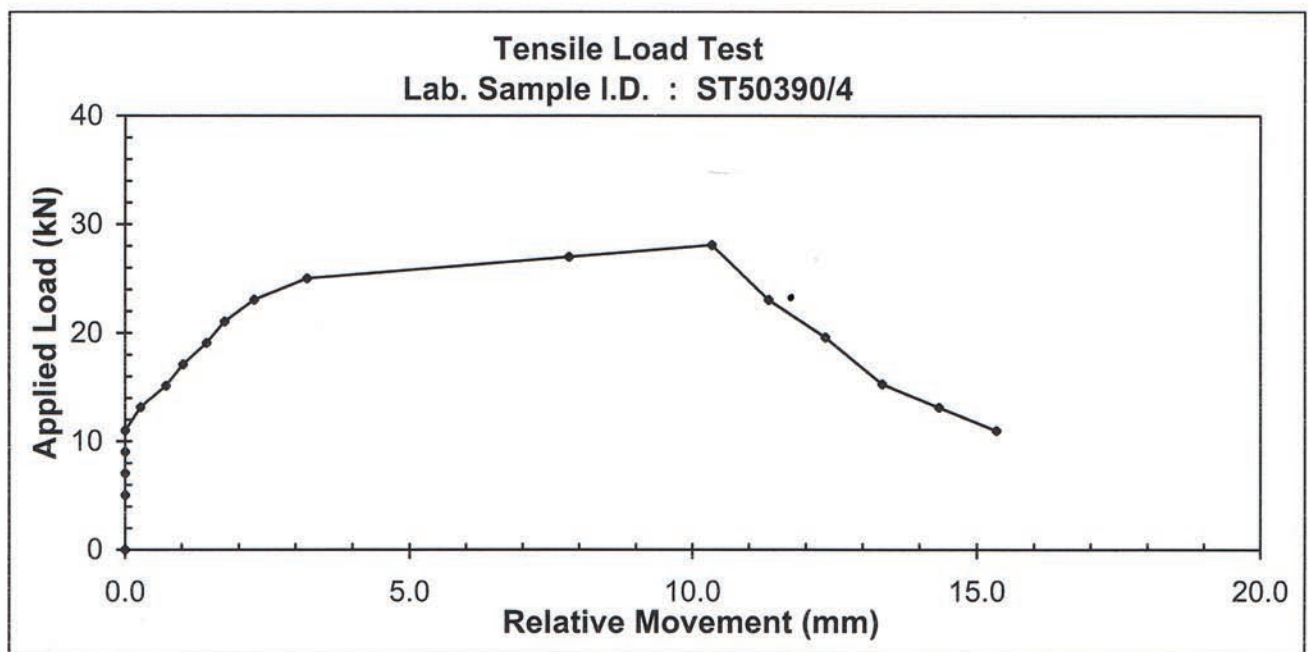
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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/4

Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	23.05	2.27
5.07	0	25.03	3.20
7.05	0	27.01	7.81
9.02	0	28.09	10.34
11.00	0	23.05	11.34
13.16	0.27	19.63	12.34
15.14	0.72	15.32	13.34
17.12	1.02	13.16	14.34
19.10	1.43	11.00	15.34
21.07	1.75		



Observation : Stripping of the anchor bolt thread was observed at a load of 25.03kN.



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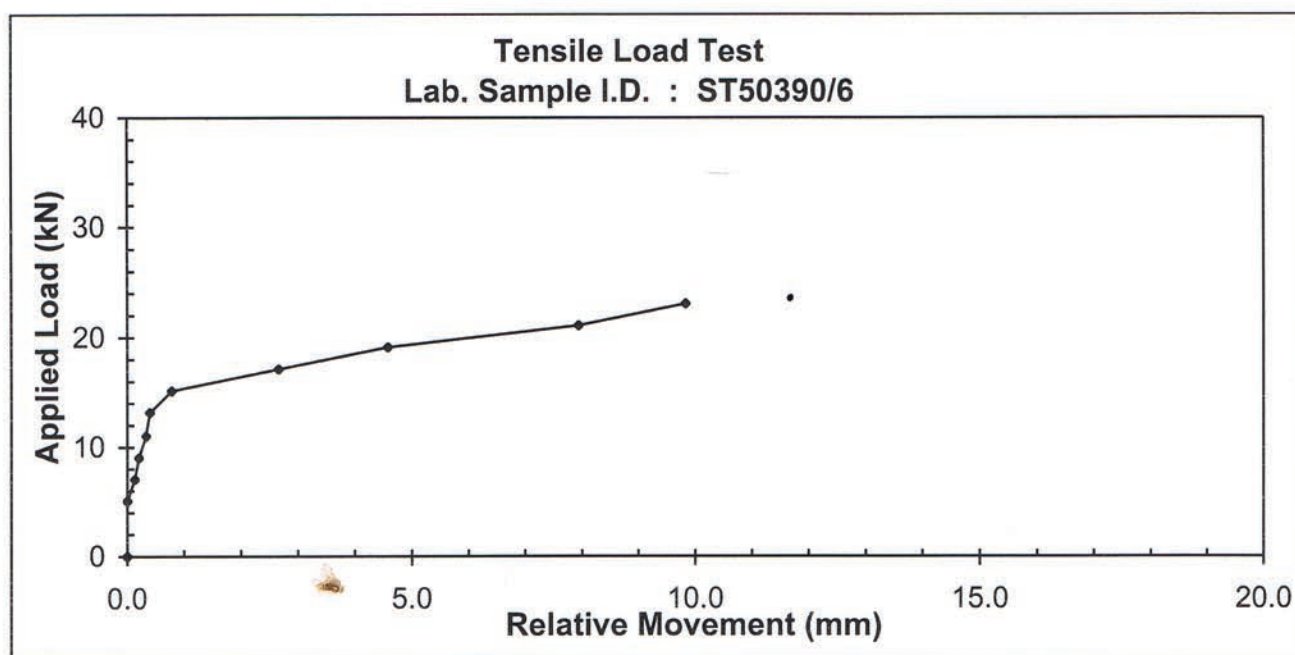
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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/6

Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	15.14	0.78
5.07	0	17.12	2.66
7.05	0.13	19.10	4.58
9.02	0.20	21.07	7.94
11.00	0.33	23.05	9.83
13.16	0.40	24.67	--



Observation : Failure of the concrete substrate at a load of 24.67kN.



