

Collection of Product Tests

ECO-WOLF, INC.
333 West Marion Avenue, Suite 15
Edgewater, FL 32132
Toll Free 877.716.4820 • Office 386.428.4722
www.transomrepair.net

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A Collection of Tests, by SICOMP,

Swedish Institute of Composites

Three Point Bending Test

- Comparison of conventional single skin laminates to laminates with recycled fiberglass mix cores of similar surface weight.

Mean Values of Five Samples:	Control Laminate (A)	Seacast™ Laminate (A)	Control Laminate (B)	Seacast™ Laminate (B)
Surface Weight	6.0 kg/m ³	6.7 kg/m ³	5.5 kg/m ³	5.5 kg/m ³
Thickness	4.4 mm	5.7 mm	3.6 mm	4.3 mm
Width	26.6 mm	26.4 mm	31.3 mm	31 mm
Density	1.38	1.17	1.52	1.28
Virgin Fibre Content	38 %	17 %	42 %	21 %
Bending Strength	202 MPa	150 MPa	218 MPa	177 MPa
Bending Load at Break	720 N	880 N	587 N	737 N

Water Absorption Test

- A water absorption test was performed when 50x50 mm coupons of the laminates was immersed in distilled water at room temperature. The test was proceeding for 16 weeks and measurements were taken by weighting the samples periodically. Results indicating no significant water absorption are presented.

Mean Values of Five Samples	Control Laminate (A)	Seacast™ Laminate (A)
1 Week	0.31 %	0.27 %
6 Weeks	0.70 %	0.68 %
16 Weeks	0.95 %	1.10 %

Fatigue Test

- A fatigue test was performed in three-point bending for the laminates. The load-span chosen was determined to cover 80-100 % of static load at break for the controlled laminates. The results presented in table, below, indicates that the recycled fiberglass mix laminates have at least twice the fatigue life at each load in comparison to the control laminates.

Load	Control Laminate (B) Cycles	Seacast™ Laminate (B) Cycles
416 N	30,000-40,000	60,000-150,000
468 N	6,000-8,000	15,000-25,000
520 N	1	6-15

Conclusion

- Applications for recycled thermoset composites have been demonstrated in this study, from SICOMP. Recycled fiberglass mix cores are showing a potential to be used as spray able core materials in marine applications. Flexural strength and screw-holding strength for sandwich laminates made with the recycled fiberglass mix core are superior to the laminates made with plywood cores. It has also shown better properties than coremat. Recycled fiberglass mix has also useful for cores replacing the middle part of conventional single-skin laminates and still maintaining flexural strength and fatigue properties.

References

1. Kelderman H. ERCOM's Reinforced Plastics Reprocessing, DSM Resins by Zwolle, The Netherlands
2. Pettersson J., Skrifvars M., Hedlund-Astrum A., Atervinning av hardplastkomodtjer, Sicomp TR 95-005
3. Scrap from spray-up can be "plowed back", Modern Plastics, Feb. 1990
4. Mechanical Recycling of Fibre-Reinforced Thermosets in spray-up applications. Part II b: Mechanical properties of different scrap-mix formulations. SICOMP CR 95-026



Chemicals

Division of United States Steel Corporation

FLORENCE, KENTUCKY 41042

May 6, 1985

Ref: 85-CTH85-038

Seavolf Design Group
1426 Beacon Street
New Smyrna Beach, FL 37069

Attention: Mr. Wolfgang Unger

Dear Wolf:

The results of Dr. Rogers's samples submitted to be identified to be USS Chemicals Polyester resin with and without microspheres, yielded the following results when tested by the lap shear bonding test:

1. With microspheres - 4,200 psi (average of 3 samples).
2. Without microspheres - 3,950 psi (average of 3 samples).

2,000 psi is considered poor and very borderline.
3,000 psi is considered good and very acceptable.
4,000 psi is considered excellent.

Sincerely,

C. T. Hicks
Technical Director

Jg

This information is supplied as a service only. It is taken from sources based upon data believed to be reliable; however, USS Chemicals Division of United States Steel Corporation makes no warranty, guarantee, or representation as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions or circumstances.

REPLY TO ACRYLIC SHEET UNIT: 7350 Empire Drive, Florence, Kentucky 41042-2882 (606) 283-1501

The Alpha Corporation



at Tennessee
Post Office Box 870
Columbia, Tennessee 38417

001/889-2460
FAX 001/883-7440

Jack Riggelman
President of
Clinical Resources

PAGE COVER SHEET

TO WOLFGANG WINGER SEA WOLF

FAX 904/423-0821

FROM JACK RIGGELMAN

RE: TRANXON CORE TEST SUMMARY

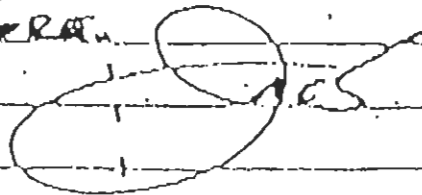
Total number of pages including cover sheet 2

REMARKS:

WOLFGANG -

SEA WOLF CORE LOOKS SLIGHTLY BETTER

THAN PLYWOOD CORE.



