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REPORT NUMBER: 6XC02-04

SUBJECT: S/T TRUCK FMVSS 216 ROOF CRUSH INVESTIGATION RESULTS

S/T TRUCK

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TEST OPERATIONS

FOR ANY CHANGES CONTACT: GRACE KARBOUSKY 6-396-7328
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Truck & Bus Group

Inter-Organization

PRODUCT EVALUATION & DEVELOPMENT
ENGINEERING EVALUATION REPORT

Page 1 of 3

SUBJECT: S/T TRUCK FMVSS 216 ROOF CRUSH INVESTIGATION RESULTS

TO: R. L. YOUNG 2203-11 *HY*

FROM: J. M. STANICK 3301-92 *LT*

T.V.O. NO. 6XC02-04 MODEL LINE S/T TRUCK MODEL YR 1992

PROCDR/FMVSS: FMVSS 216 UPC 1 VERB. # ENGINE

DATE EVAL FROM 15PE90 TO 30MY90 DATE PUBLISHED 120090

FINAL REPORT (X) PROGRESS REPORT () SUPPLEMENT NO. ()

OBJECTIVE

To determine the maximum achievable roof crush load when using the FMVSS 216 procedure.

Additionally, proposed enhancements were also tested to determine the likelihood of increasing the maximum achievable load for the three S/T cab types.

FOREWORD

A Federal NPRM has been issued that would require Light Duty trucks and multi-purpose vehicles to meet roof crush requirements similar to those currently applicable to passenger cars (FMVSS 216). The proposed effective date would impact vehicles produced after September 1, 1991.

Preliminary data is being obtained for inclusion in the GM response to the NPRM and for establishing design direction, if applicable.

SUMMARY OF TEST RESULTS

The maximum resistive load observed by the S/T Regular Cab was 5614 pounds. This load was achieved at approximately 2.0 inches of platten displacement.

The maximum resistive load observed by the S/T Extended Cab was 5950 pounds. This load was achieved at approximately 2.75 inches of platten displacement.

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SUMMARY OF TEST RESULTS - (Continued)

The maximum resistive load observed by the S/T 2-Door Utility was 6150 pounds. This load was achieved at approximately 3.25 inches of platten displacement.

Additionally, development tests were run to determine the performance increase attainable by specifically reinforcing the B-pillar in the Regular Cab. Reinforcing the B-pillar on the LH and RH sides of the vehicle showed an increase in observed resistive load of 580 pounds. The observed resistive load was further increased by 170 pounds with the addition of an extra seat belt D-Ring reinforcement lower in the B-pillar, near the cab belt line.

TEST MATERIAL

In this roof crush performance investigation, three S/T cab types were evaluated. The three were:

Regular Cab Pickup
Extended Cab Pickup
Two-Door Utility

The Extended Cab and Two-Door Utility were upgraded to include the roof reinforcements added to span the A and B pillars for 1992.

TEST PROCEDURE

GMUTS Test Procedure L-C01-2160 was used to conduct this evaluation.

TEST RESULTS

The S/T Regular Cab roof crush test was performed at the CPC Headquarters Test Laboratory. The plot of the roof crush test is attached as Graph #1. The peak load observed for the Regular Cab was 5614 pounds at 2.0 inches of platten displacement.

The S/T Extended Cab roof crush test was performed at the GM Truck & Bus Product Test and Development Laboratory. The plot of the roof crush test is attached as Graph #2. The peak load observed for the Extended Cab was 5950 pounds at 2.75 inches of platten displacement.

The S/T Two-Door Utility roof crush was performed at the GM Truck & Bus Product Test and Development Laboratory. The plot of the roof crush test is attached as Graph #3. The peak load observed for the Two-Door Utility was 6150 pounds at 3.25 inches of platten displacement.

Graph #4 is a composite plot showing the results of the three cabs tested for roof crush compared to the GMT 440 4-Door Utility which was previously tested (reference 60C22-39).

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Graph #3. The peak load observed for the Two-Door Utility was

TEST RESULTS - (Continued)

Additional testing was performed to determine the amount of improvement which would be observed in this test with the addition of a B-pillar reinforcement. To conduct this series of tests, S/T regular cab bodies were obtained from the Pontiac West Assembly plant. These cabs had no glass installations, but door latches and strikers were installed. Three tests were conducted, a baseline test of a regular cab with no modifications, a second test with the B-pillar reinforcement proposal installed, and a final test with the B-pillar reinforcement and the addition of a second seat belt D-ring installed lower in the B-pillar at the level of the bottom of the door glass opening. The results are as follows:

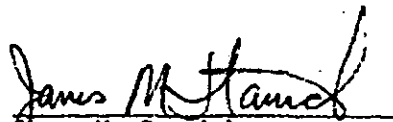
The Baseline cab roof crush resulted in a peak load of approximately 3600 pounds at 2.5 inches of platten displacement. This number is lower than the regular cab tested previously due to the omission of glass in the test buck.