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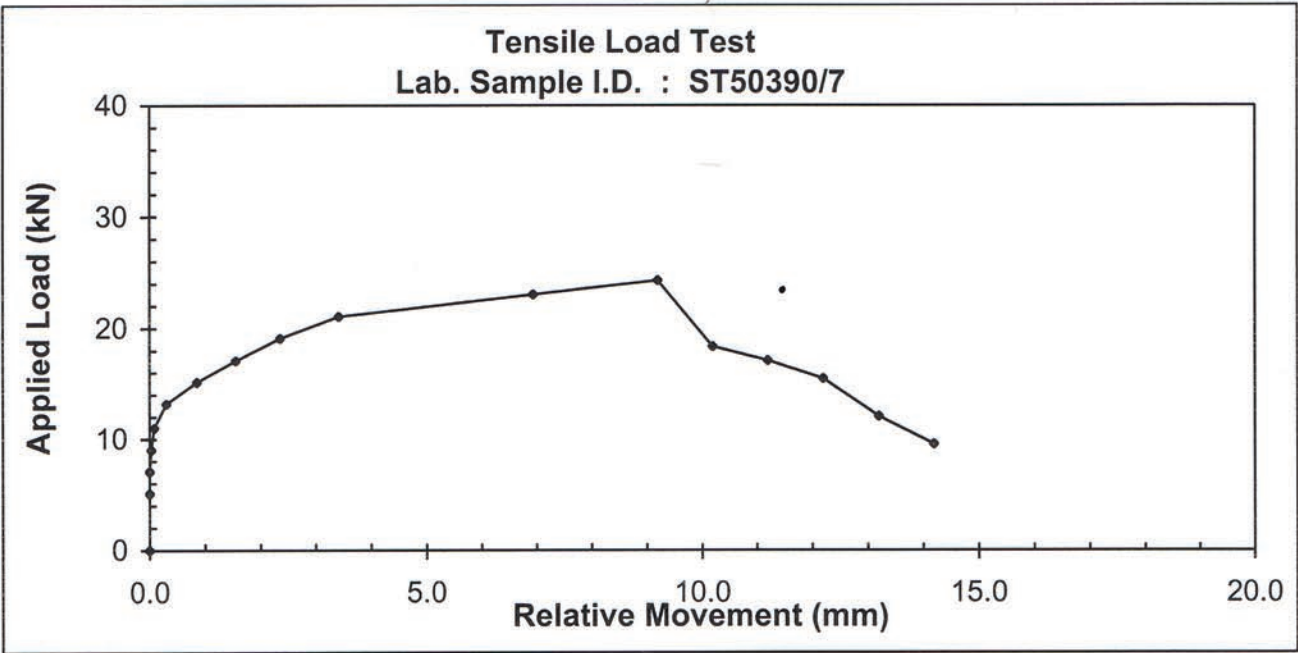


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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/7 Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	21.07	3.41
5.07	0	23.05	6.93
7.05	0	24.31	9.19
9.02	0.03	18.38	10.19
11.00	0.08	17.12	11.19
13.16	0.30	15.50	12.19
15.14	0.85	12.08	13.19
17.10	1.55	9.56	14.19
19.10	2.35		



Observation : Thread stripped failure was observed at a load of 23.05kN.



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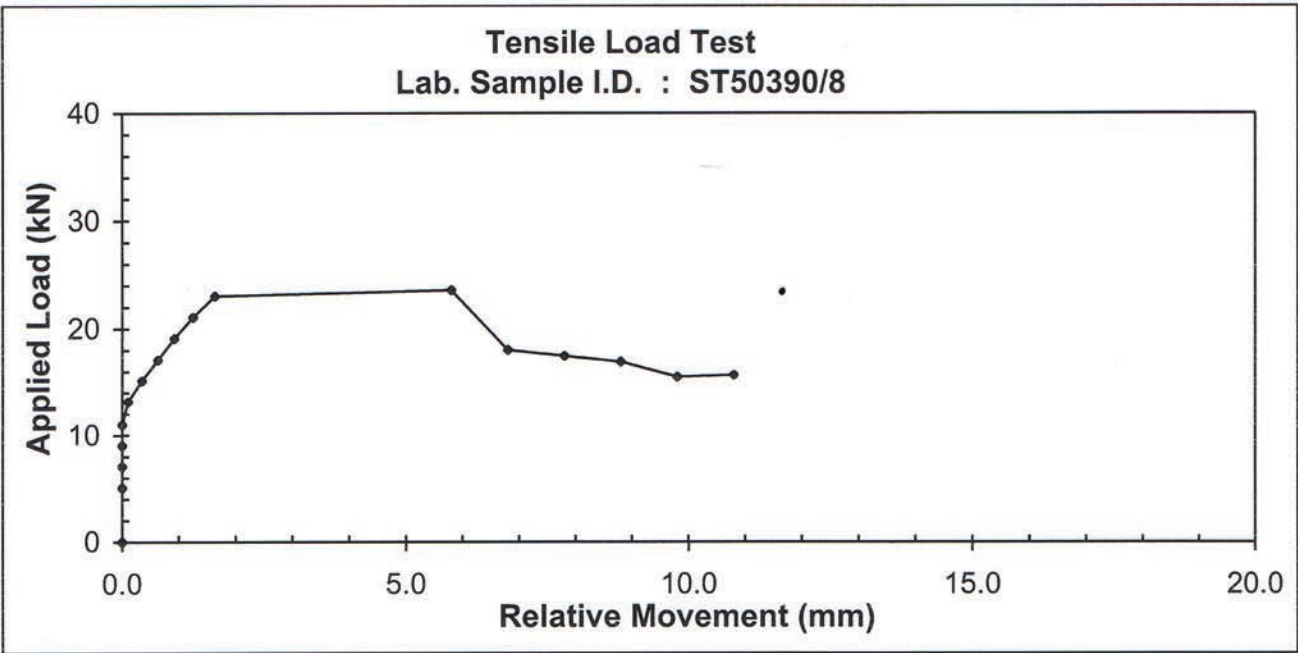


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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/8 Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	21.07	1.25
5.07	0	23.05	1.63
7.05	0	23.59	5.80
9.02	0	18.02	6.80
11.00	0	17.48	7.80
13.16	0.10	16.94	8.80
15.14	0.35	15.50	9.80
17.12	0.63	15.68	10.80
19.10	0.92		



Observation : Stripping of the anchor bolt thread was observed at a load of 23.59kN.



