



Detroit Testing Laboratory, Inc.

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TEST REPORT

REDDI-WALL INC
1075 ROCHESTER ROAD
OAKLAND, MI 48363

DTL REPORT NO5041068 REV1
REPORT DATE 10/28/05
RECEIVE DATE 06/14/05
CUSTOMER REF 490

ATTN: GLORIA MARTIN

SAMPLE DESCRIPTION

Reddi-Wall submitted four Wall sections. The samples were labeled #1, 2, 3 and 5 by Reddi-Wall.

WORK REQUESTED/TEST SPECIFICATIONS

Transverse Loading per ASTM E 72-05 dated May 1, 2005, provided by Reddi-Wall.

REFERENCE DOCUMENTS

2003 Michigan Building Code dated April 2004 provided by Reddi-Wall.
Illustration of sample cross sections provided by Reddi-Wall.

CONCLUSION

All samples met the requirements of the specification for a 100 mph wind load.

Since the samples were tested to failure, the following conclusions can be drawn.

- All samples met the requirements of maximum pressure produced by a 170 mph wind load (52.0 lb/ft²; reference Table 1609.6.2.1(2) of 2003 Michigan Building Code).
- All samples met the requirements of the maximum soil load pressure properly backfilled (100 lb/ft²; reference Table 1610.1 of 2003 Michigan Building Code).

TEST RESULTS

Transverse Loading – Specimen Horizontal

Procedure

Prior to mounting the sample on the transverse load, fixturing the foam along the outer edge on the under side of each wall sample was removed.

Each sample was set on two 1" x 6" x 60" steel plates that spanned the width of the sample. Each steel plate had a roller that was attached to the center of the opposite side to the steel plate with a span of 10.5 feet between each plate.

The load was applied through two steel rollers that were attached to the center of a 1" x 6" x 60" steel plate that spanned the width of the sample with the flat surface of the plate against the surface of the sample. Each plate was located approximately 25% of the spanned distance between the supports, toward the middle of the specimen.

The load was applied to the inside face of all four specimens in increments of 500 lbs except where noted.

A deflection gage was rigidly mounted independent of the specimen. The deflection gage was placed on the longitudinal centerline of the specimen. The gage was monitored throughout the test and data was recorded at each incremental load.

Results

Test	Sample	Description	L/240 Reached		Total Load (lb)
			(lb)	(lb/ft ²)	
1	1	No re-rod	6025	120.5	6025
2	2	#3 re-rod center of holes, 2 places	6141	122.8	6141
3	5	#3 re-rod every other hole, staggered	8750	175	13250
4	3	#4 re-rod every hole, staggered	9250	185	21050+

Note: Inclusive in reported loads is the approximate weight of the specimen and the weight of the setup of 2,000 lbs. and 750 lbs., respectively.

TEST RESULTS CONTINUED

Refer to Attachment A for Transverse Load Photographs.
Refer to Attachment B for Sample Cross Section Illustrations.
Refer to Attachment C for Load vs. Deflection Tables and Observations.

Requirements

Samples must not exceed deflection of $L/240$ under 100 mph wind load.

Per Table 1609.6.2.1(2) of 2003 Michigan Building Code maximum pressure produced by 100 mph on a wall with an effective wall area 10 ft^2 is 18.0 lb/ft^2 .

TEST EQUIPMENT

Detroit Testing Laboratory, Inc.'s calibration system meets the requirements of ISO 17025:1999.

Signal Conditioner, Daytronic, Model 3270, I.D. #04687, Calibrated to 04/29/06.

Decade Resistor, Ohmite, Model 3416, I.D. #04991, Calibrated to 06/28/06.

Load Cell (25k), GSE, Model 4652-25k, I.D. #01136, Calibrated to 04/09/06.

Digital Indicator, Mitutoyo, Model ID-C1050ER, I.D. #11114, Calibrated to 12/22/05.

Plotter, Hewlett Packard, Model 7090A, I.D. #09345, Calibrated to 07/14/06.

ATTACHMENTS

Attachment A: Test Photographs (4 pages)

Attachment B: Sample Cross Section Illustrations (1 page)

Attachment C: Load vs. Deflection Tables and Observations (3 pages)

REMARKS

Changes made to original report dated 09/12/05. Results, requirements and conclusion sections revised. Reference documentation added. Attachments B and C added.

SAMPLE DISPOSITION

Samples are to be disposed of by DTL.

Reported by:

DETROIT TESTING LABORATORY, INC.