If you do not receive the correct number of legible pages, please
call 001/883-2460 and ask for JACK.

! - ALMOST 3 TIMES BETTER!



PROJECT SEAWOLF TRANSOM CORE

Div _____
by [Signature] Date 9/18-19/90

V. PLYWOOD TRANSOM CORE

Check LAB DATA CONTRACT ADAMS

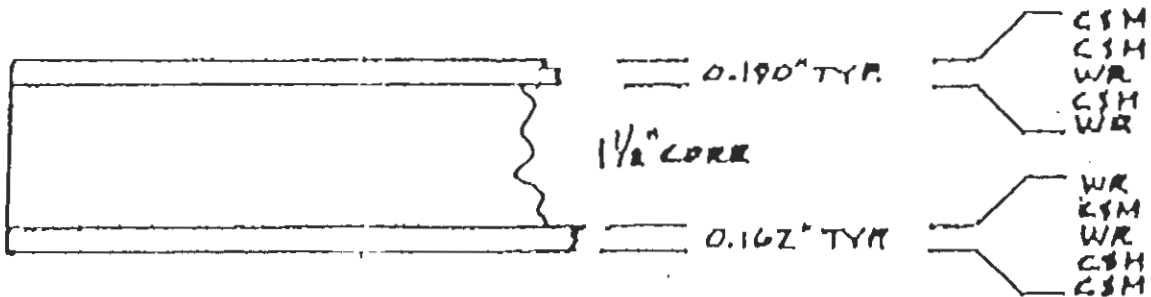
SUBJECT SAMPLES PREPARED BY SEAWOLF DESIGN

Rev _____ Date _____

App'd By _____ Date _____

TEST: FOUR POINT LOAD. SUPPORT SPAN: 20", LOAD SPAN: 6.667"

PANELS:



PLYWOOD CORE FABRICATED FROM 2 PIECES OF 3/4" PW
GLUED AT NEUTRAL AXIS OF PANEL.

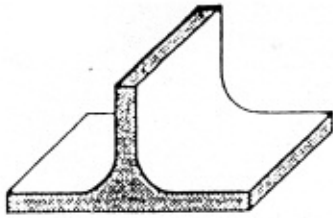
TEST RESULTS:

SEAWOLF CORE	MAX LOAD ^{lb}	δ"	FAILURE
SW-2-1B-CR-1	7260	0.895	TENSILE (LOW) SKIN
" 2	7584	0.785	FAILED WITH LOAD,
" 3	8243	—	RESOUNDING "BANG";
AVERAGE	7696	0.840	CORE FOLLOWED.

PLYWOOD CORE

STPW-2-1B 1	1970	0.200	PLYWOOD "SLIP"
1A ①	3207	0.395	SHEARED AT NEUTRAL
2	2304	0.232	AXIS BOND JOINT
2A ①	3312	0.920	IN ALL SAMPLES.
3	3279	0.313	
AVERAGE	2814	0.412	

① AFTER INITIAL FAILURE, NEUTRAL AXIS REBONDED WITH VERESI-LOG.



Structural Composites Inc.

Post Office Box 1300, Melbourne, FL 32902 USA

Tel. (407)951-9464

Fax. (407)728-9071

December 23, 1991

Mr. Wolfgang Unger, President
Seawolf Design Group, Inc.
1426 Beacon Street
New Smyrna Beach, FL 32069

Subject: Flexural Test Results

Dear Mr. Unger:

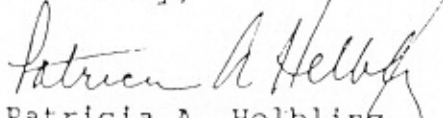
Structural Composites, Inc. has completed flexural testing on the three laminate panels you provided. The results are summarized below.

<u>Panel ID</u>	<u>Catalyst</u>	<u>Flex Strength</u>	<u>Flex Modulus</u>	<u>Max Load</u>
L panel	MEKP	17290 psi	903762 psi	6053 lb
M panel	BPO	17641 psi	845039 psi	6443 lb
Wood	none	10204 psi	1005342 psi	3598 lb

Data summaries from the tests, in the form of load to deflection graphs, are enclosed for your reference.

