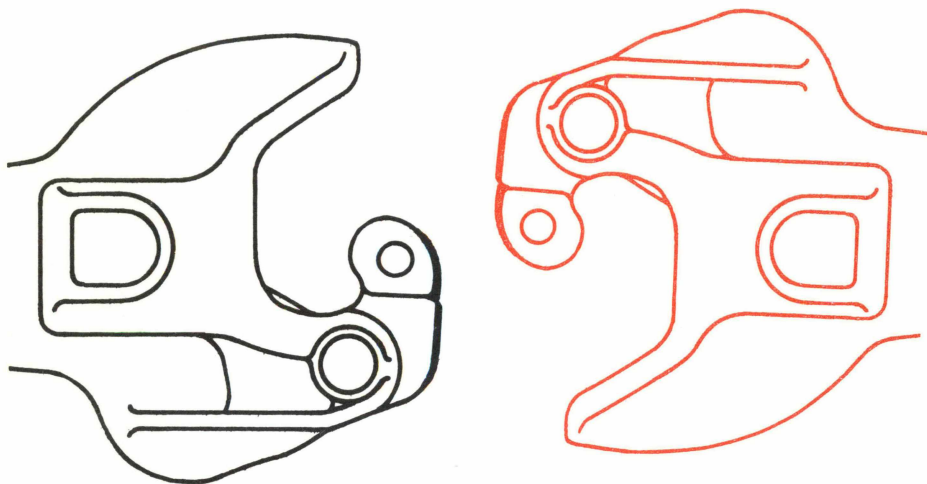

Draft Gear/Cushioning Unit Optimization for Train Action

Final Report-Volume 2



Track Train Dynamics Phase II-Task 5



An International Government-Industry
Research Program on Track Train Dynamics

R-363

03 - Rail Vehicles &
Components

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| 12. SUPPLEMENTARY NOTES See also Report R-308, Draft Gear/Cushioning Unit Optimization for Train Action, Interim Report. | | | | | |
| 13. ABSTRACT <p>This report describes a series of impact tests that were conducted by W. H. Miner, Inc., Research and Development Division, for the Draft Gear/Cushioning Unit Optimization Task of Track-Train Dynamics - Phase II.</p> <p>Using a special test fixture car, modified for these tests, buff and draft impact tests were conducted on two end-of-car cushioning units and two draft gears. Forces and displacements of the draft gears and cushioning units, over their active strokes, were recorded on magnetic tape for all of the impacts in the test series, at speeds of 1 to 6 mph. Force <u>vs.</u> displacement curves for each impact are presented.</p> <p>The test data was developed for future use in improving sub-routines in the Detailed Train Action Simulation Program. Within the scope of this task, it has also been used to develop guidelines for improving the in-train performance of draft gears and end-of-car cushioning units.</p> <p>The United States Government assumes no liability for the contents of this report or the use thereof.</p> <p>Volume I contains the main body of the report. This Volume II consists of the Appendices, containing all of the force <u>vs.</u> displacement curves.</p> | | | | | |
| 14. SUBJECT TERMS Coupler Forces; Cushioning Units; Draft Gear/Cushioning Unit Simulation; Draft Gears; Train Action | | | 15. AVAILABILITY STATEMENT Executive Director, Technical Center Association of American Railroads 3140 S. Federal Street Chicago, Illinois 60616 | | |