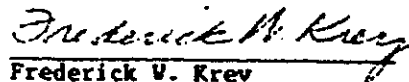
The cab with the B-pillar reinforcements installed resulted in a peak roof crush load of 4180 pounds at 2.5 inches of platten displacement, an increase of 580 pounds when compared to the Baseline cab.

The third cab with both the B-pillar reinforcement and the additional D-ring reinforcement installed resulted in a peak load for roof crush of 4350 pounds at 3.25 inches of platten displacement, an increase of 750 pounds when compared to the Baseline cab results.

Graph #5 is a comparison of the three tests described, Baseline, B-pillar reinforcement, and B-pillar reinforcement plus a second D-ring reinforcement.

As the cabs did not have glass installed, it is not possible to predict directly the results of complete cabs tested with the level one and level two B-pillar reinforcements. The test results of cabs without glass do clearly show a significant elevation of the peak load observed in the roof crush test with the B-pillar reinforcements in place.


 James M. Stanick
 Sr. Test Engineer
 Product Test and
 Development Laboratories

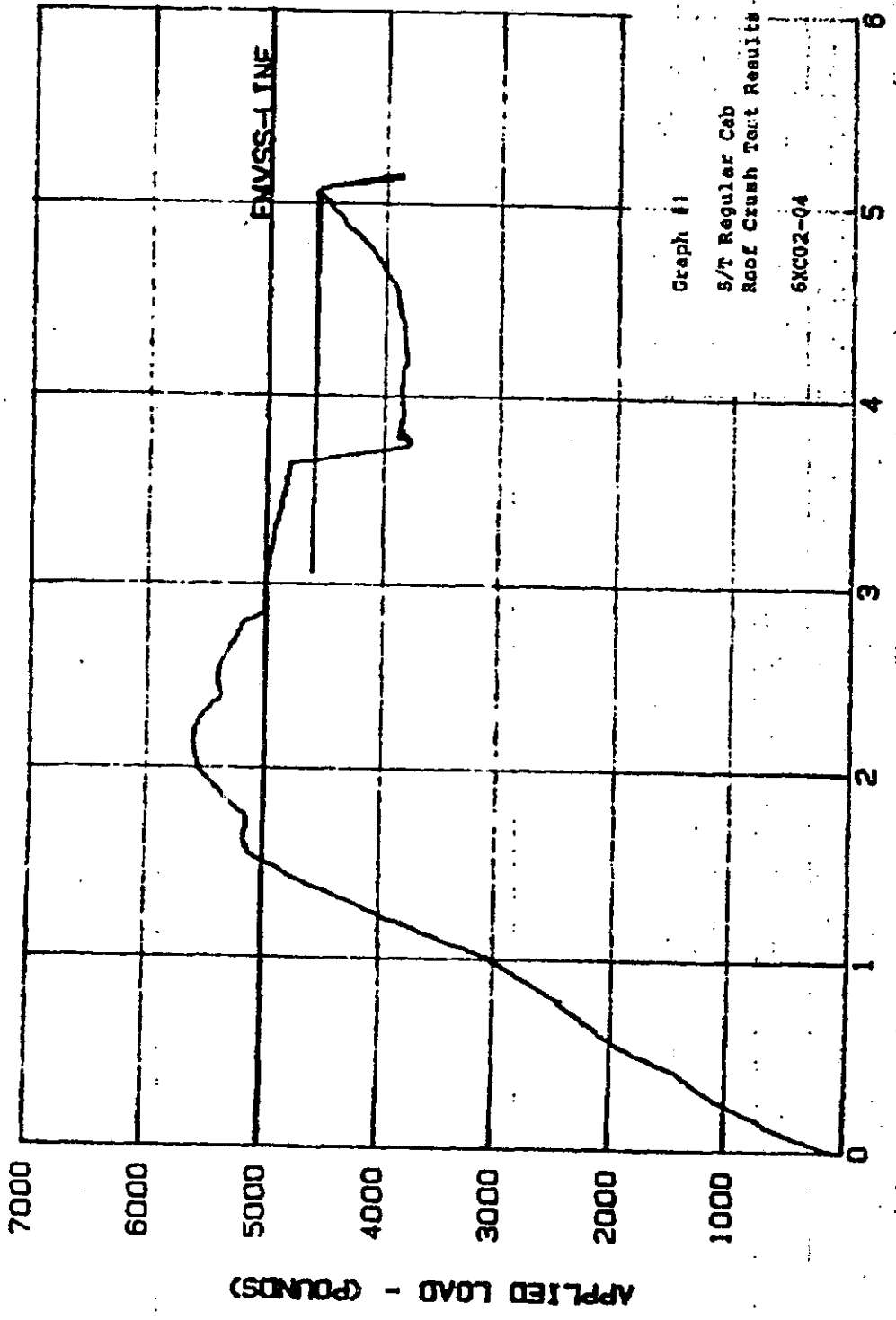

 Frederick V. Krey
 Supervisor, S/T Testing
 Product Test and
 Development Laboratories

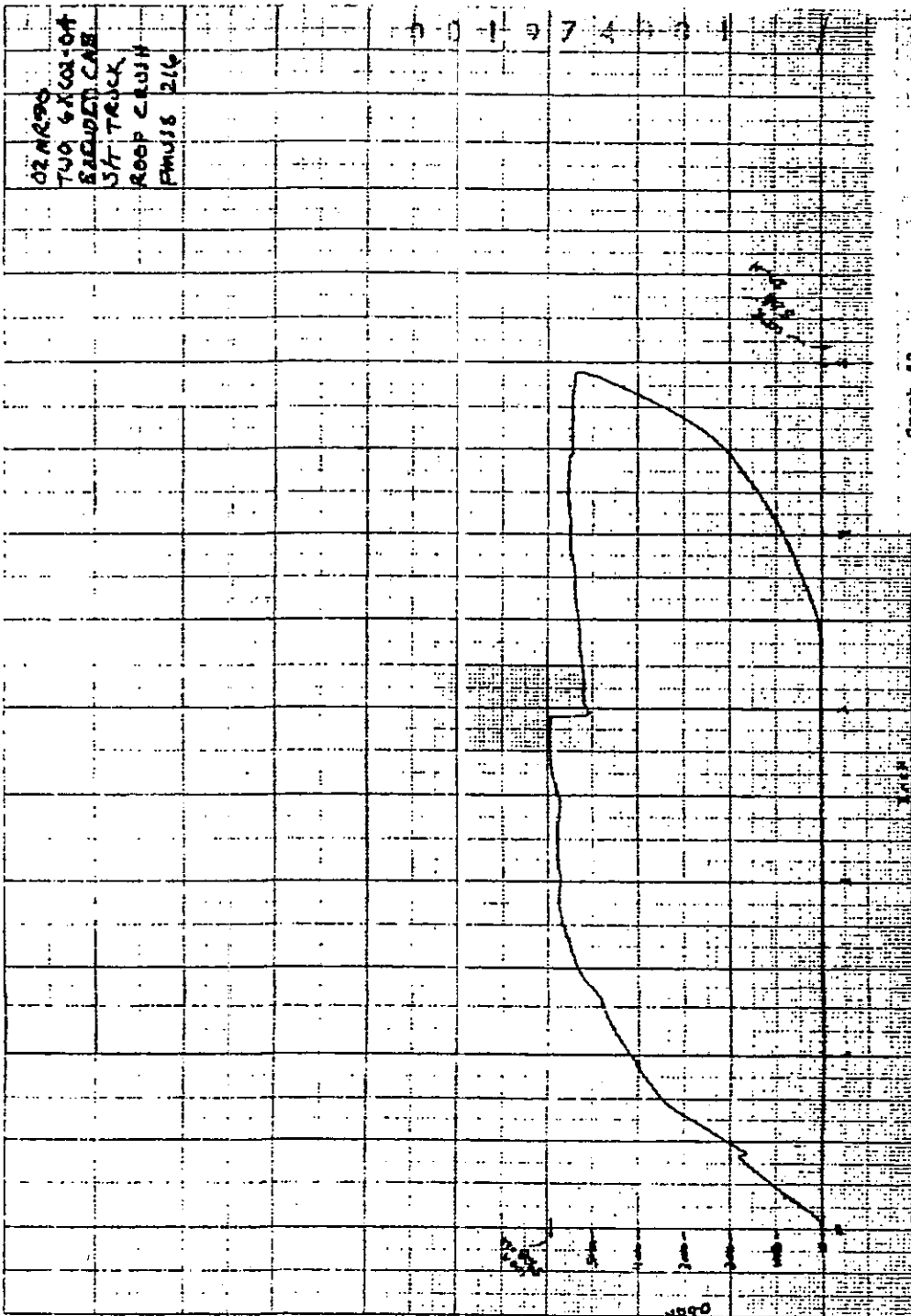
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ROOF CRUSH RESISTANCE