Please feel free to contact us if you have any questions or if we can be of further assistance. Thank you for selecting the Structural Composites, Inc. Laboratory for your testing services.

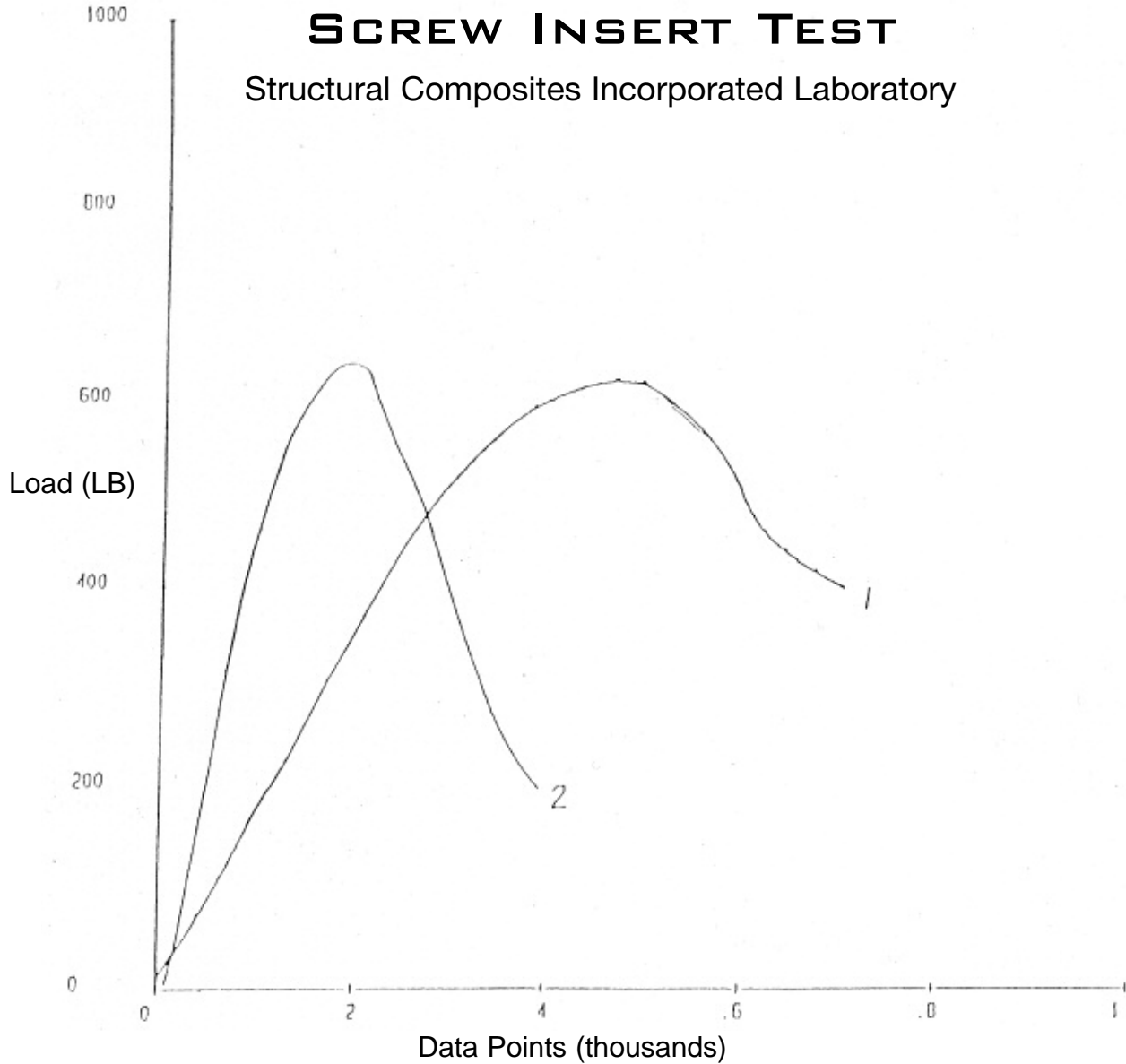
Sincerely,


Patricia A. Helbling
Executive Vice President

Enclosures

SCREW INSERT TEST

Structural Composites Incorporated Laboratory



#1 Sample #N-P4 (Seacast™)