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10.0 APPENDICES

10.1 Appendix I

Force vs. Displacement Curves

For a Type 1, End-of-Car
Cushioning Unit

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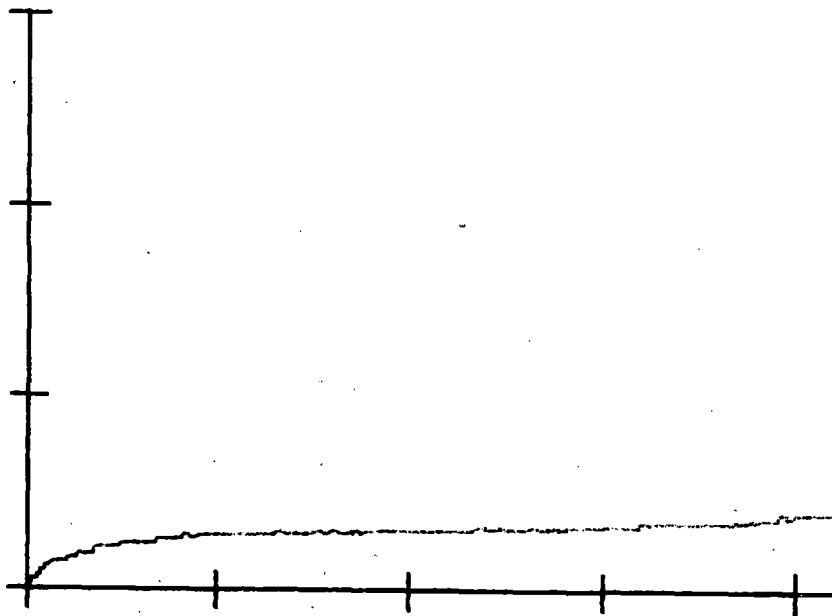
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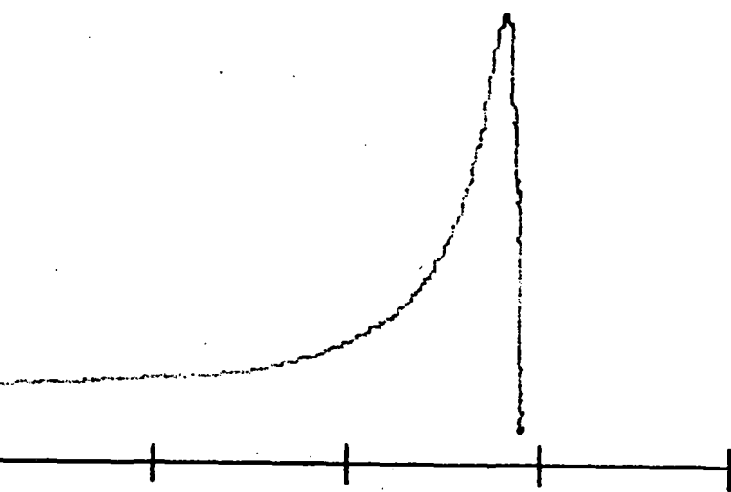
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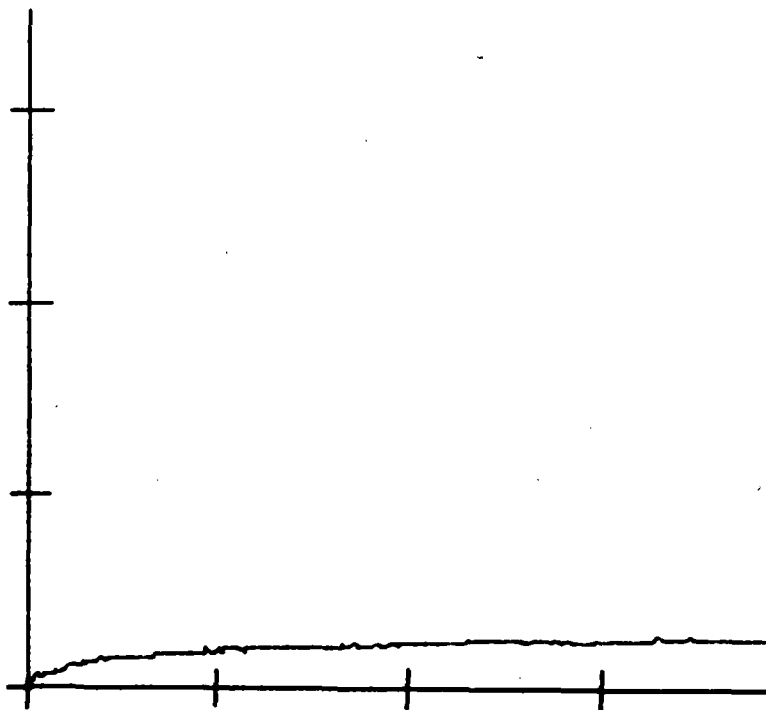
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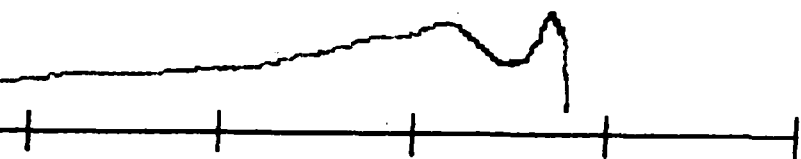
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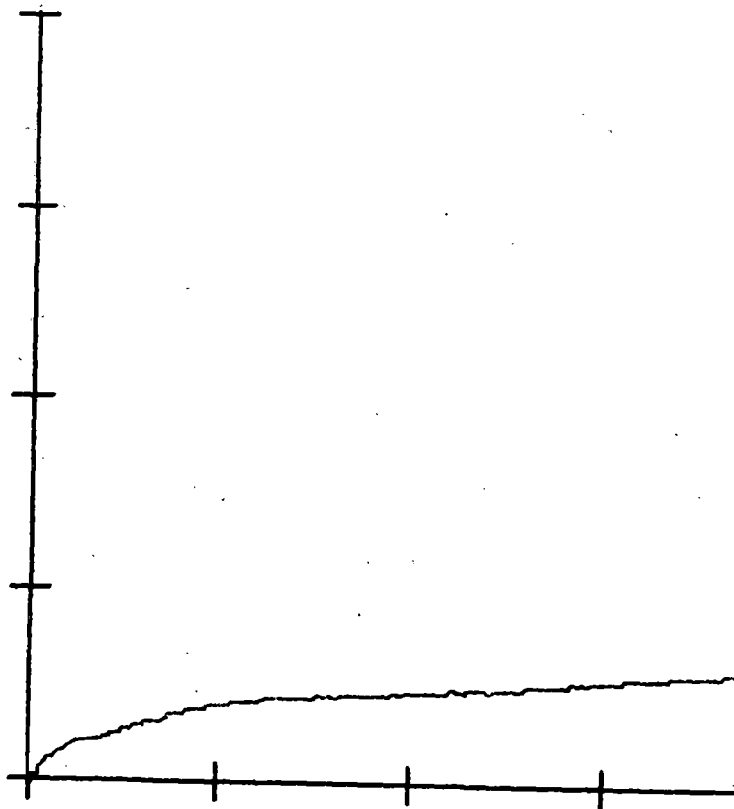
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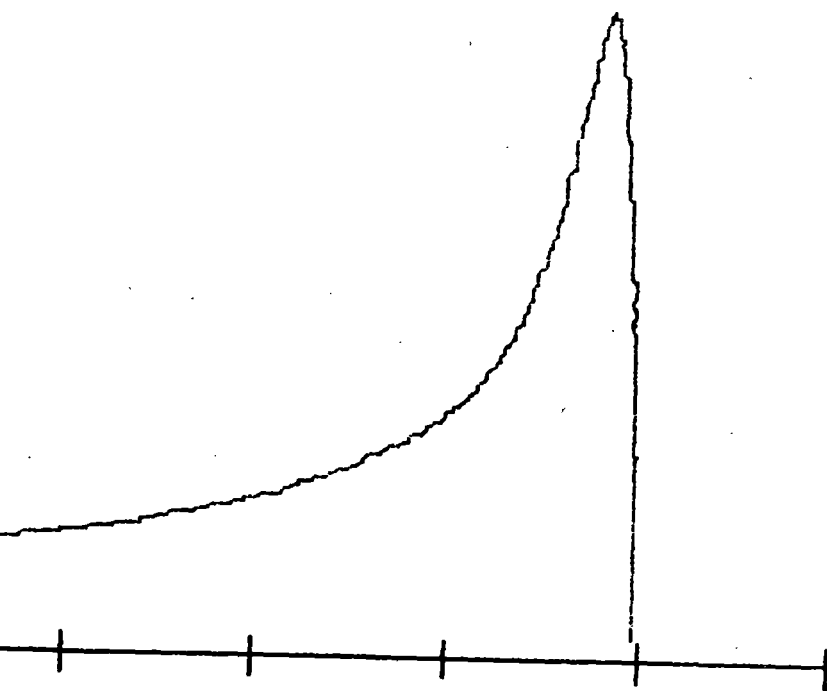
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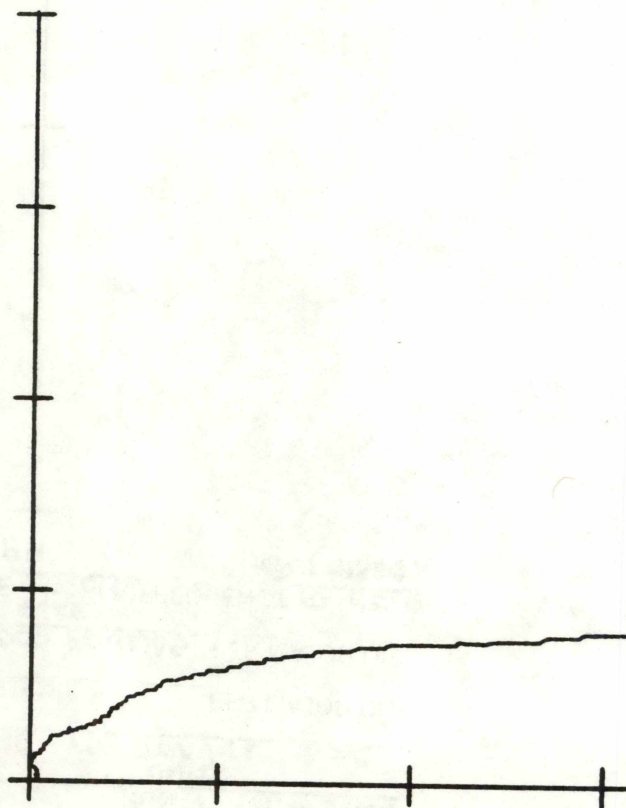
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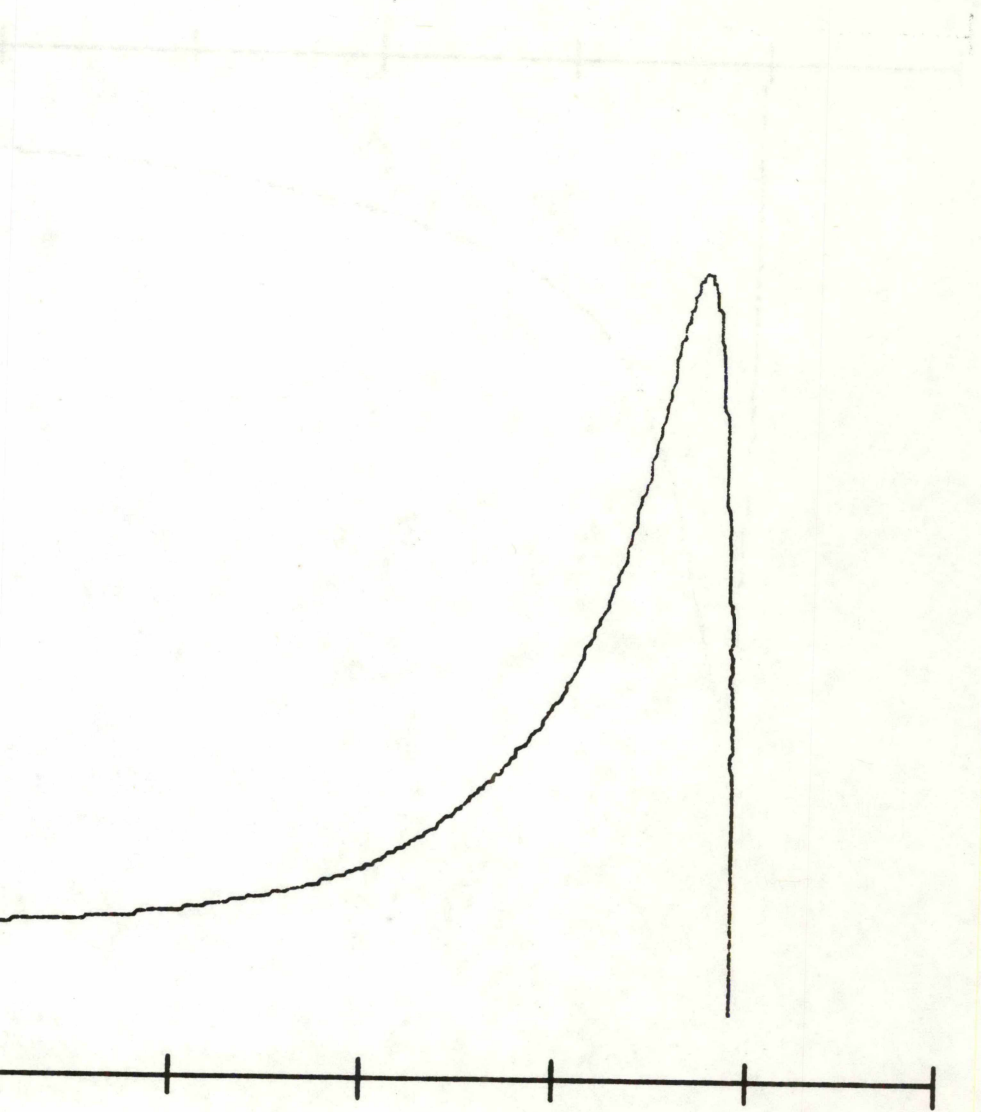
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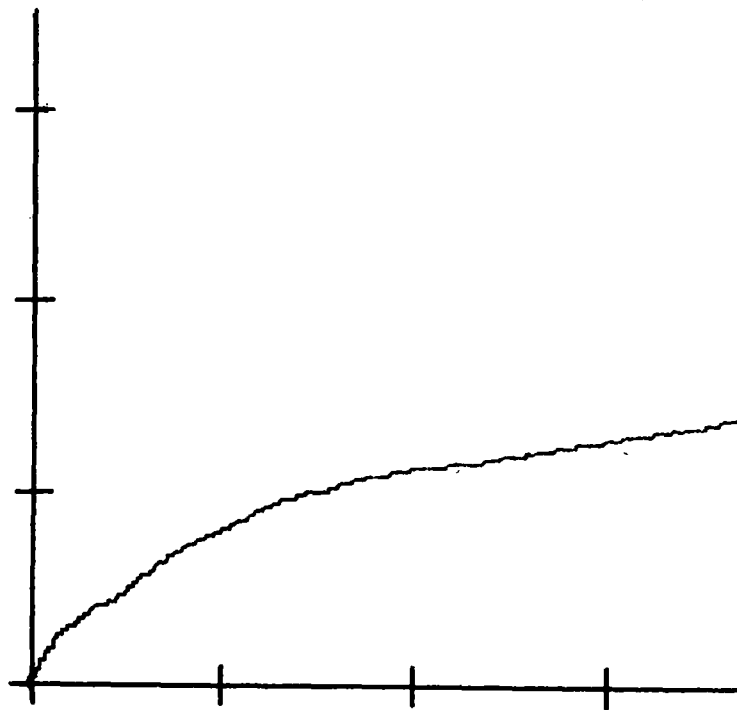
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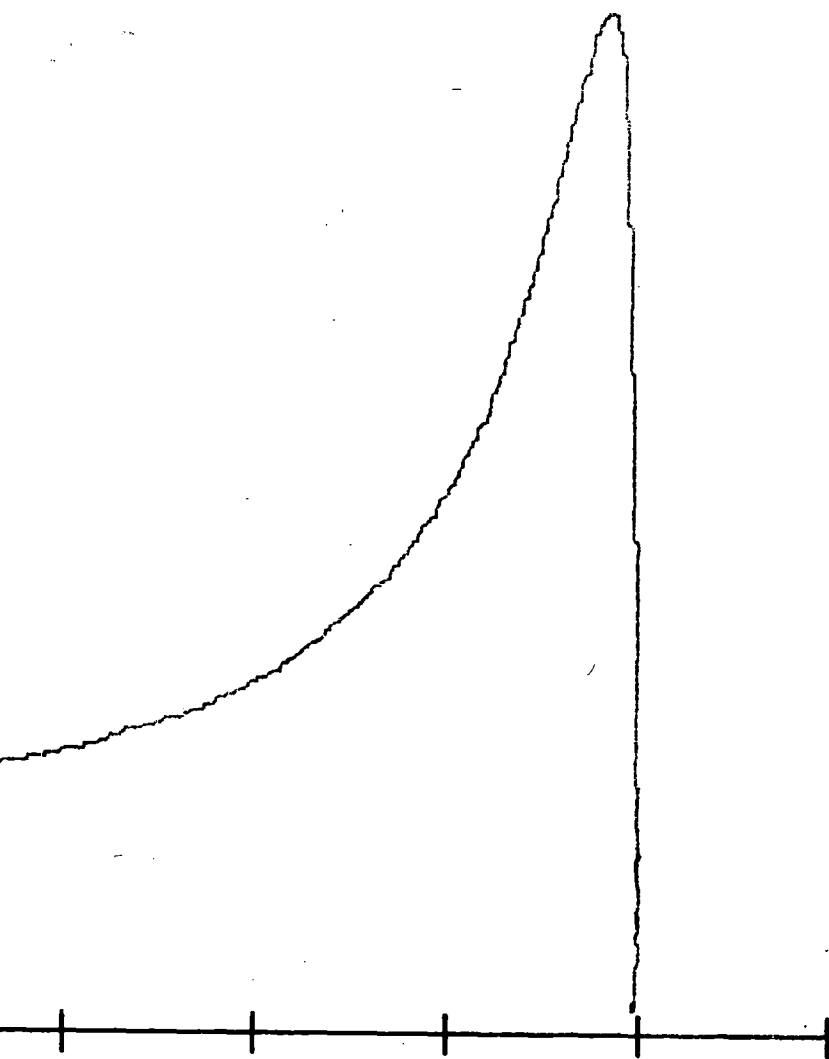