Anthony Lazzara, Test Technician
Vehicle & Component Testing

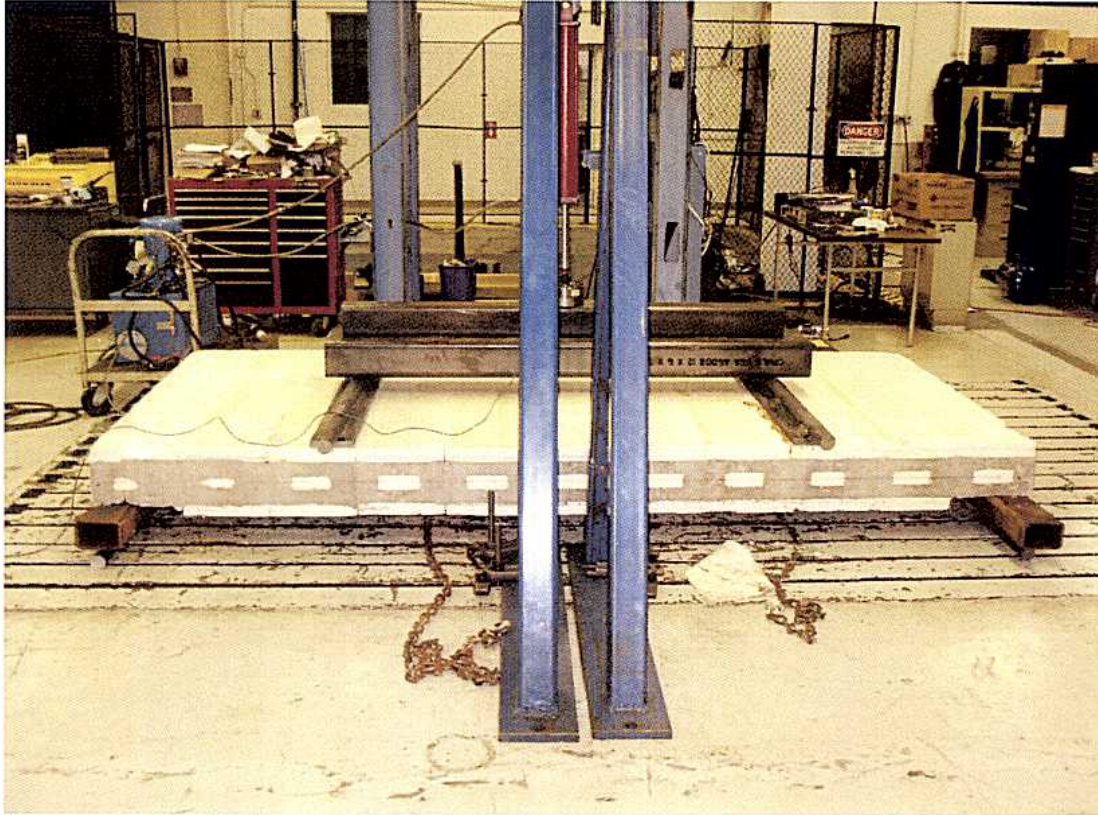


Marc Sanderson, Program Manager
Vehicle & Component Testing

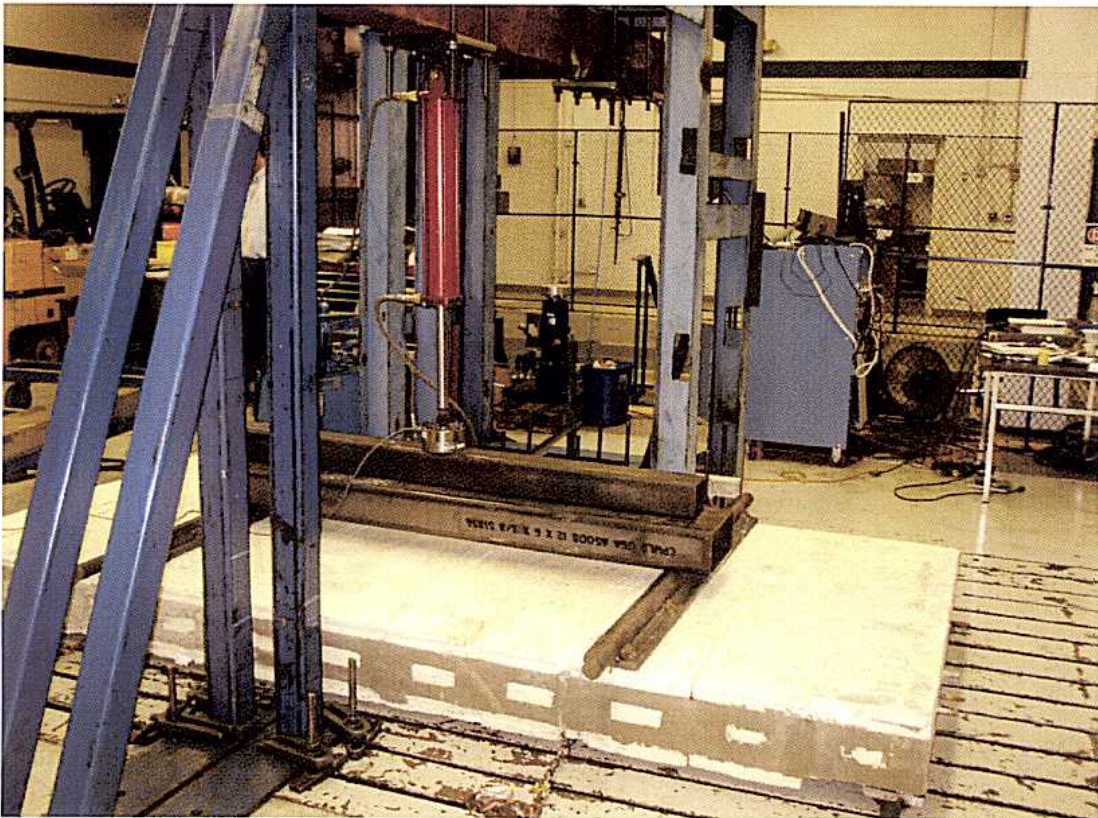
AL/MS/sr

Enclosure: Terms and Conditions

DTL Test Report # 5041068
Reddi Wall Transverse Load Test
Attachment A Test Photographs