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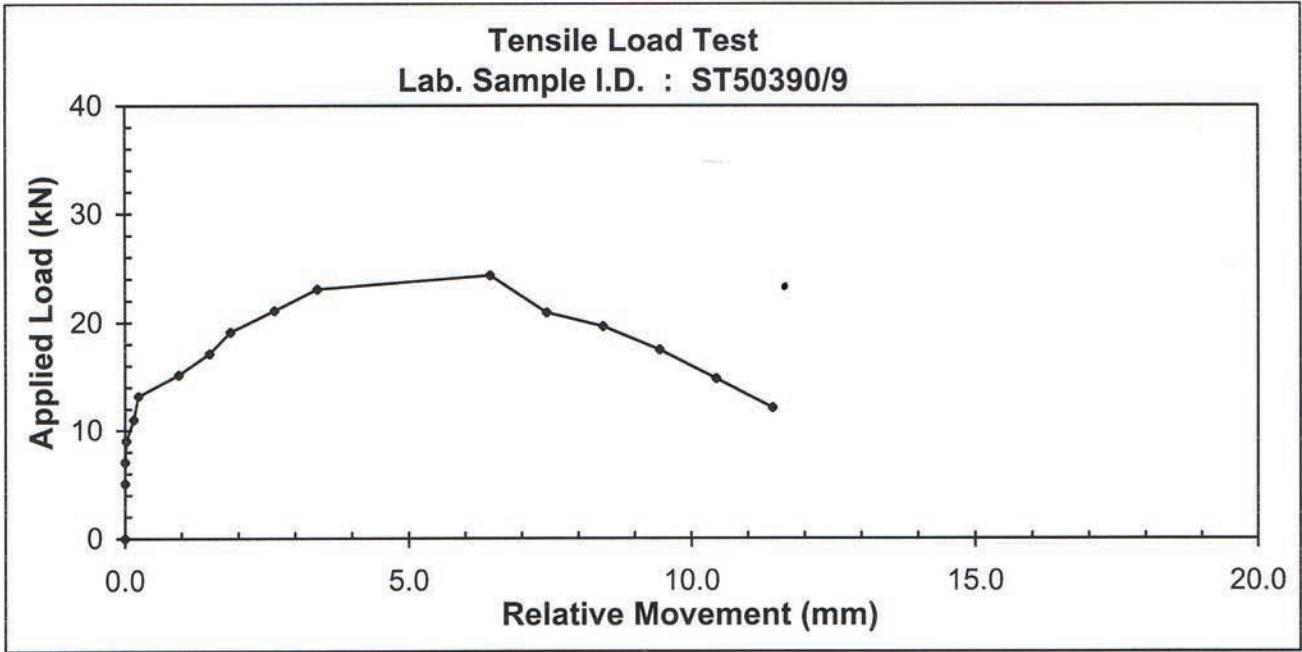


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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/9 Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	21.07	2.63
5.07	0	23.05	3.39
7.05	0	24.31	6.44
9.02	0.02	20.89	7.44
11.00	0.15	19.63	8.44
13.16	0.24	17.48	9.44
15.14	0.95	14.78	10.44
17.12	1.49	12.08	11.44
19.10	1.86		



Observation : Stripping of the anchor bolt thread was observed at a load of 24.31kN.



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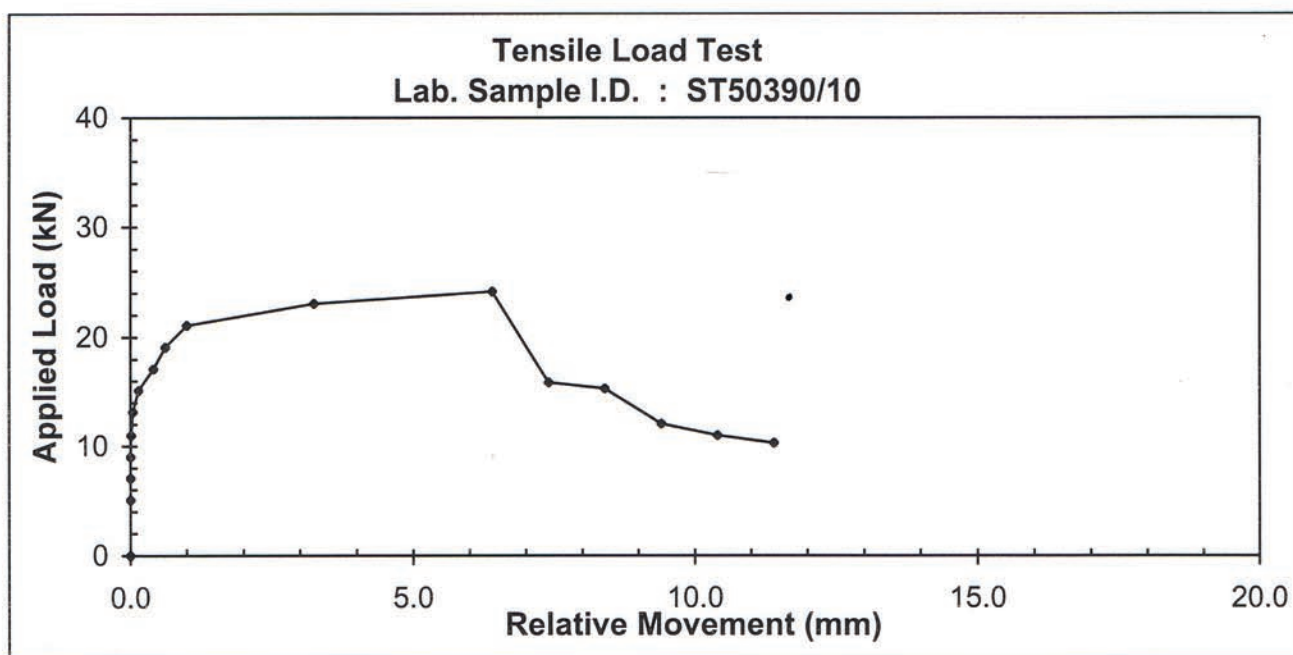
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REPORT ON THE TENSILE LOAD TEST OF ANCHOR BOLT

Lab. Sample I.D. : ST50390/10

Date Tested : 06 April 2005

Applied Load (kN)	Relative Movement (mm)	Applied Load (kN)	Relative Movement (mm)
0	0	21.07	1.00
5.07	0	23.05	3.24
7.05	0	24.13	6.40
9.02	0	15.86	7.40
11.00	0.01	15.32	8.40
13.16	0.04	12.08	9.40
15.14	0.14	11.00	10.40
17.12	0.41	10.28	11.40
19.10	0.62		



Observation : Stripping of the anchor bolt thread was observed at a load of 23.05kN.