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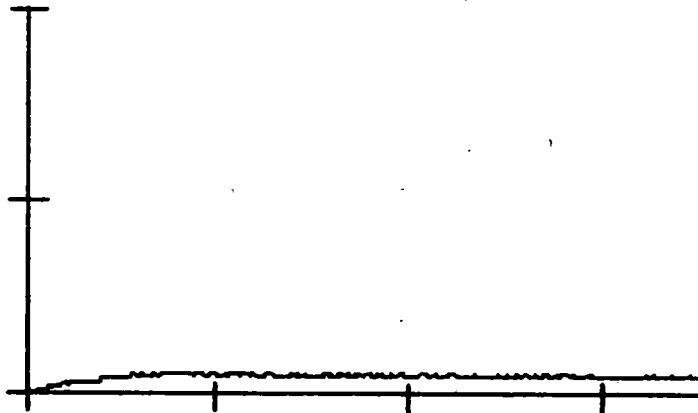
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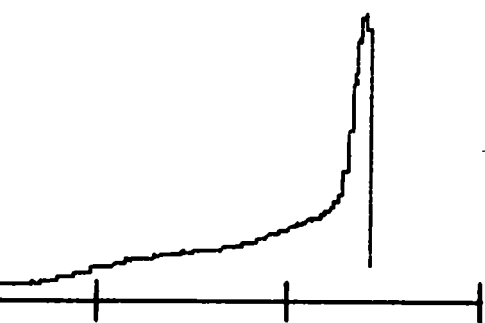
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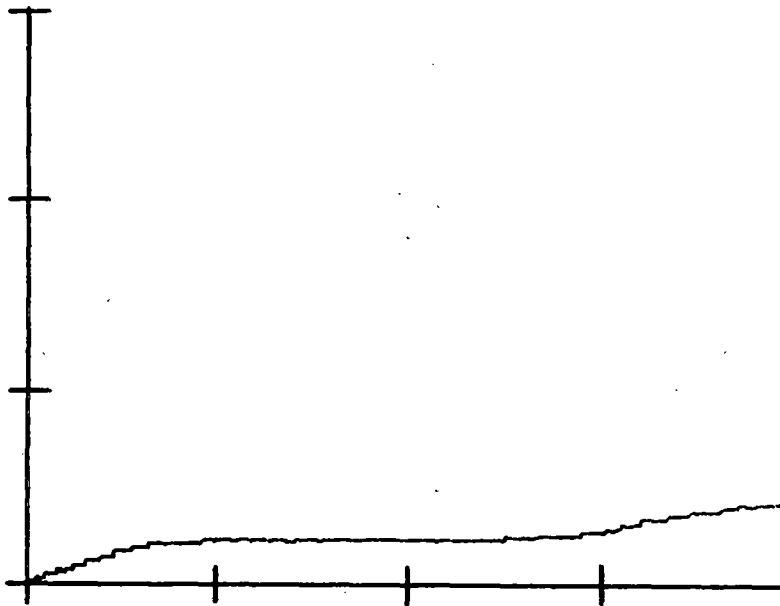
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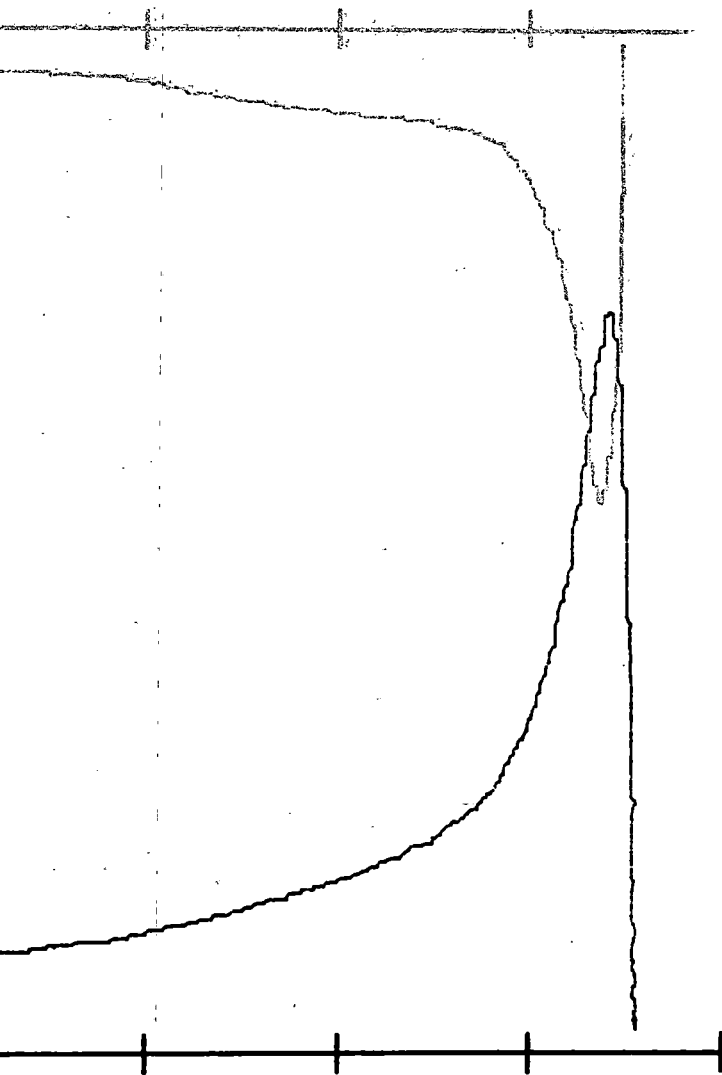
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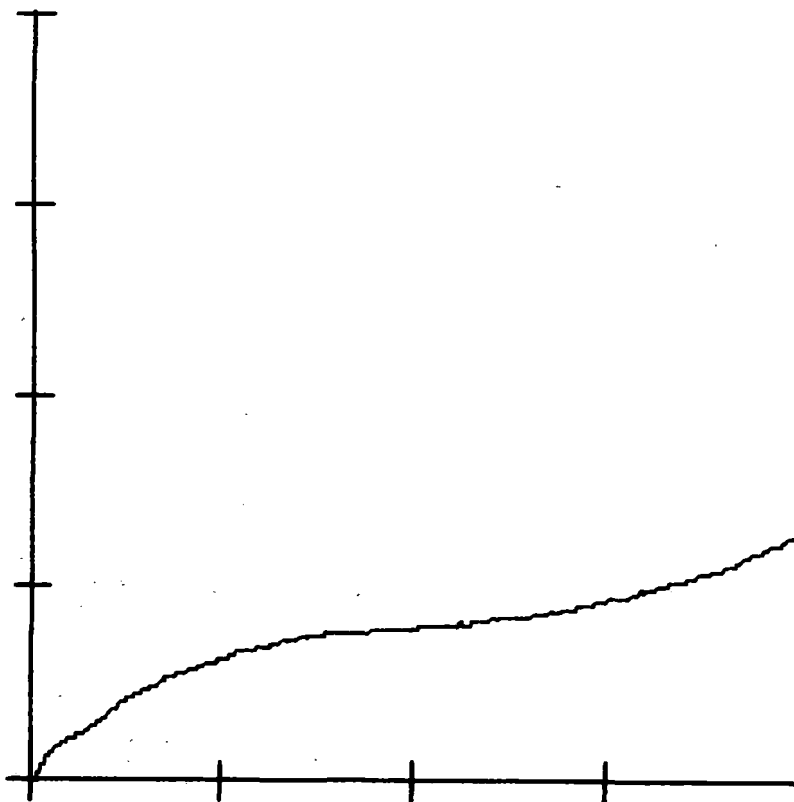
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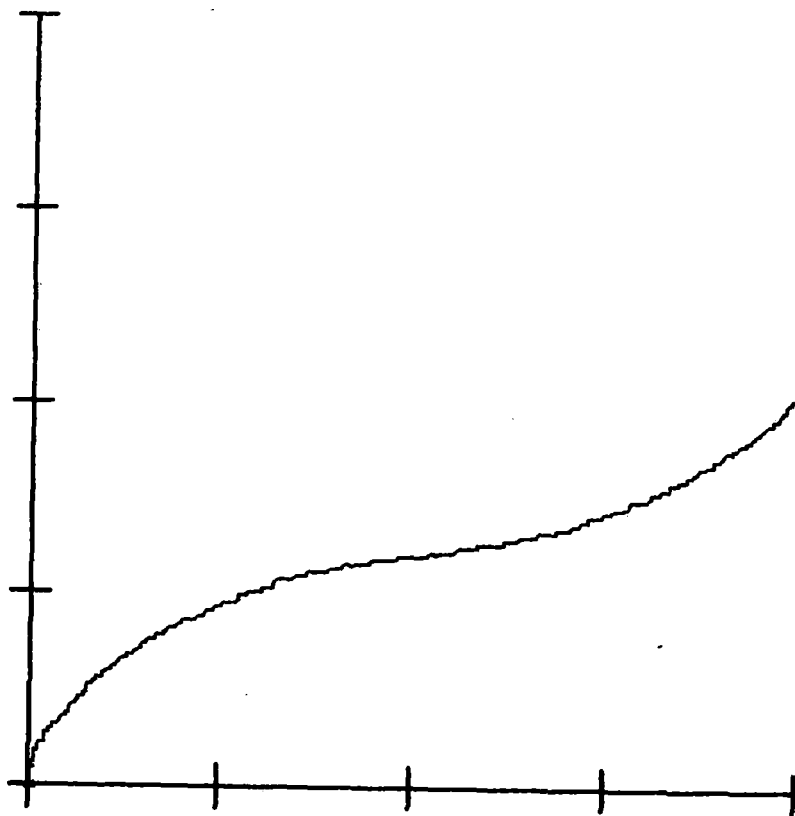
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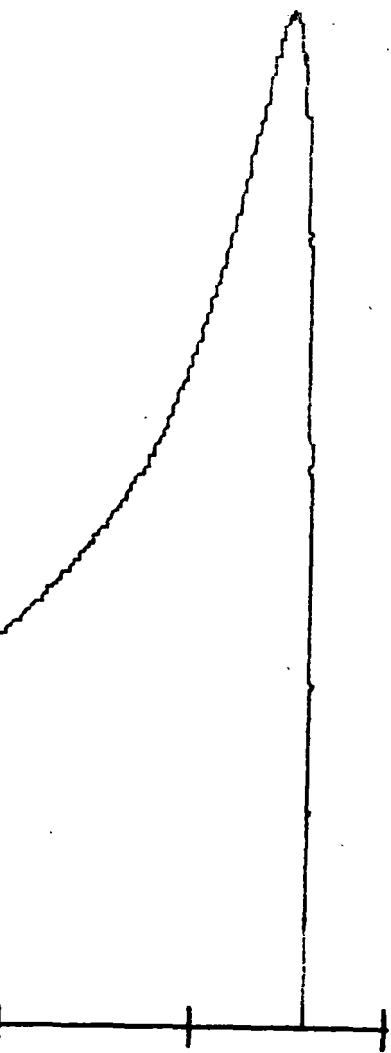
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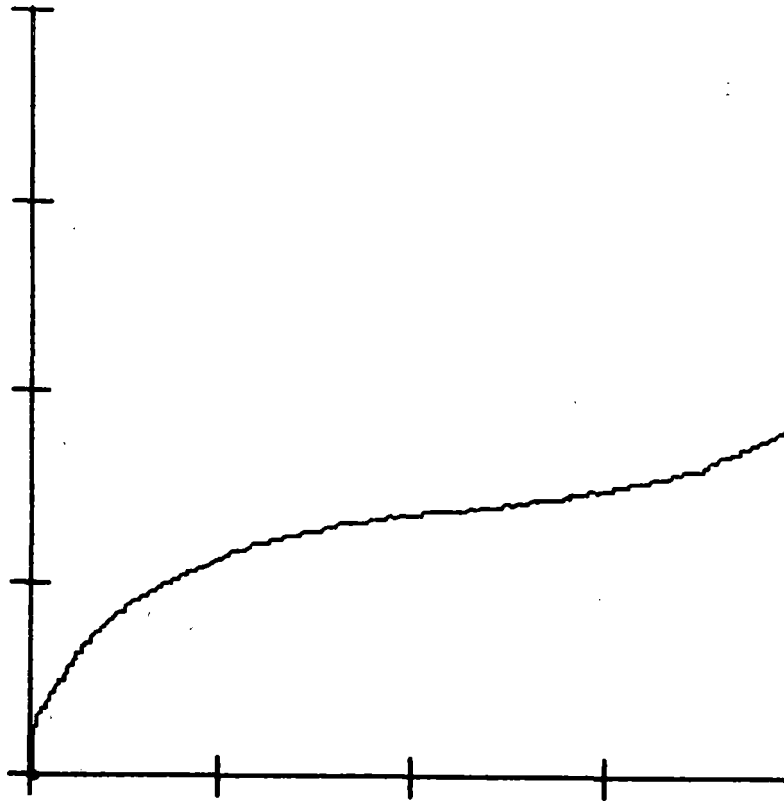
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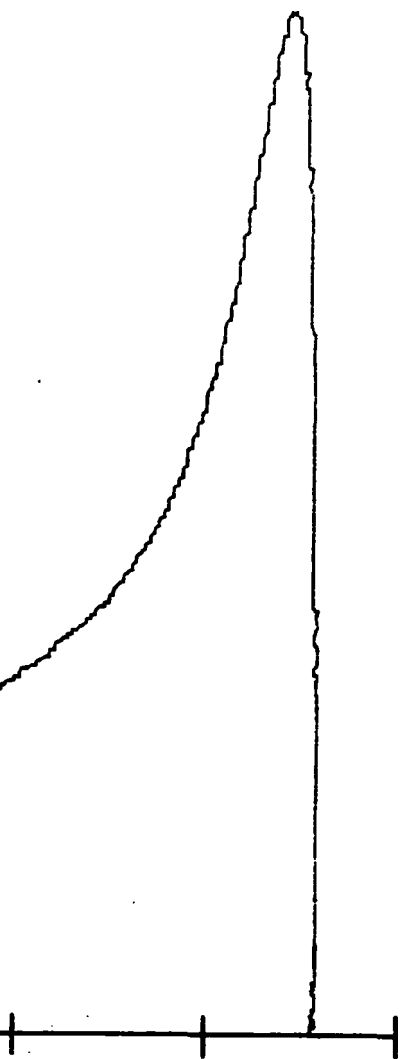
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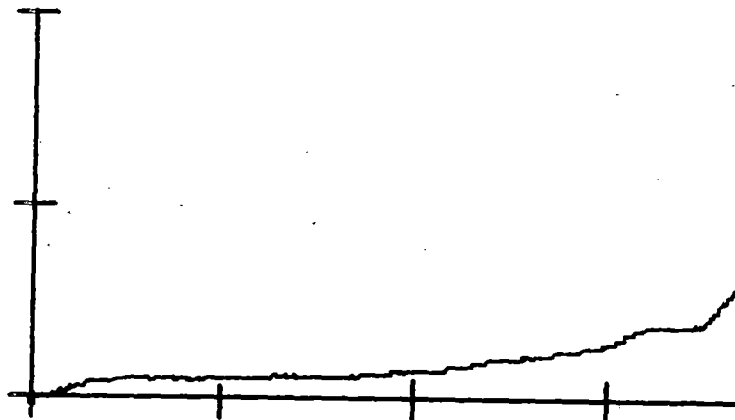
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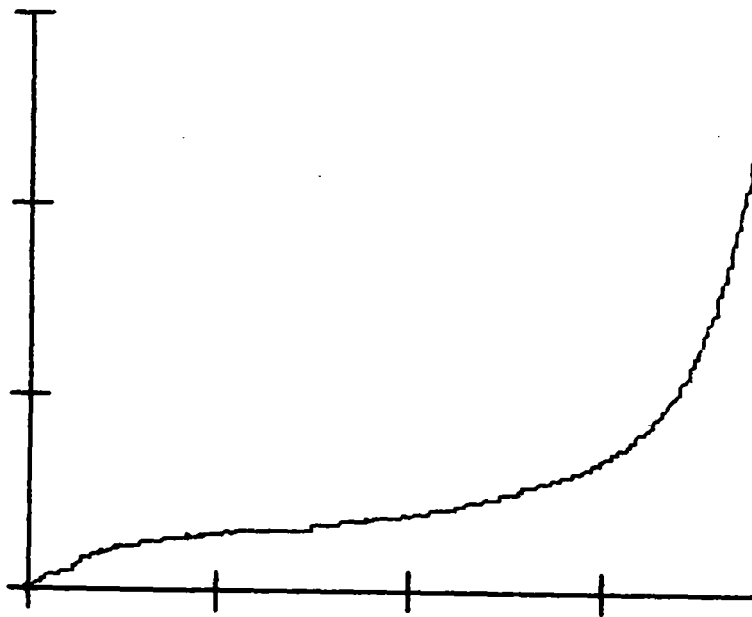