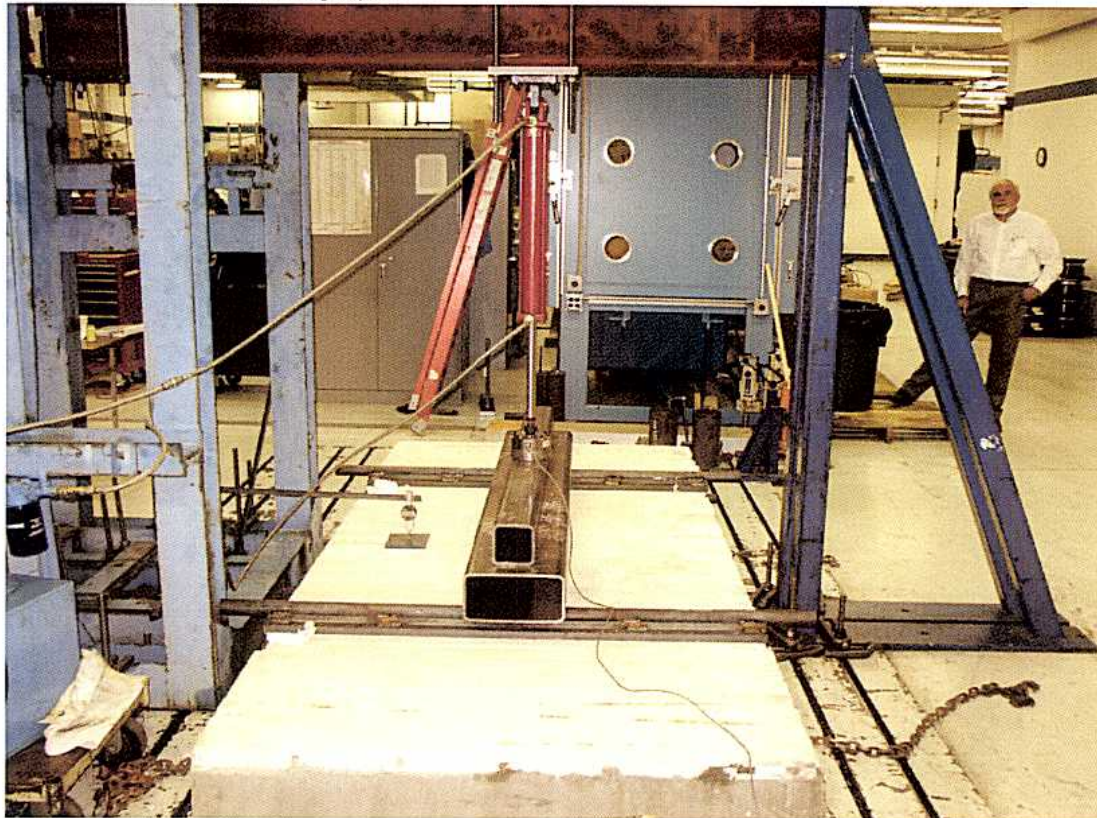


Transverse Load Set up

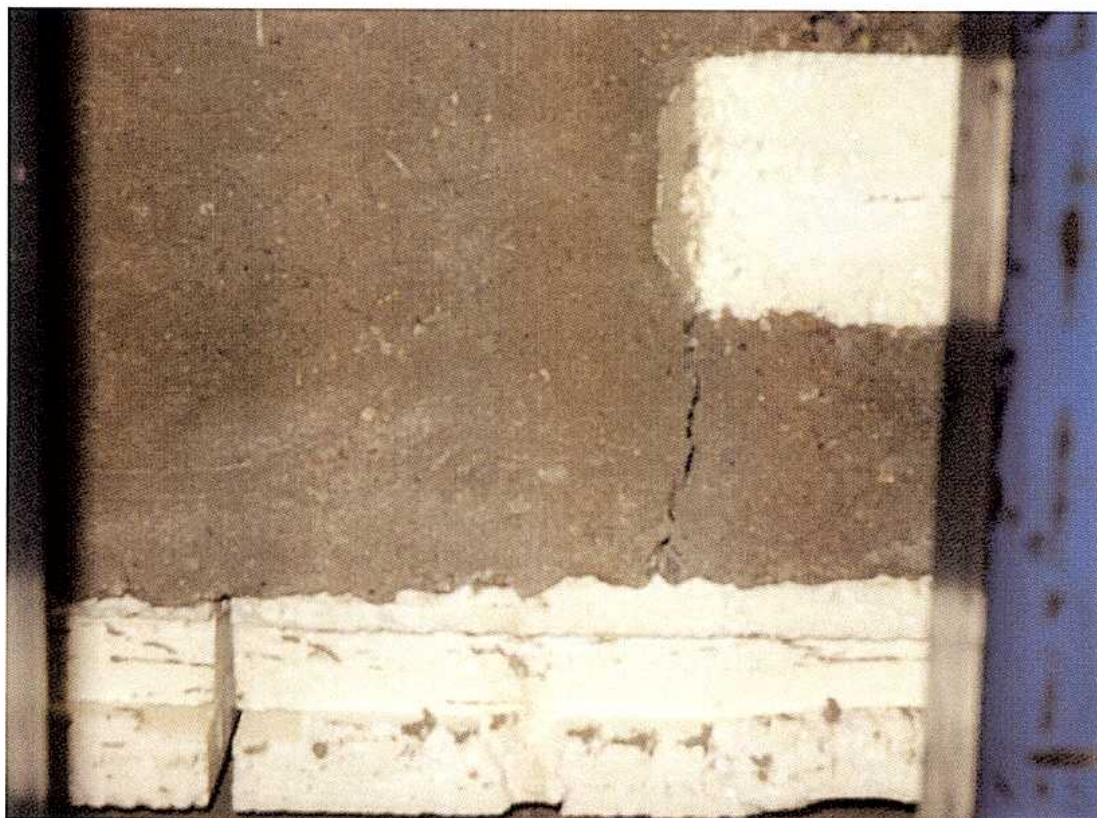


Transverse Load Set up

DTL Test Report # 5041068
Reddi Wall Transverse Load Test
Attachment A Test Photographs