Date: 01/30/1992

Temp: 75°F

Humidity: 60%

Tester: John

Location: Melbourne, Fl

Sample Depth: 1.1835 IN

Max Load: 621 LB

#2 Sample #Wood-P1

Date: 02/03/1992

Temp: 73°F

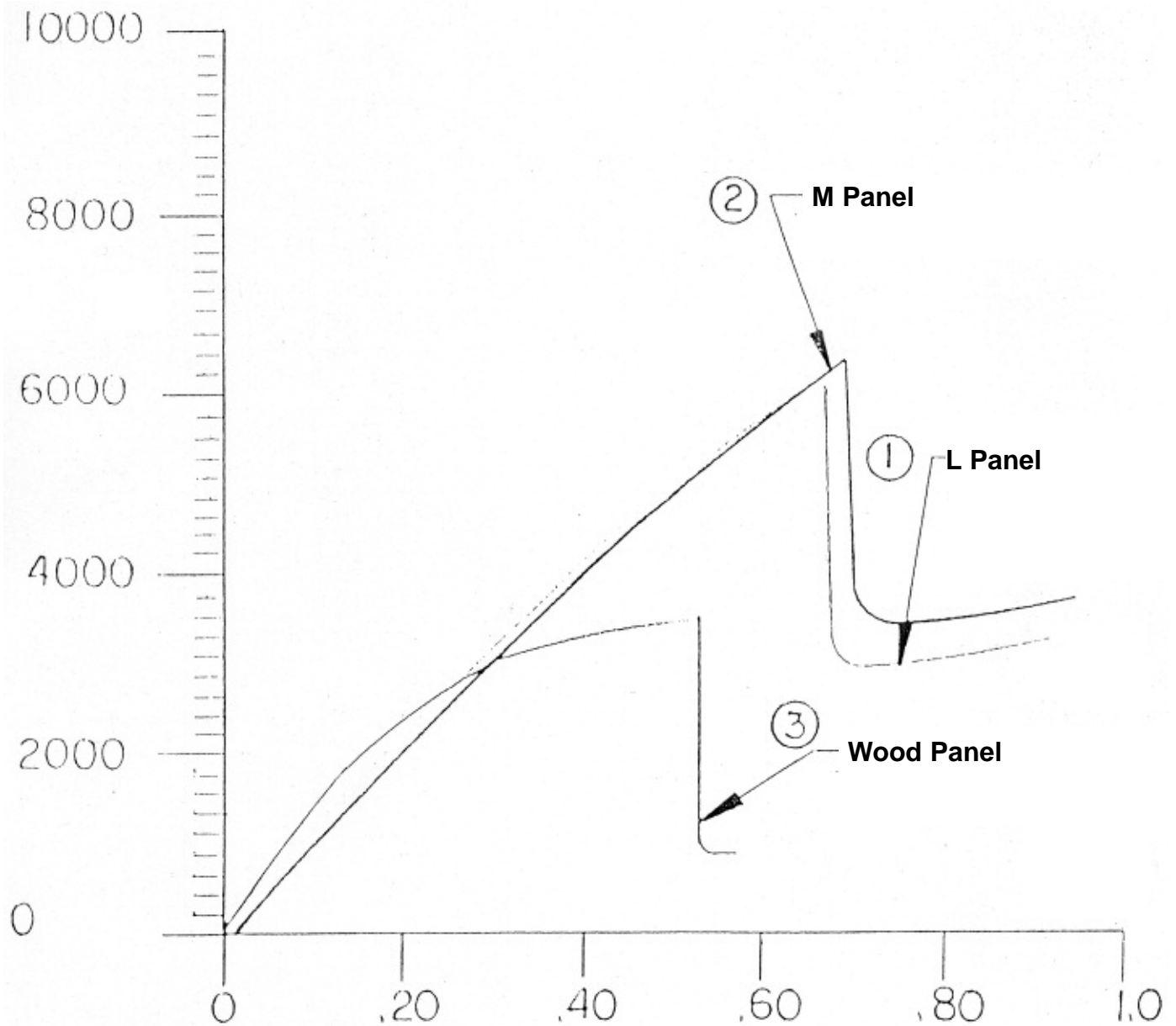
Humidity: 50%

Tester: John

Location: Melbourne, Fl

Sample Depth: 1.1125 IN

Max Load: 645 LB



Date: 12/23/91

Temp: 73°F

Humidity: 51

Width: 6 IN

Depth: 1.11 IN

Span: 14 IN

Mod Low: 500 LB

Mod High: 1500 LB

Tester: ARW

Location: Melbourne, Fl

1. Seacast™, panel L

Catalyst: MEKP

Flex Strength 17290 psi

Flex Modulus 903762 psi

Max Load 6053 LB

2. Seacast™, panel M

Catalyst: BPO

Flex Strength 17641 psi

Flex Modulus 845039 psi

Max Load 6443 LB

3. Wood, 21 ply hardwood

Flex Strength 10240 psi

Flex Modulus 1005342 psi

Max Load 3598 LB