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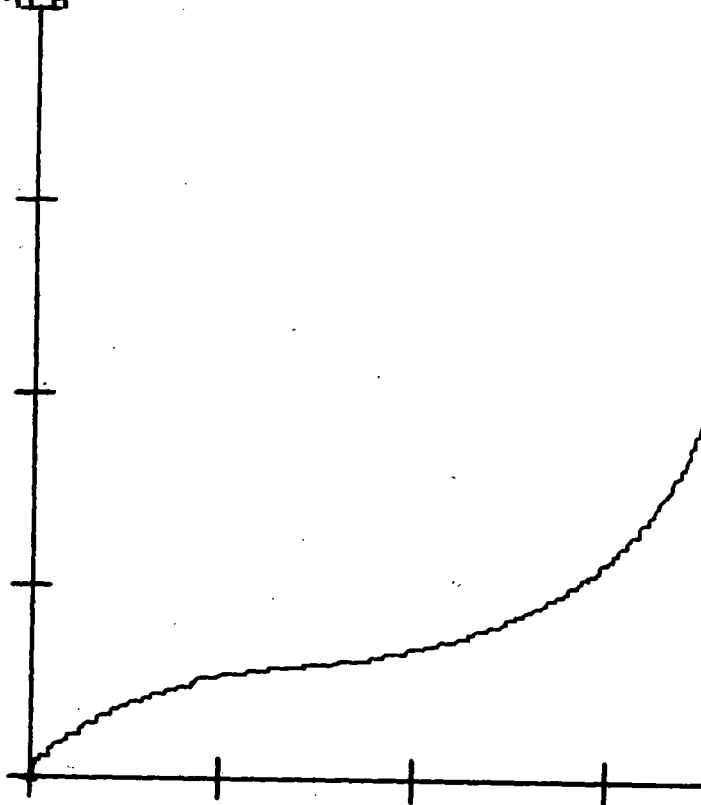
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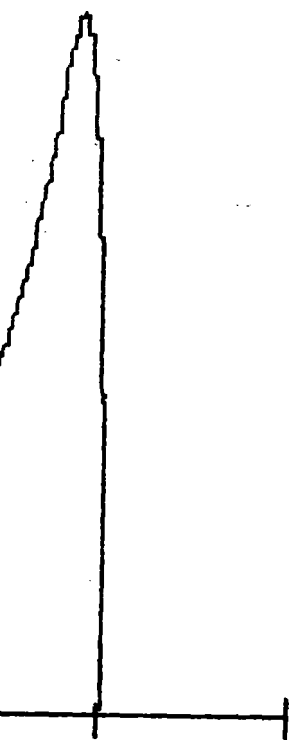
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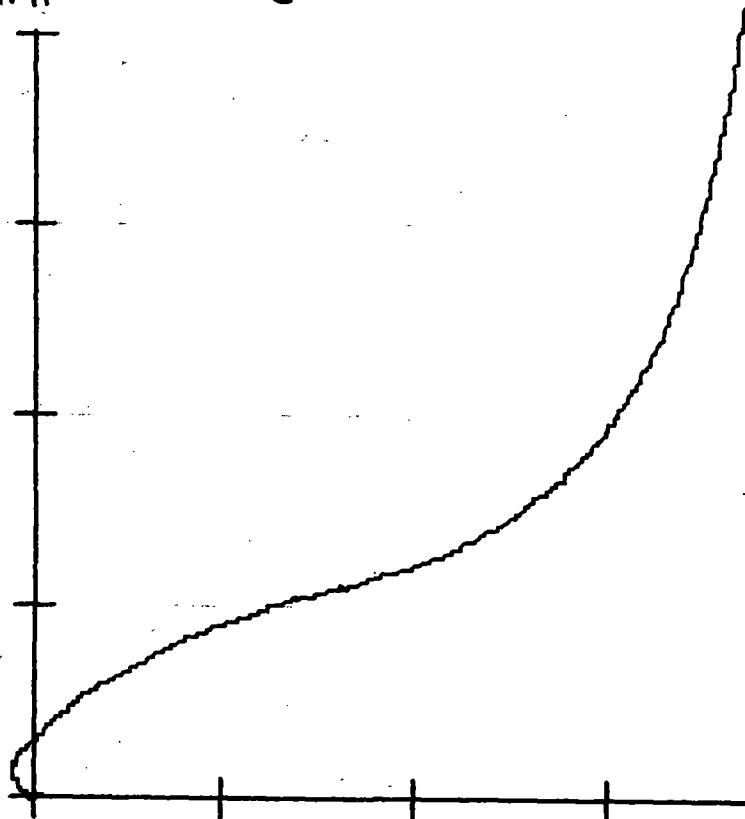
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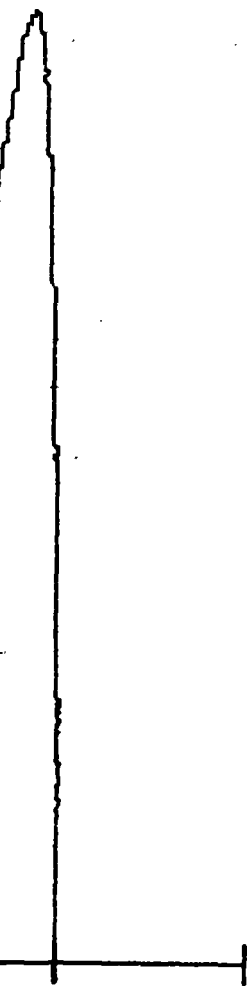
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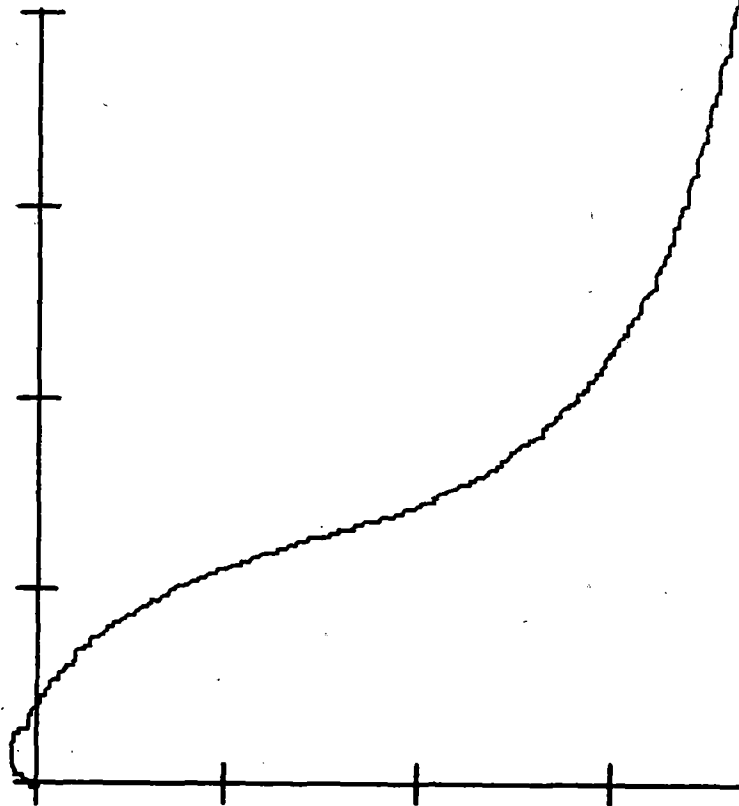
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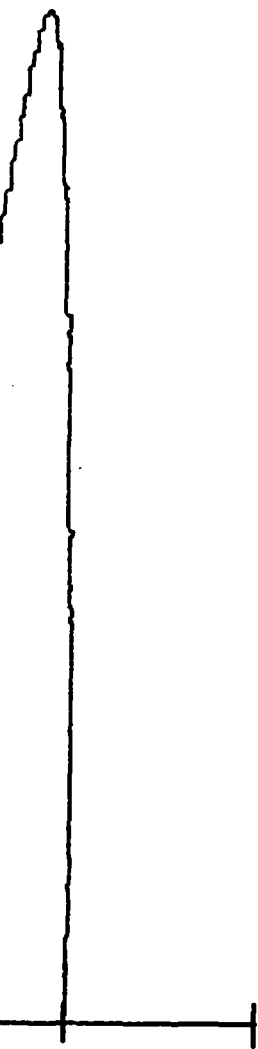
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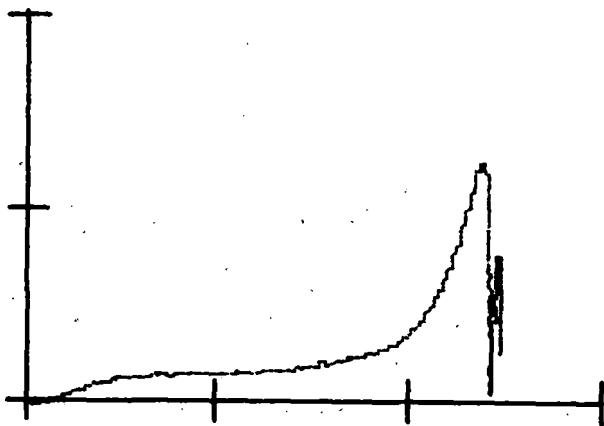
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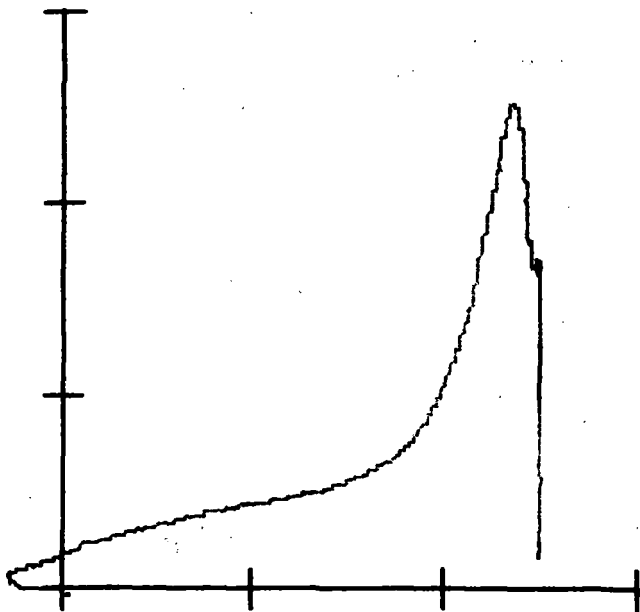
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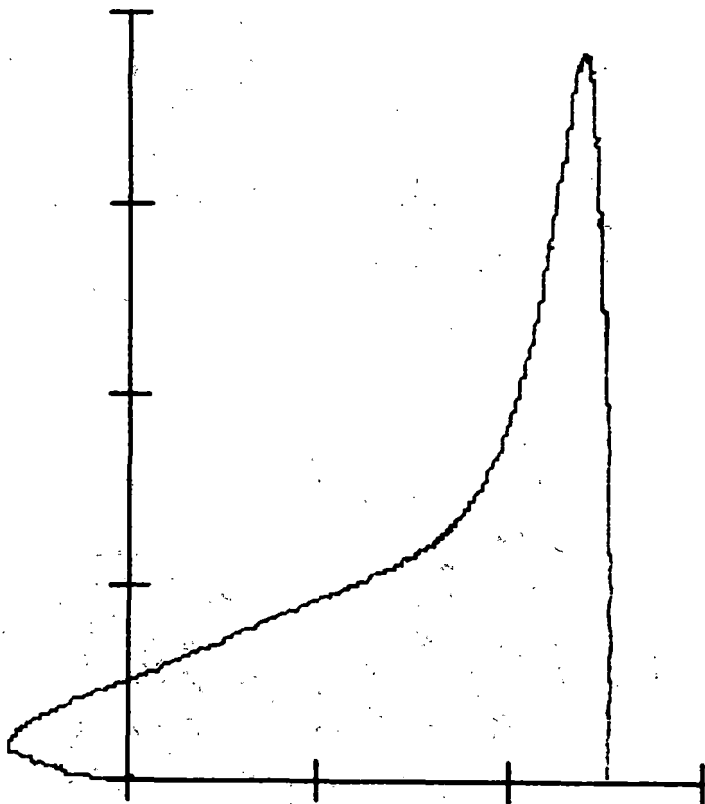
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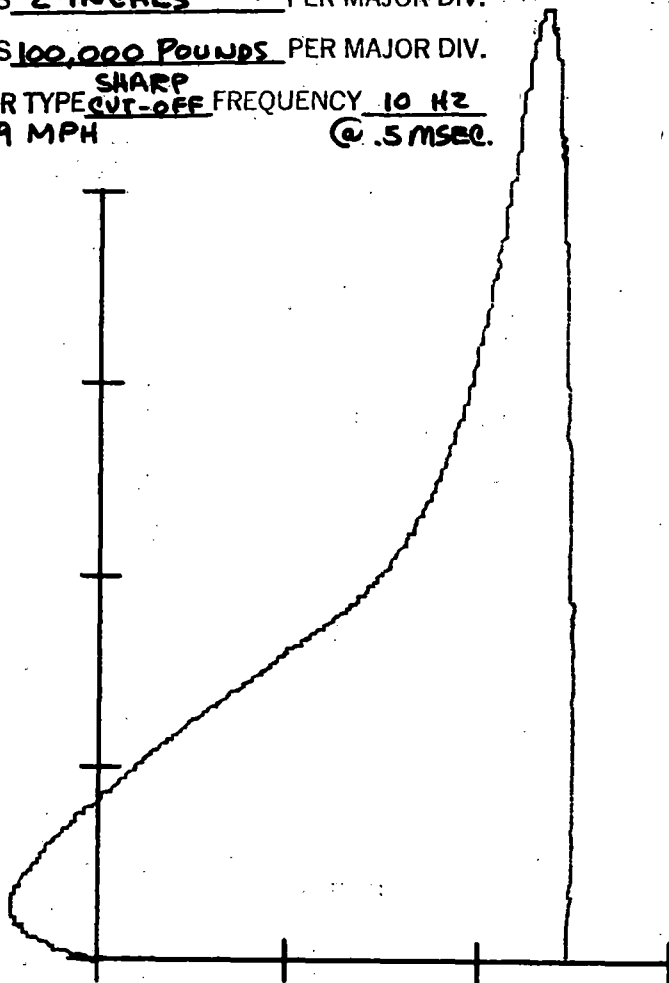
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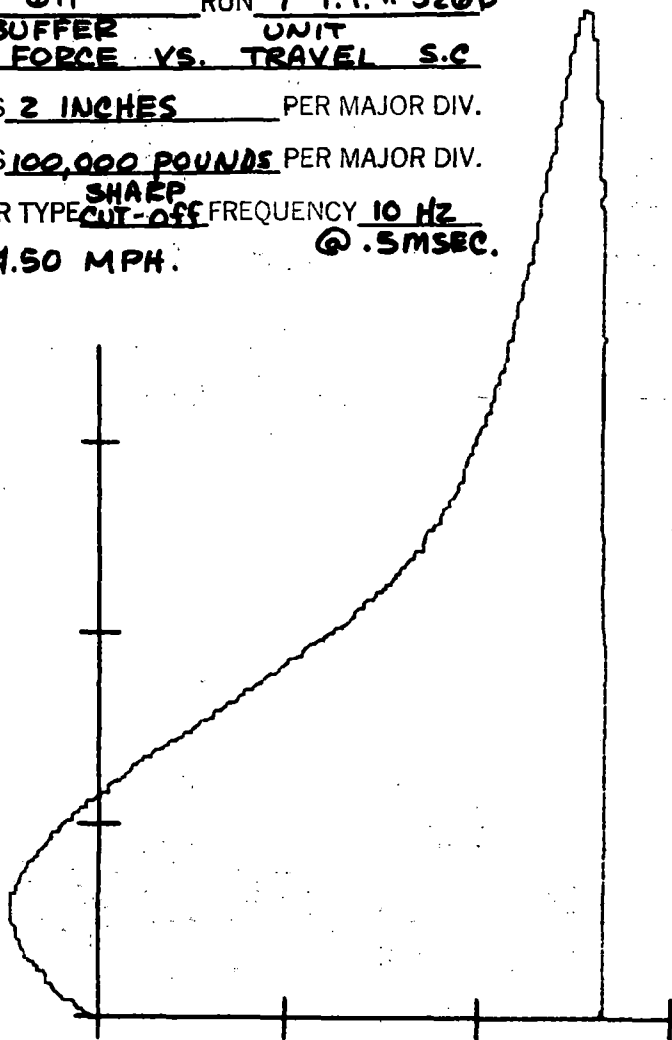
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OPERATOR KAJ DATE 8-7-78