Transverse Load Set up

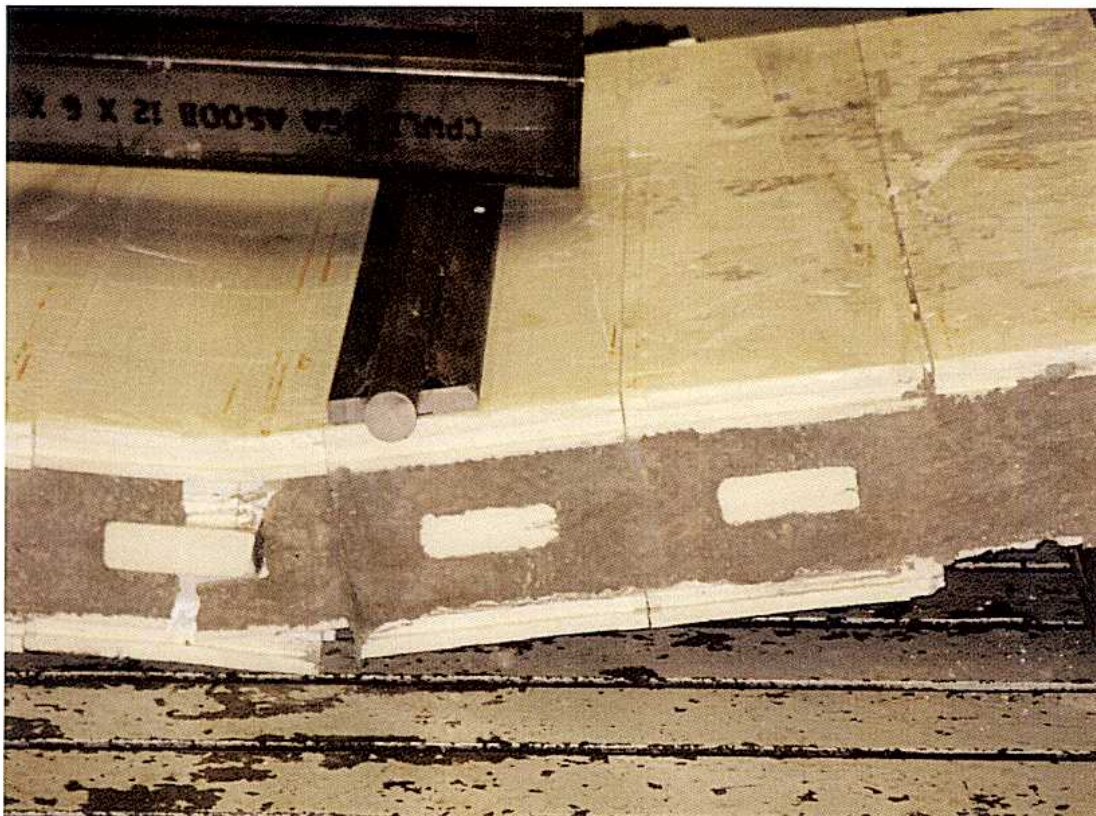


Sample 5 Fracture Close up

DTL Test Report # 5041068
Reddi Wall Transverse Load Test
Attachment A Test Photographs