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5.0 Record Photographs



Test Configuration
Sample I.D. : ST50390/1-10



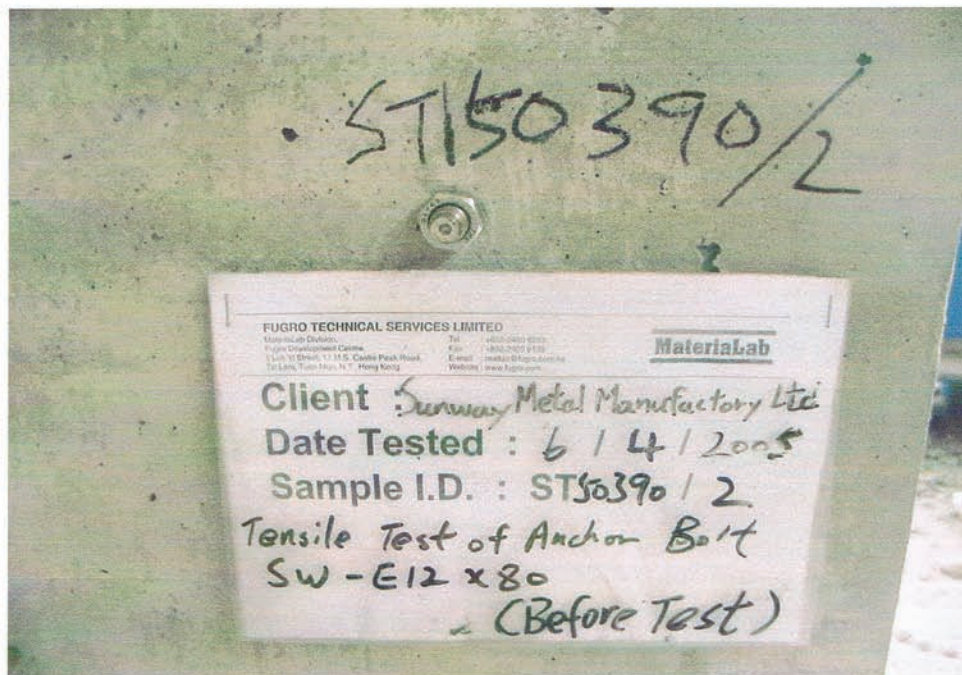
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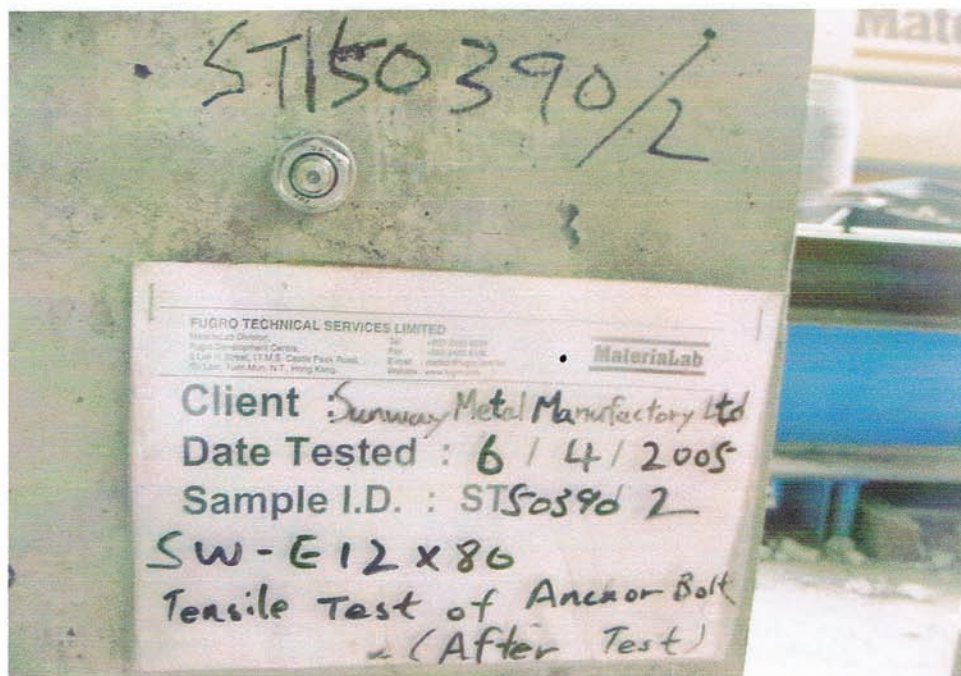
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Before Test
Sample I.D. : ST50390/2



After Test
Sample I.D. : ST50390/2

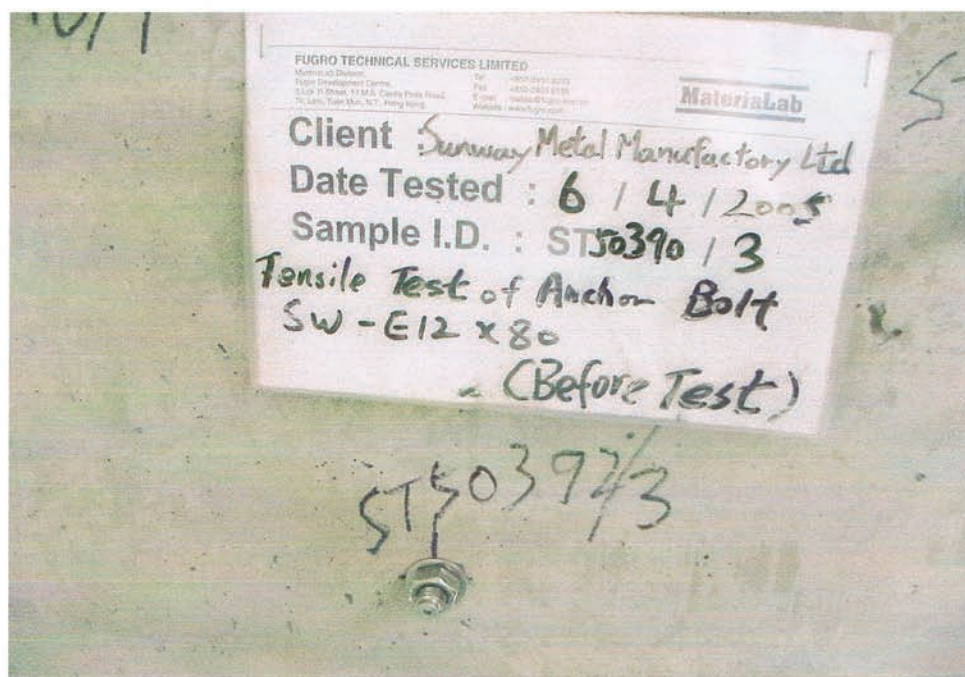
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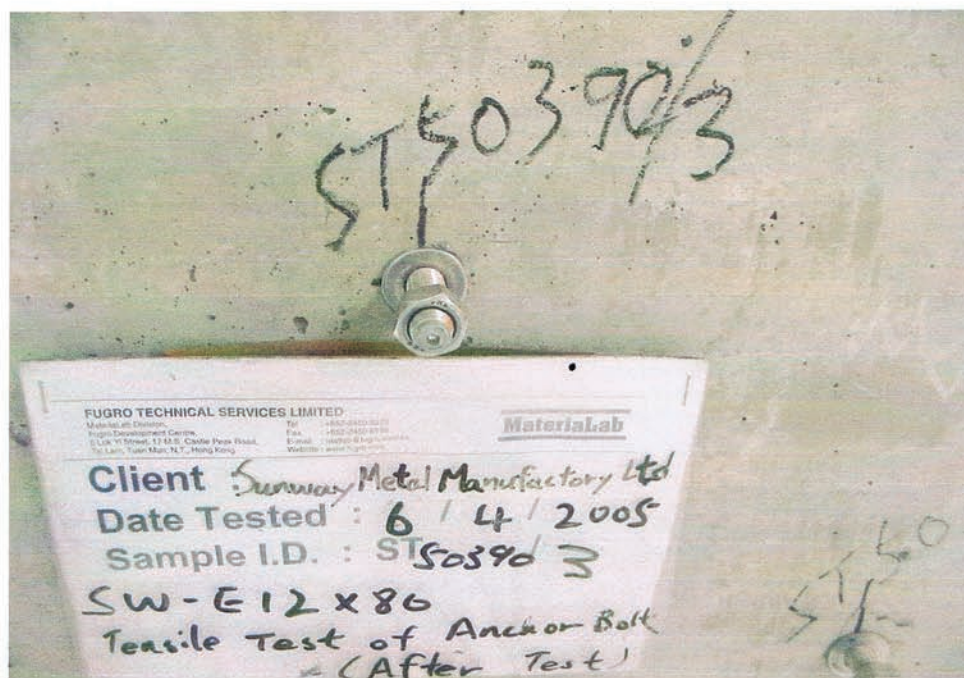
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Before Test
Sample I.D. : ST50390/3