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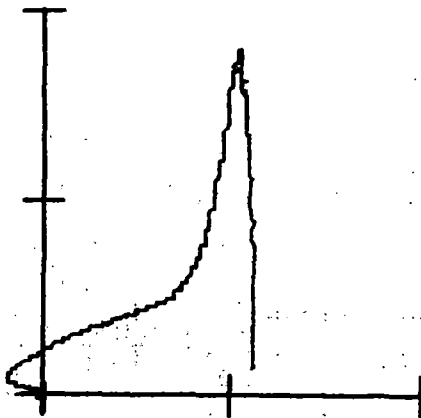
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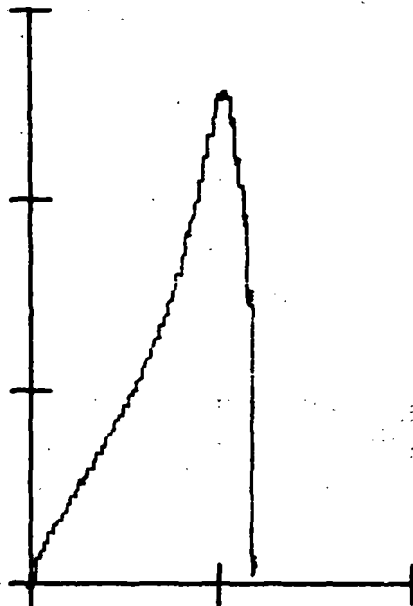
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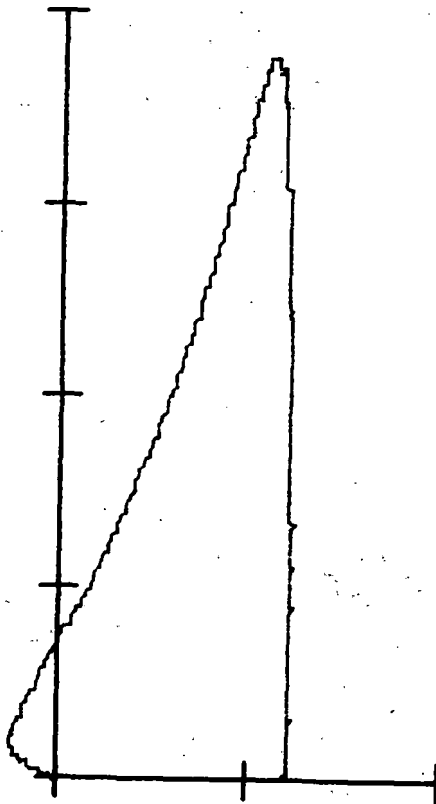
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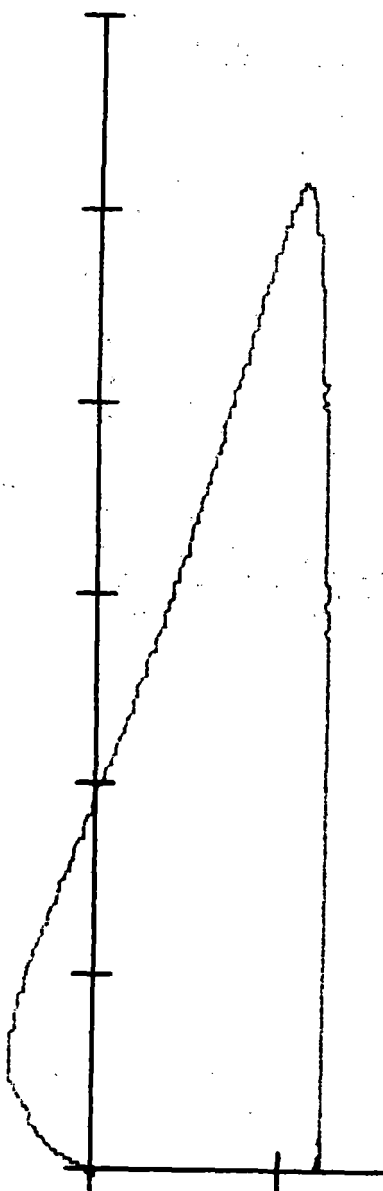
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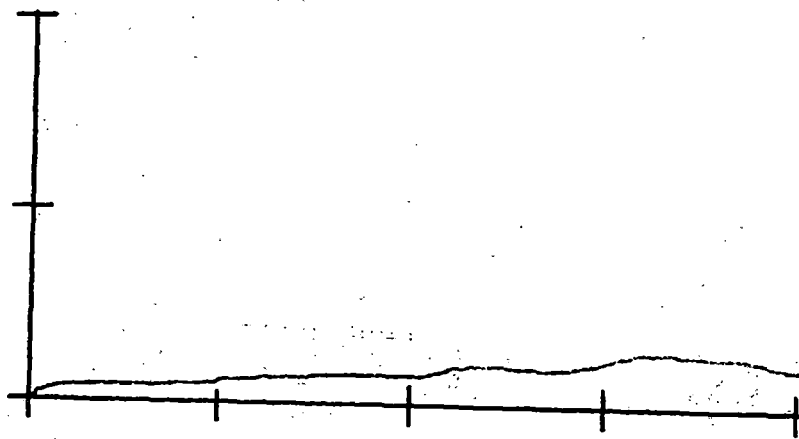
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OPERATOR KAJ DATE 9-25-78