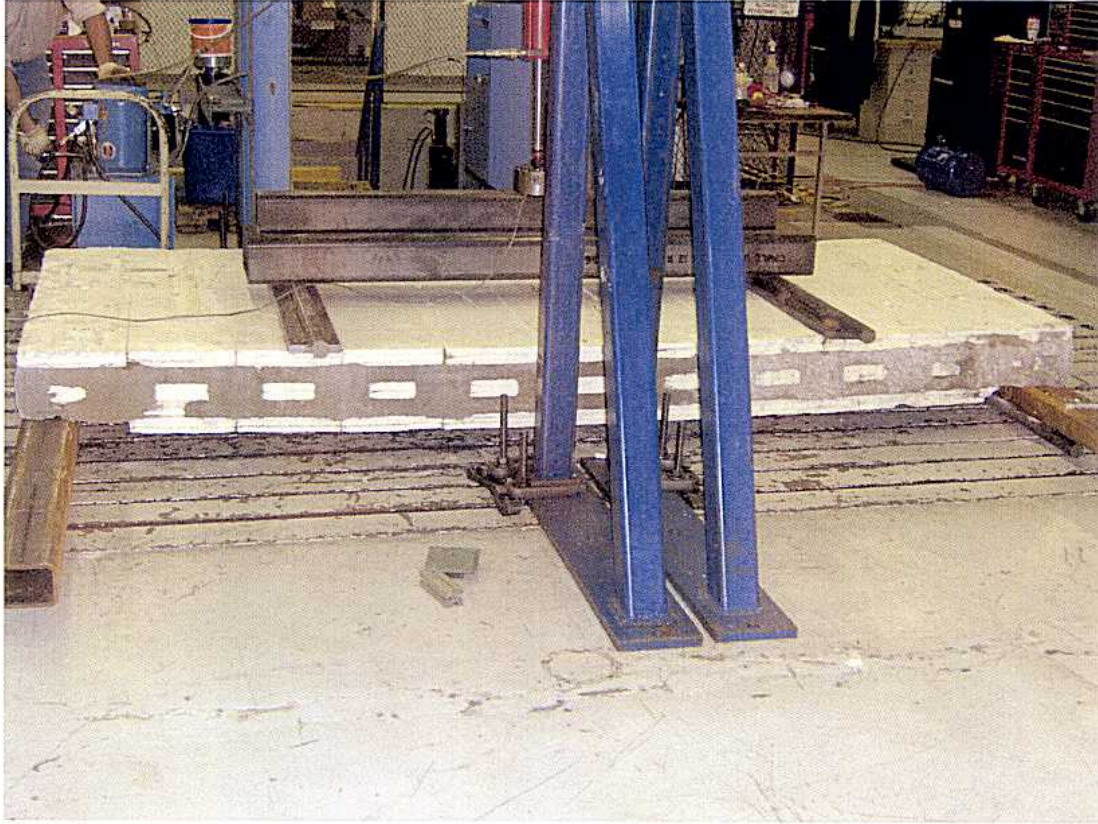


Sample 1 Fracture Close up



Sample 2 Fracture

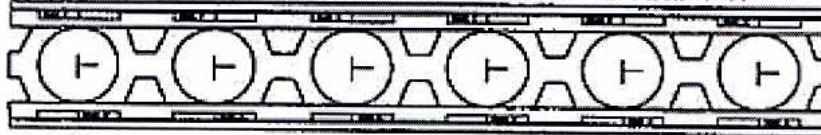
DTL Test Report # 5041068
Reddi Wall Transverse Load Test
Attachment A Test Photographs



Sample 3 Under Load

TEST SAMPLES

TEST #1 NO ROD FAILED AT 120.5 LBS./SQ. FT.



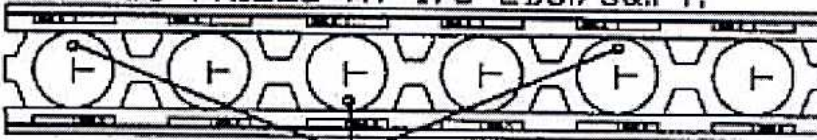
L/240 = 6,025 LBS
TOTAL LOAD 6,025 LBS.

TEST #2 FAILED AT 122.8 LBS./SQ. FT



L/240 = 6,141# # 3 GRADE 60 REROD
TOTAL LOAD 6,141 #

TEST #3 FAILED AT 175 LBS./SQ.FT.



L/240 = 8,750 # # 3 GRADE 60 REROD
TOTAL LOAD = 13,250 #

TEST #4 FAILED AT 185 LBS./SQ.FT



L/240 = 9,250 # #4 GRADE 60 RODS
TOTAL LOAD 21,050 #

DTL Test Report # 5041068 REV1
Reddi-Wall Transverse Load Test
Attachment C Load vs. Deflection Tables and Observations

Sample 1

Load (lb.)	Deflection (mm)
2750	0
3250	0.04
3750	Data N/A
4250	0.33
4750	0.62
5250	0.91
5750	1.33
6025	Fracture

Observations

- An audible crack was heard at 5550 lbs.
- Sample fractured through at 6025 lbs.

Sample 2

Load (lb.)	Deflection (mm)
2750	0
3250	0
3750	Data N/A
4250	0.20
4750	0.32
5250	0.47
5750	0.67
6141	Fracture

Observations

- Sample fractured through at 6141 lbs.

DTL Test Report # 5041068 REV1
Reddi-Wall Transverse Load Test
Attachment C Load vs. Deflection Tables and Observations