After Test
Sample I.D. : ST50390/3



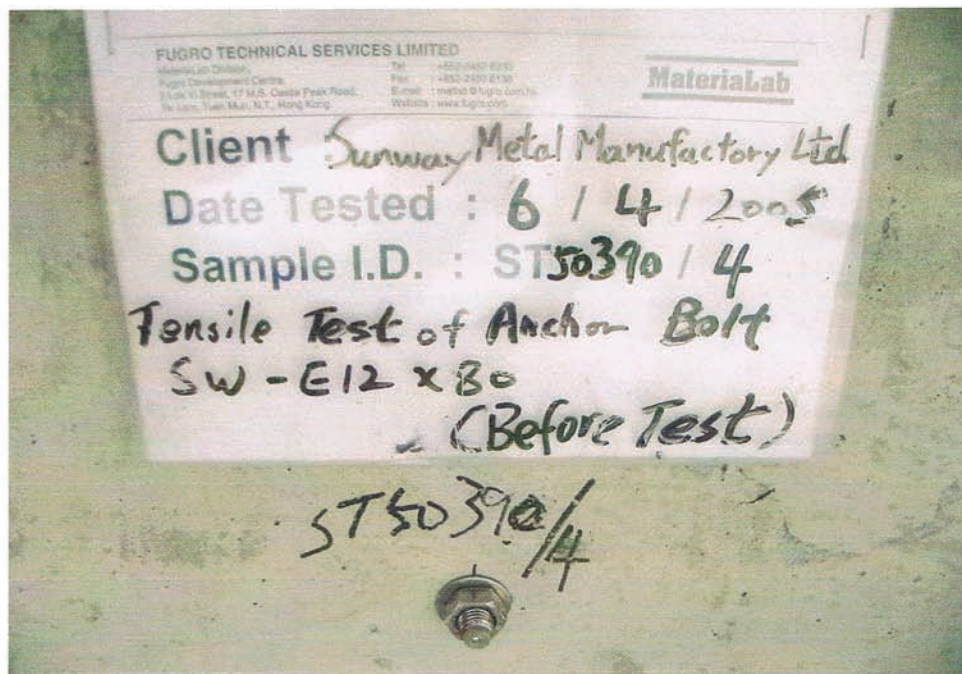
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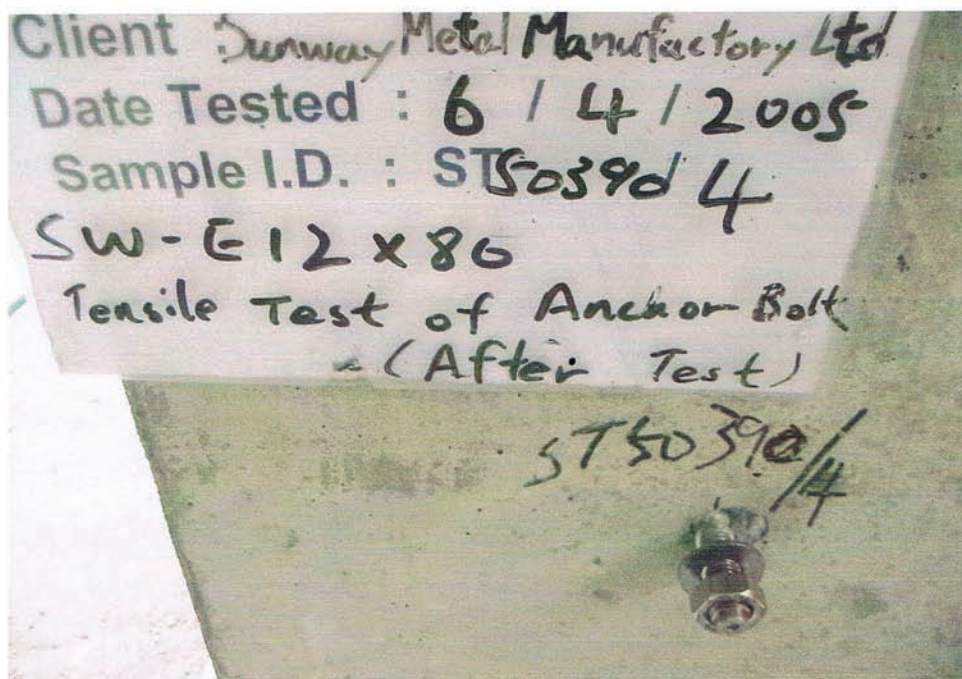
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Before Test
Sample I.D. : ST50390/4