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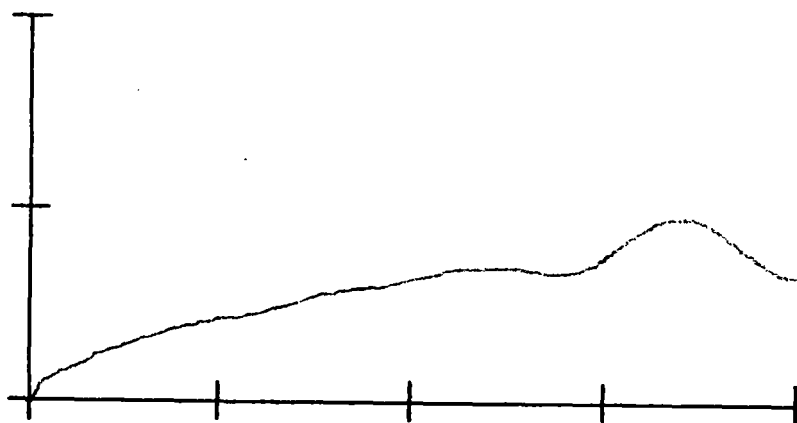
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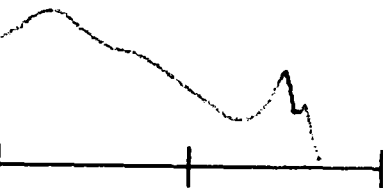
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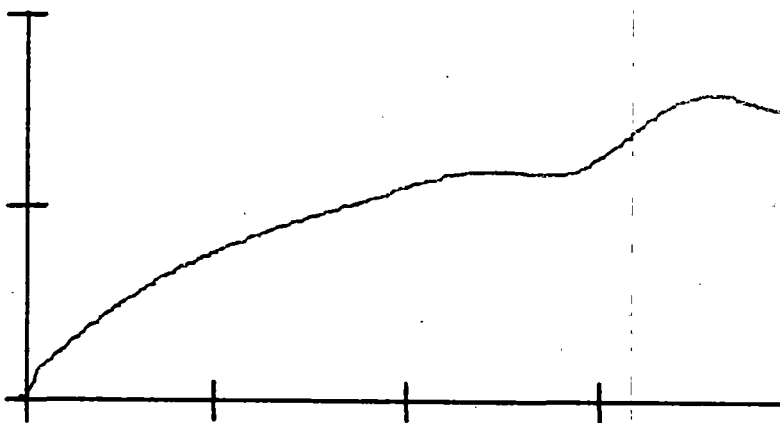
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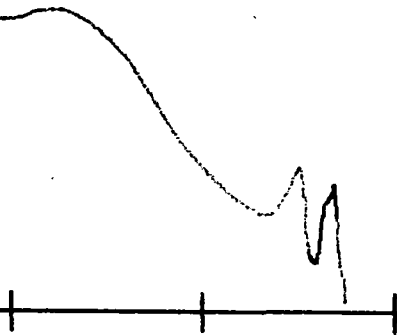
TITLE BUFFER UNIT VS. TRAVEL S.C.