Sample 3

Load (lb.)	Deflection (mm)
2750	0
3250	0
3750	0
4250	0.29
4750	0.52
5250	0.77
5750	1.05
6250	1.81
6750	3.98
7250	5.20
7750	7.33
8250	9.43
8750	11.41
9250	12.34
9750	13.11
10250	13.77
10750	14.67
11250	15.54
11750	16.55
12250	17.71
12750	18.68
13250	19.62
13750	20.61
14250	21.65
14750	22.74
15250	23.70
15750	24.79
16250	25.72
16750	26.70
17250	28.15
17750	29.29
18250	30.22
18750	31.41
19250	32.45
19750	33.34
20250	35.20
20750	38.52

Observations

- Audible cracks were heard at 7250 and 8250 lbs.
- Stress cracks were observed below load rollers at 19750 lbs.
- Test was stopped maximum load of set up was achieved at 21050 lbs.

DTL Test Report # 5041068 REV1
Reddi-Wall Transverse Load Test
Attachment C Load vs. Deflection Tables and Observations

Sample 5

Load (lbs.)	Deflection (mm)
2750	0
3250	0.17
3750	0.23
4250	0.36
4750	0.52
5250	0.67
5750	0.85
6250	1.09
6750	8.55
7250	9.15
7750	9.87
8250	Data N/A
8750	12.50
9250	22.28
9750	23.19
10250	25.59
10750	26.46
11250	26.60
11750	26.68
12250	26.76
12750	26.85
13250	27.23

Observations

- Audible cracks were heard at 6250 lbs and 9250 lbs.
- Test was stopped at 13250 lbs because the sample had deflected to the point that it was bottoming out on the bed plate.

Detroit Testing Laboratory, Inc.