After Test
Sample I.D. : ST50390/4

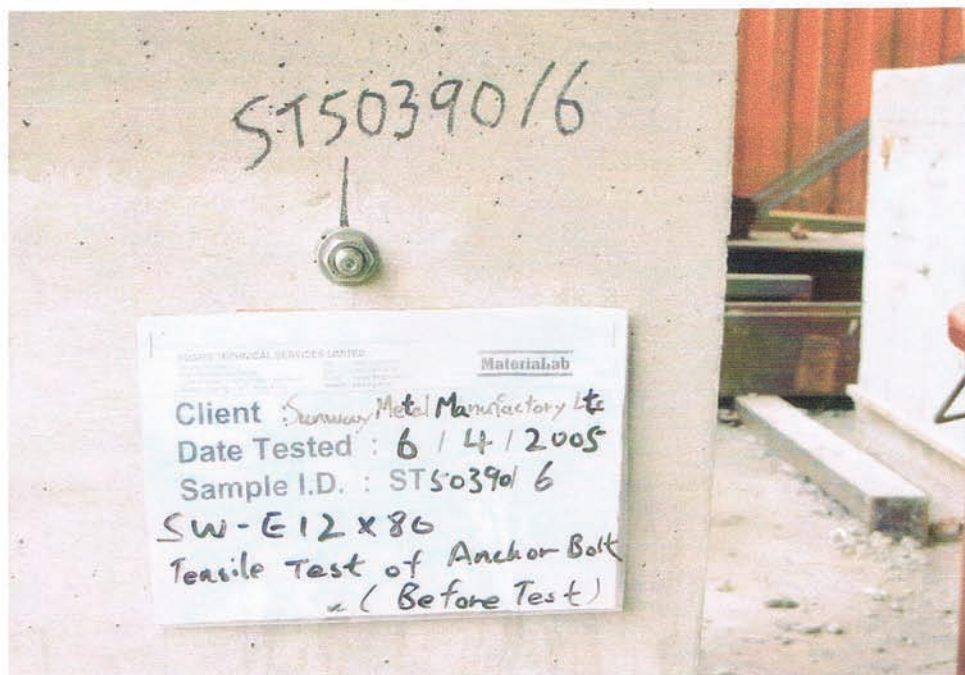
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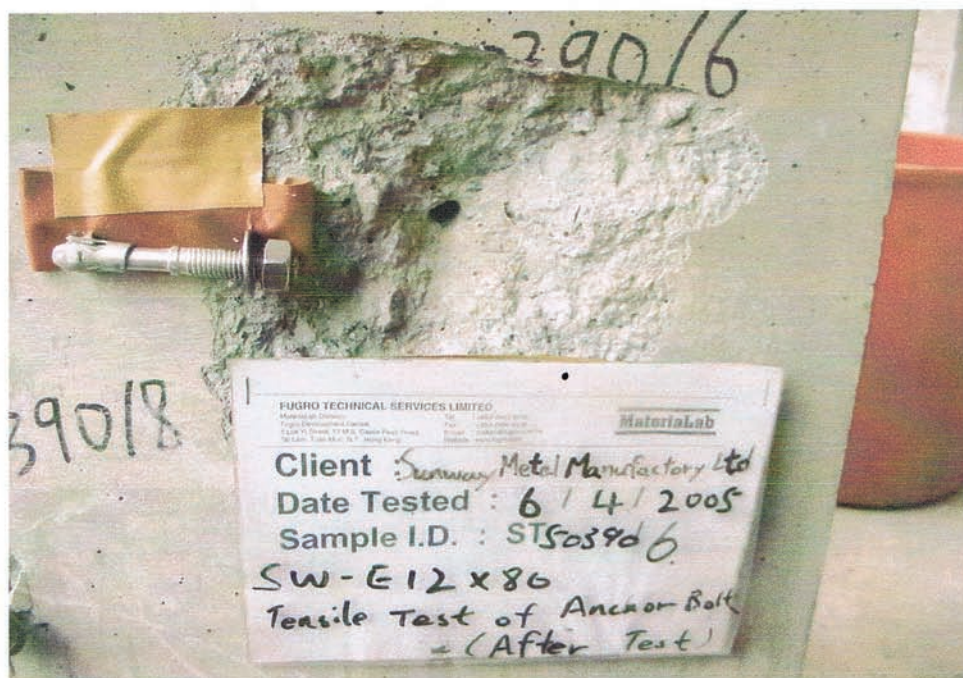
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Before Test
Sample I.D. : ST50390/6



After Test
Sample I.D. : ST50390/6



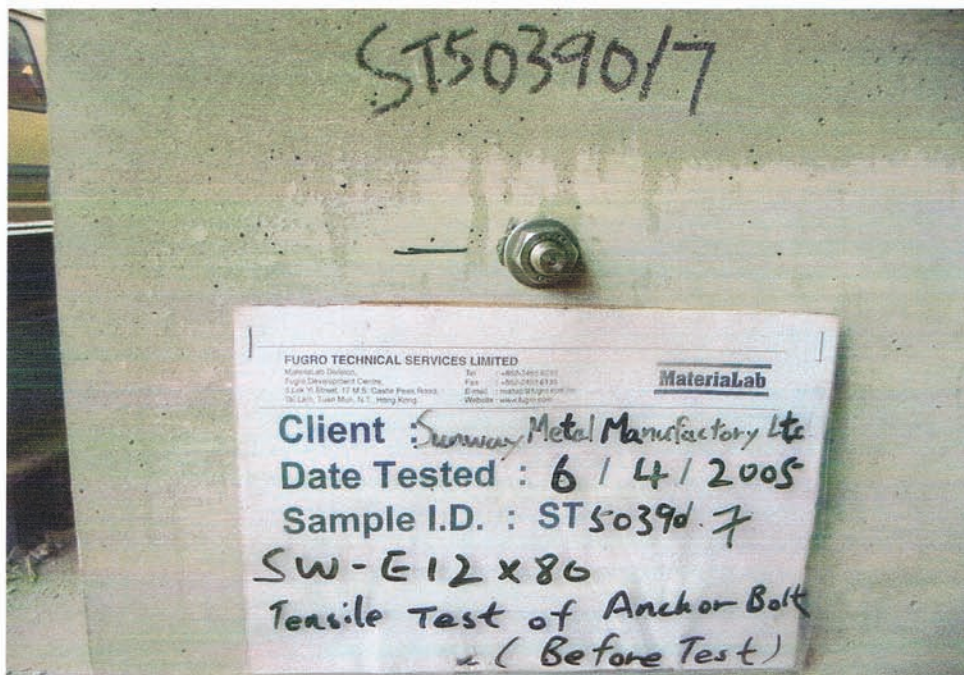
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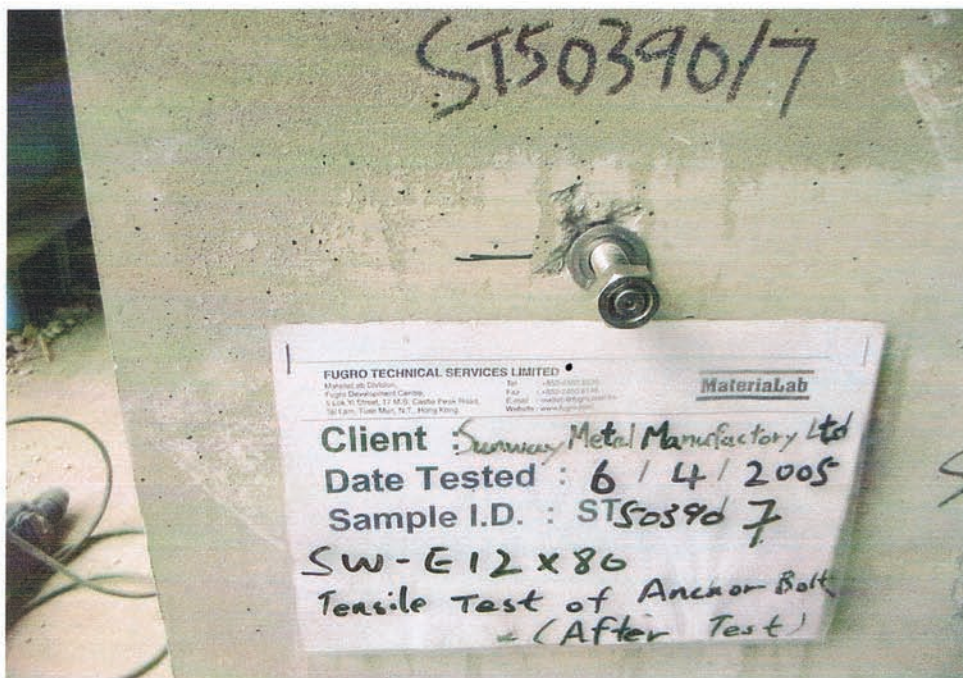
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Before Test
Sample I.D. : ST50390/7