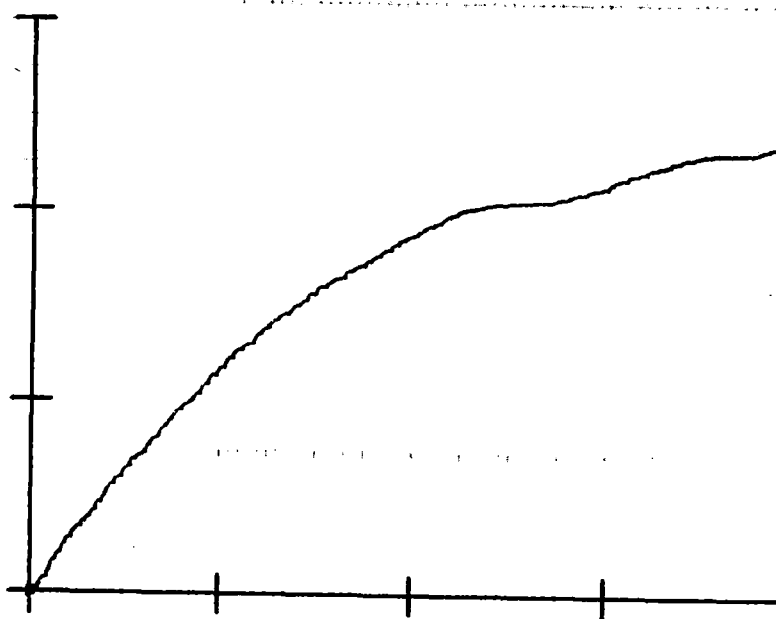
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-off FREQUENCY 10 HZ

15" STROKE 2.89 MPH @ 2 MSEC





OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 4 T.T. # 330A

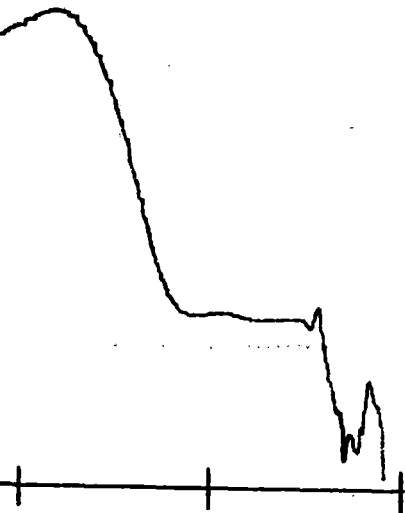
~~BUFFER~~ ~~UNIT~~
TITLE FORCE VS. TRAVEL S.C.