TERMS AND CONDITIONS

The following terms and conditions apply to all work performed by Detroit Testing Laboratory, Inc. (DTL), unless specifically exempted in writing by an officer of DTL.

1. **CONTRACT AGREEMENT/TERMS AND CONDITIONS:**

The Client, when placing an order with DTL, agrees that DTL's quotation, Terms and Conditions, the Client's purchase order, and DTL's agreement to perform testing shall constitute the entire contract between the Client and DTL. A purchase order issued to DTL shall not constitute a binding contract until it is accepted and acknowledged by DTL. It is assumed the Client accepts DTL's Terms and Conditions in lieu of the Client's Terms and Conditions on any orders placed with DTL.

2. **GOVERNING LAW:**

All contracts between DTL and the Client shall be deemed to be made and governed by the Laws of the State of Michigan. Any legal action brought by either the Client or DTL shall be brought in a court of competent jurisdiction in Macomb County, Michigan, or if the action is to be in federal court, in the U.S. District Court for the Eastern District of Michigan, Southern Division.

3. **QUOTATION PERIOD AND PRICING:**

Prices quoted by DTL remain in effect for thirty (30) days and are subject to change after that period. The prices contained in a quotation supplied by DTL apply specifically to the test or engineering program proposed in accordance with stated specifications and documentation provided to DTL at the time of quotation. DTL shall not be bound to this pricing for any subsequent testing, repeat testing, additions, and omissions to the test program or parts thereof. Pricing for materials purchased by DTL for use during the test program are subject to change as determined by the actual price paid by DTL upon delivery of material.

4. **PRICING REVISION:**

The Client representative requesting any testing or engineering quotation by DTL shall be considered an agent of the client and authorized to make technical and/or cost changes of any nature to the test procedures, specifications, or other Client documents. If DTL is required to submit a quotation without first receiving and reviewing applicable test specifications, any pricing submitted shall be subject to change when such specifications are made available to DTL.

5. **CREDIT TERMS AND PAYMENT:**

The acceptance of any purchase order by DTL shall be contingent upon approval of the Client's credit. Unless otherwise determined, terms of DTL's invoices shall be Net 30 days and payable in U.S. funds. Payment for the services rendered is the obligation of the Client issuing the purchase order or accepting the proposal. This obligation is not contingent on any specific result from DTL's services and may not be assigned without the written permission of DTL. If the Client fails to make payment within the agreed terms, DTL shall have the right to cease work and make all invoices immediately due and payable. In addition, DTL shall have the right to charge interest on all amounts not paid by the due date at the rate of 1% interest per month, compounded monthly, from the due date of payment.

6. **STANDARD PROCEDURES AND ACCREDITATION:**

DTL represents to the client that testing is done in accordance with standard procedures as applicable and that reported test results are accurate within generally acceptable commercial ranges of accuracy, unless another measure of accuracy has been agreed to in writing by DTL and the client. DTL's testing laboratories are accredited by A2LA in accordance with ISO 17025. It is the client's responsibility to ensure DTL is aware of any testing requiring accreditation.

7. **WARRANTIES:**

DTL performs services and hence its work and reports are not governed by the Uniform Commercial Code. Except as stated in paragraph 6, DTL disclaims all warranties, express or implied, including any warranties of merchantability or fitness for a particular purpose. DTL shall have no liability for incidental or consequential damages of any nature whatsoever.

8. **LIABILITY FOR TEST ITEMS:**

Due to the inherent risks associated with product testing and the difficulty determining the value of test items, DTL will not be liable for damage to or loss or destruction of the Client's property while in the possession of DTL. In the event that insurance coverage is required for any of the above conditions, it shall be the responsibility of the Client to obtain such coverage.

9. **CLIENT FURNISHED EQUIPMENT:**

In the event that the Client provides equipment, tooling, material, etc. to DTL for use during a test program, the Client hereby represents to DTL and warrants that any such equipment, material and tooling shall conform to all applicable specifications and understandings between the parties and shall in all other respects be suitable for the intended purpose. In no event will DTL be responsible for any delays or damages resulting from nonconforming or otherwise unsuitable equipment or material furnished by the Client. Aside from the responsibility of DTL to use reasonable care in protecting and handling any such equipment and material furnished by the Client, DTL shall have no further liability with respect thereto. Any such equipment, material, and tooling furnished by the Client and not consumed in the performance of testing shall be returned to the Client upon completion of all work hereunder in the same condition as received, reasonable/normal wear and tear excepted. Unless otherwise expressly provided, DTL shall retain title to and possession of all jigs, fixtures, tools, test equipment etc. made for or obtained for the furnishing of the testing service covered by the purchase order.