After Test
Sample I.D. : ST50390/7

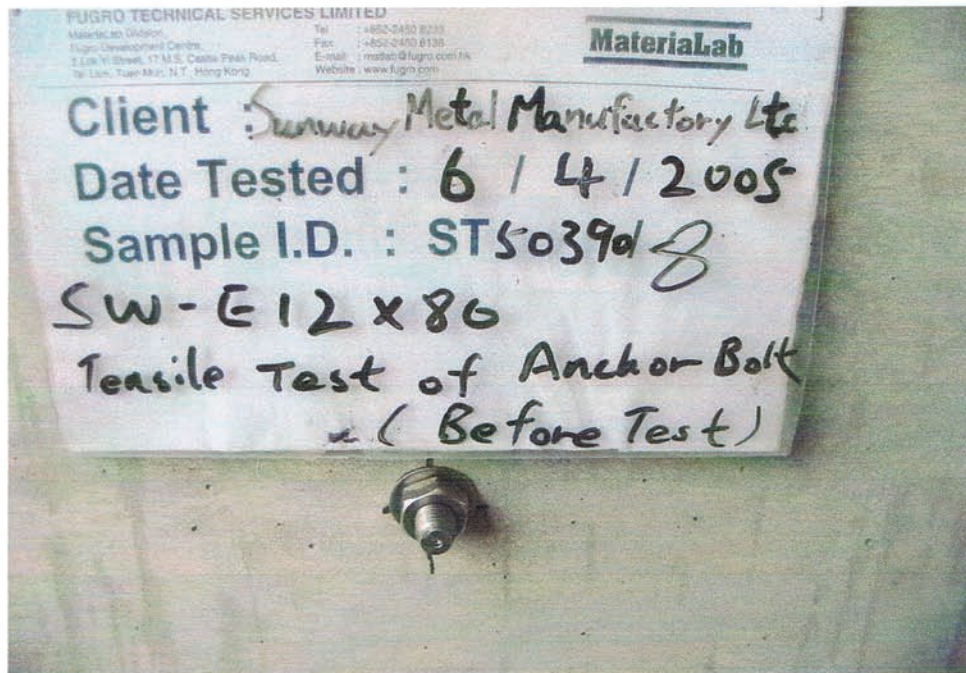
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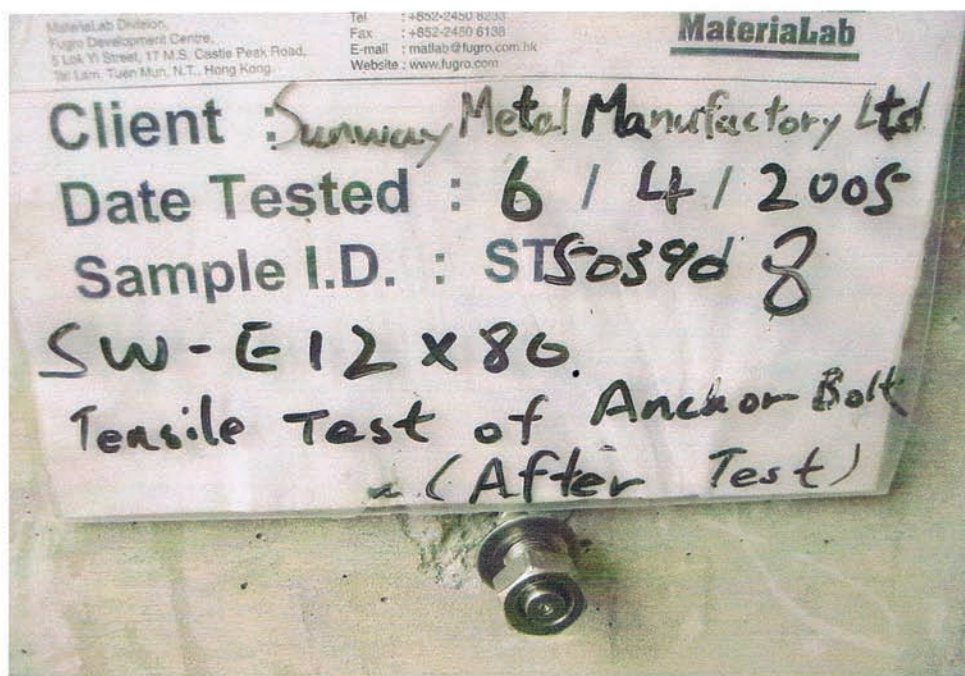
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.fugro.com

MaterialLab

Client Ref. : --
Report No. : 032154ST50390



Before Test
Sample I.D. : ST50390/8



After Test
Sample I.D. : ST50390/8



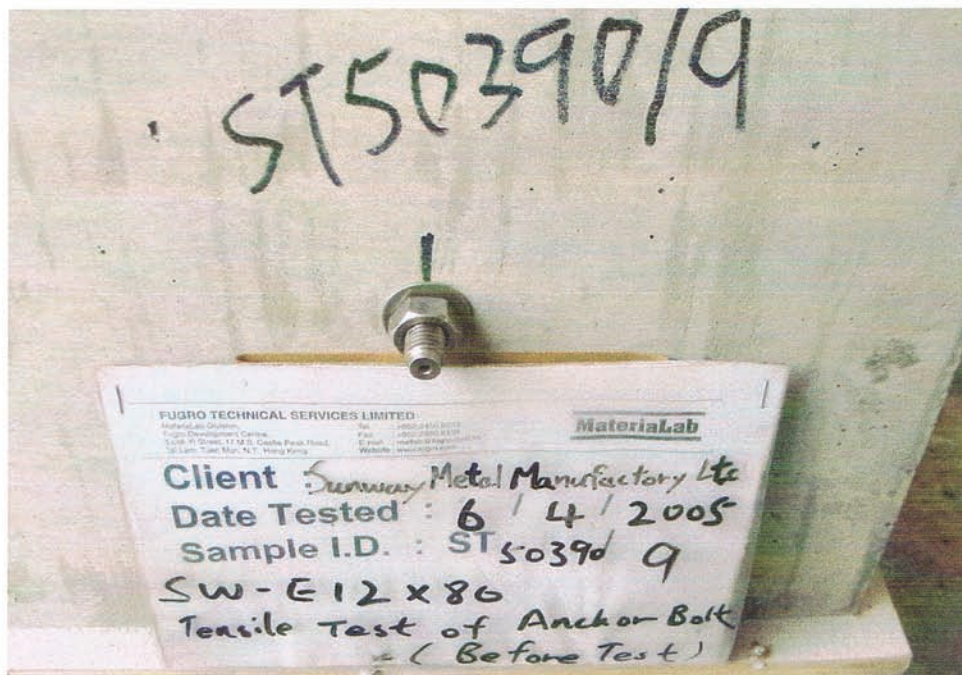
FUGRO TECHNICAL SERVICES LIMITED

MaterialLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.