FILENAME R22FE906
ENGINEER W. PERRY
T.W.O. # 09002-416
DATE 22FE90

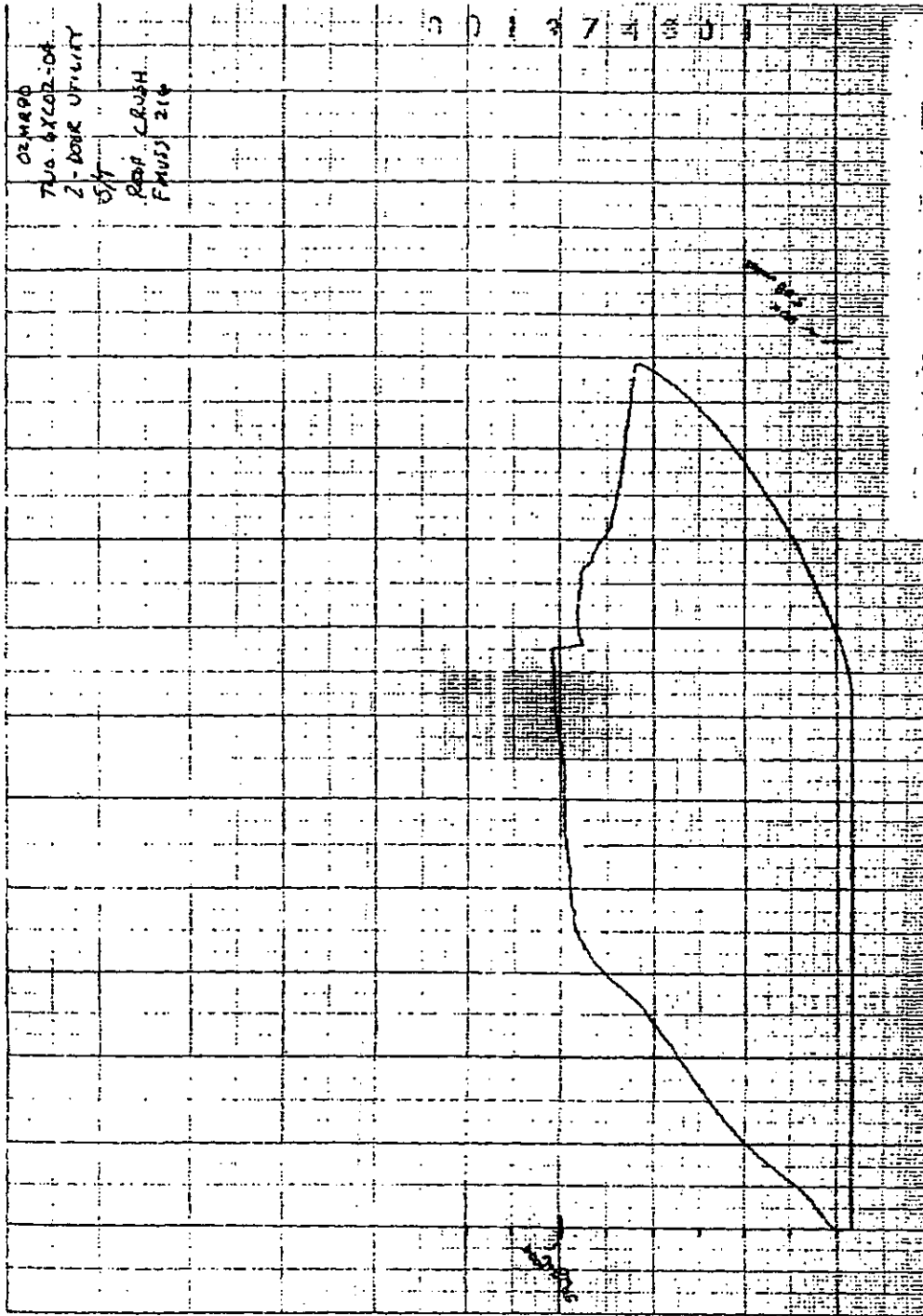




Graph #2

S/T Extended Cab
Roof Crush Test Results

6XC02-04



Graph #3

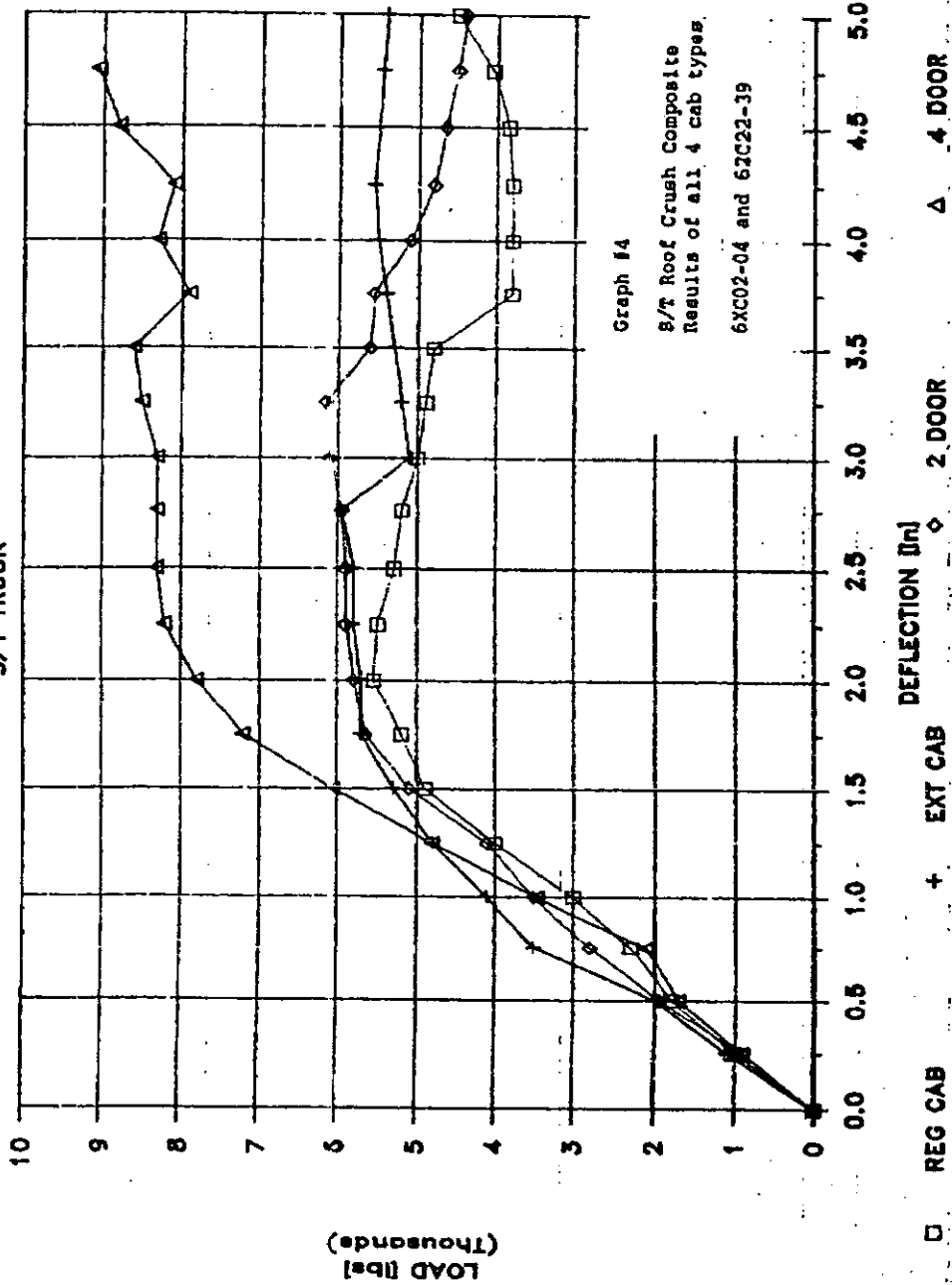
S/T 2 Door Utility
Roof Crush Test Results

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FMVSS 216 ROOF CRUSH

S/T TRUCK



Graph #4

S/T Roof Crush Composite
Results of all 4 Cab types

6XC02-04 and 6JC22-39

□ REG CAB + EXT CAB ◇ 2 DOOR △ 4 DOOR

ROOF CRUSH REINFORCEMENT DEVELOPMENT