10. SCHEDULING/INTERRUPTIONS:

DTL will provide the Client, upon request, with a schedule for any test or engineering program. If for any reason the test or engineering program is interrupted by the Client, or by the failure of items under test, for a period of thirty (30) days, the completed portion of the work, including (but not limited to) supplies, materials, labor, and equipment utilization shall be billed to the Client and be payable within the agreed upon payment terms. In such circumstances where DTL agrees to place the program on hold, DTL may bill the Client stand-by charges, up to the full cost of established testing rates, until the test program resumes or is terminated by the client. If the test or engineering program is terminated by the client, DTL may impose a cancellation fee of no less than 10% of the unbilled portion of the program.

11. PROGRAM DELAYS:

DTL shall not be liable for any failure or delay in performance which is caused in whole or in part by acts of God (fire, flood, earthquakes, etc.), strikes or other labor disturbances, shut-downs, equipment breakdowns, unforeseen engineering problems, fuel shortages, Government priorities, or any other cause beyond the control of DTL.

12. PERIODIC BILLINGS:

If the service to be performed requires more than one month for completion, DTL may make monthly billings of the approximate percentage of the work completed each month, upon request, supplying with the interim invoice a progress report showing accomplishments to date.

13. FORENSIC TESTING SERVICES:

If the client desires forensic testing services, the client must mark each test sample supporting document and the test authorization form conspicuously as "LEGAL". Unless otherwise indicated in writing, prices quoted or charged by DTL do not include charges for any court appearance, expert witness testimony, deposition or affidavit, or preparation thereof, in connection with forensic testing services. Such charges will be computed at DTL's then prevailing hourly rates, plus expenses. All such charges must be prepaid by the client prior to such appearance, testimony, deposition or affidavit and, where required by law, advance court approval of charges must be obtained by the client at the client's expense.

14. COURT APPEARANCE BY DTL:

In the event that DTL, as a result of an order or subpoena issued by a court, is called upon to produce or testify in respect to a report, DTL will advise the client of the fact and the time and place of the scheduled hearing, if reasonable advance notice is given to DTL. If the client has any objections to DTL complying with such order or subpoena, it will be the client's obligation to present such objections to the court at or prior to the time specified in such order or subpoena, and to give timely notice to DTL of the results.

15. USE OF TEST REPORTS:

Test reports by DTL and related data and documents remain the exclusive property of DTL and the Client shall, upon full payment of DTL's fees for the testing project, be granted permission to reproduce the report to provide to third parties provided that said report is reproduced in its entirety and without any modification(s). DTL, as an independent testing laboratory, does not directly or indirectly endorse any product or service provided, or to be provided, by any of its Clients. Clients shall not in any way imply that the test results they obtain as a result of this kind of testing is an endorsement of any such product or service they provide. The customer is free to use the test results for internal evaluation purposes. The client shall not advertise, publish or otherwise communicate in any manner, the name, the seal or service mark, reports, test results, documentation or procedures of DTL, in whole or in part, without prior written approval of an officer of DTL. The client's actual or threatened failure to abide by this paragraph 15 may result in legal action by DTL for injunctive and other relief. In the event DTL seeks injunctive relief, the client will not contest that DTL will suffer immediate and irreparable harm if such relief is not granted. DTL will not release information it obtains from performing engineering or testing services to any party other than the party contracting for the services provided, unless ordered to do so by cognizant legal authority.

16. ACCEPTANCE OF TEST REPORTS:

DTL reports apply only to the specific samples tested under stated test conditions and test results are not necessarily indicative of the qualities of apparently identical or similar test or operating conditions. DTL shall have no liability for any deductions, inferences or generalizations drawn by the client or others from DTL reports. If the Client requests verification of any part of the test report, DTL shall be notified within thirty (30) days of submission of the report to the Client. Failure to notify within this thirty (30) day period acknowledges acceptance of the report. Should additional work be required for verification purposes, DTL shall be entitled to the reasonable value of the additional work involved providing the original findings are verified. Payment for any test program and applicable test report shall not be contingent upon acceptance and/or approval of a third party.

17. SAMPLE/DATA RETENTION

Samples will be destroyed thirty (30) days after the date of the final report, unless the client indicates otherwise in writing and prepays before the expiration of said thirty (30) day period the entire cost of any storing, packaging and shipping the sample(s) by DTL. DTL shall have no obligation to retain its test reports or related data and documents beyond its normal retention periods.

18. SHIPPING/TRANSPORTATION

The Client shall be responsible for the transportation and any associated shipping costs of Client's property to and from DTL's Testing Laboratory.