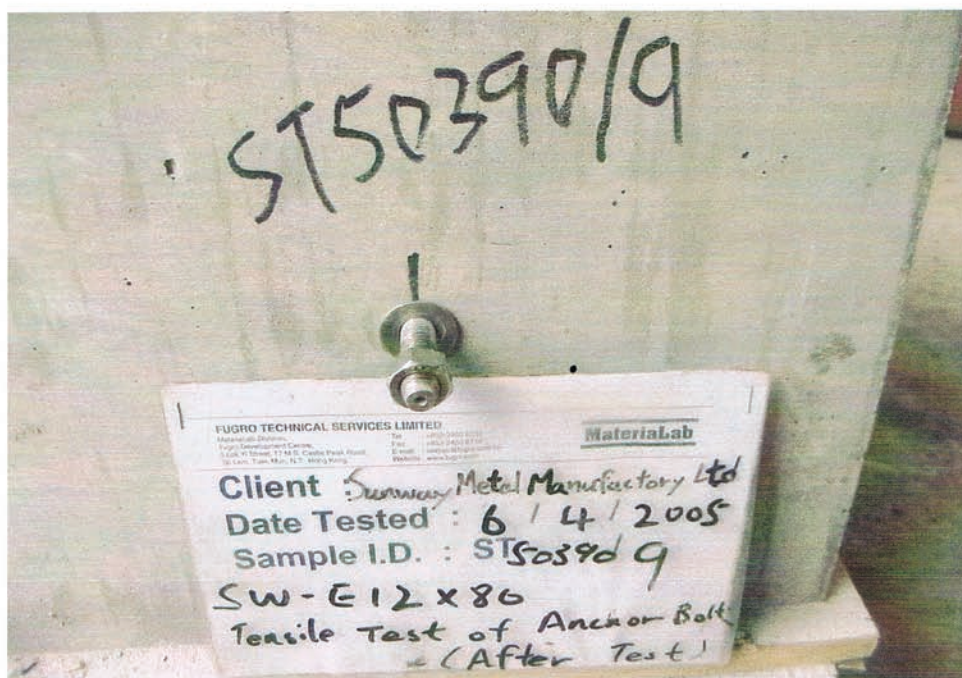
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Report No. : 032154ST50390



Before Test
Sample I.D. : ST50390/9



After Test
Sample I.D. : ST50390/9



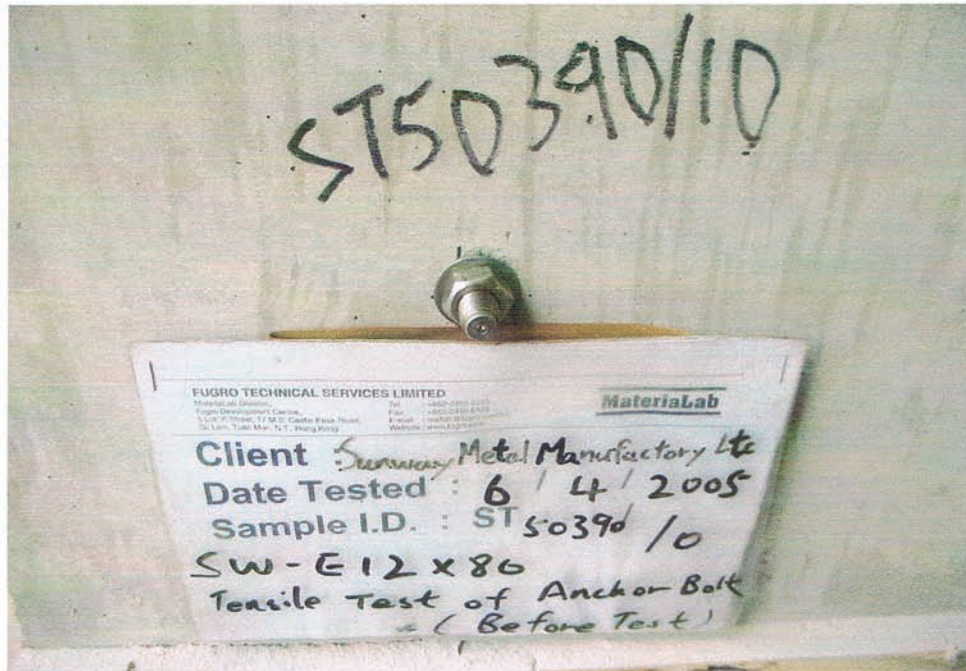
FUGRO TECHNICAL SERVICES LIMITED

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Tai Lam, Tuen Mun, N.T., Hong Kong.

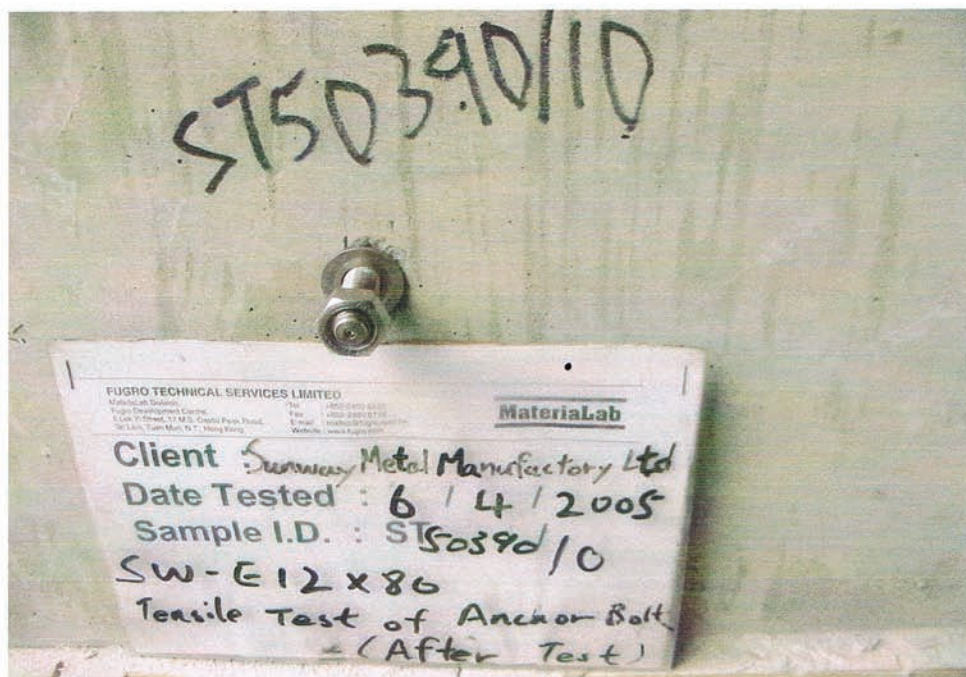
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Report No. : 032154ST50390



Before Test
Sample I.D. : ST50390/10



After Test
Sample I.D. : ST50390/10