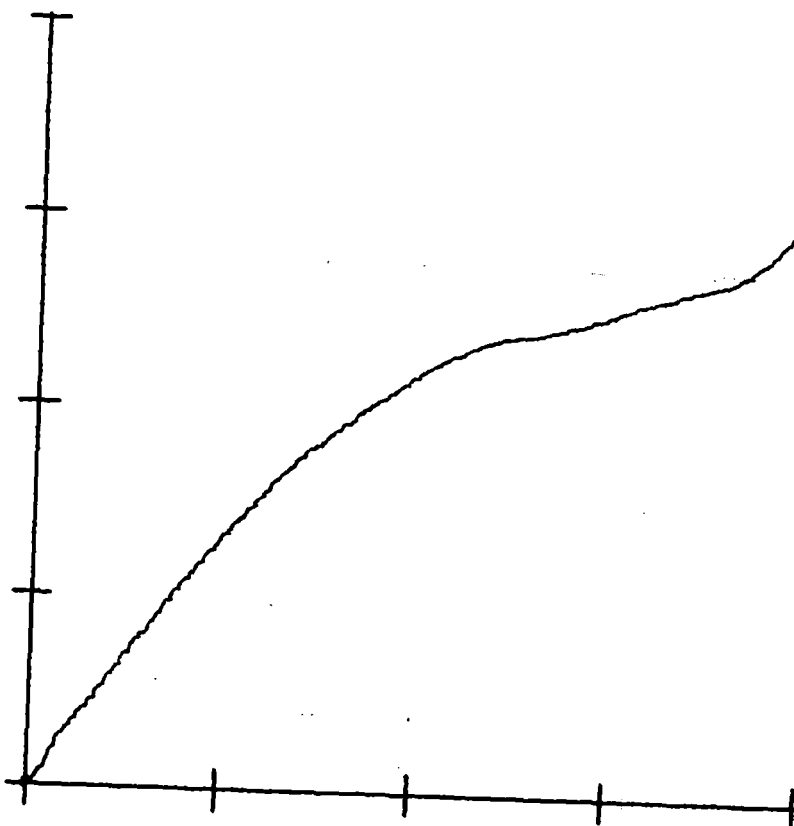
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 4.06 MPH @ 2 MSEC.





OPERATOR KAJ DATE 9-25-78

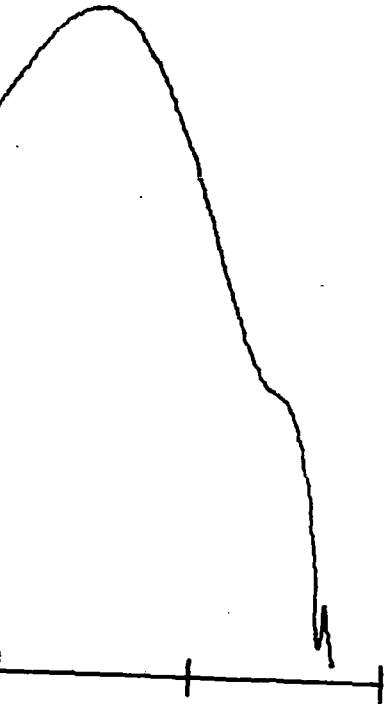
RD # C 1002 RUN S T.T.# 330A

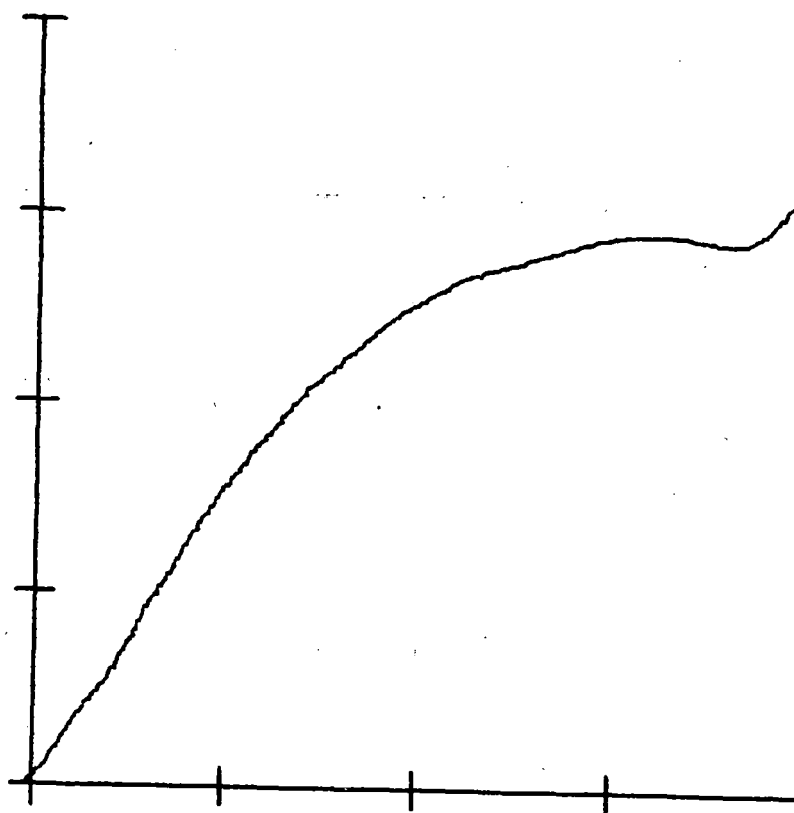
~~BUFFER~~ UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

~~SHARP~~
FILTER TYPE CUT-off FREQUENCY 10 HZ
15" STROKE 4.52 MPH @ 1MSEC





OPERATOR KAJ DATE 9-25-78

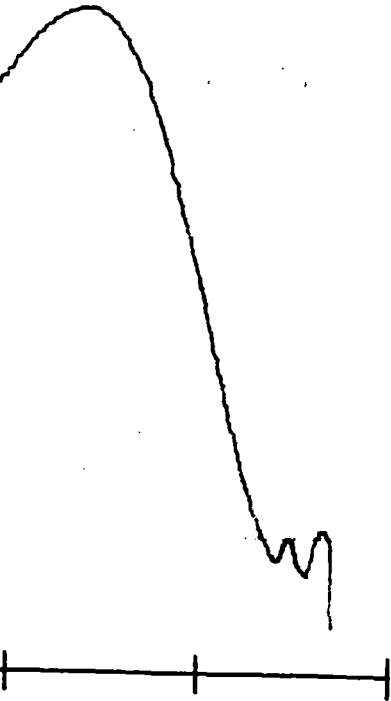
RD # C 1002 RUN 6 T.T.# 330A

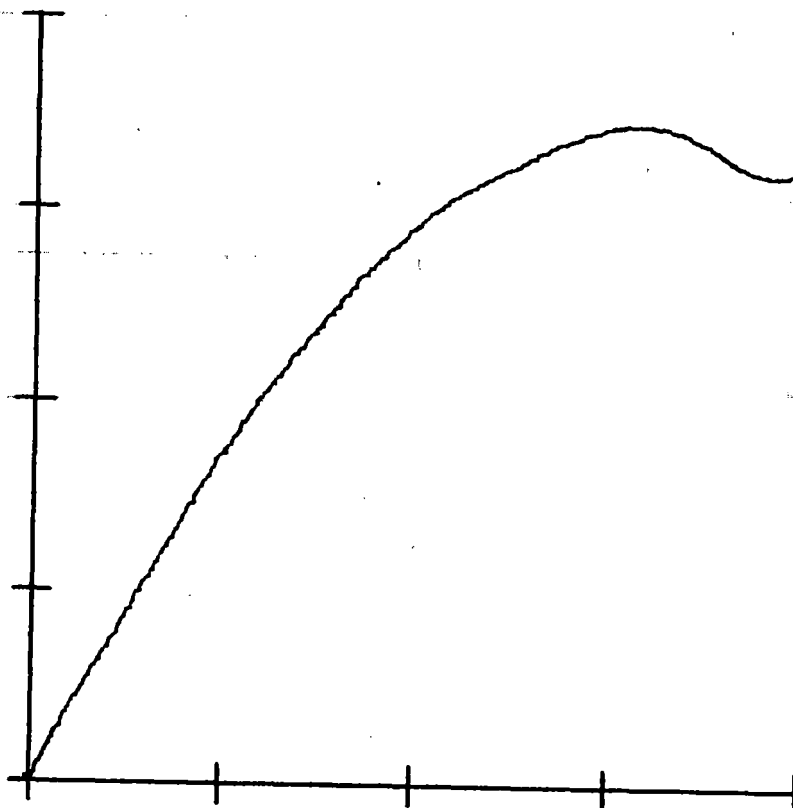
TITLE FORCE VS. TRAVEL S.C.
BUFFER UNIT

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ
15" STROKE 5.11 MPH @ 1 MSEC





OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 7 T.T. # 330A

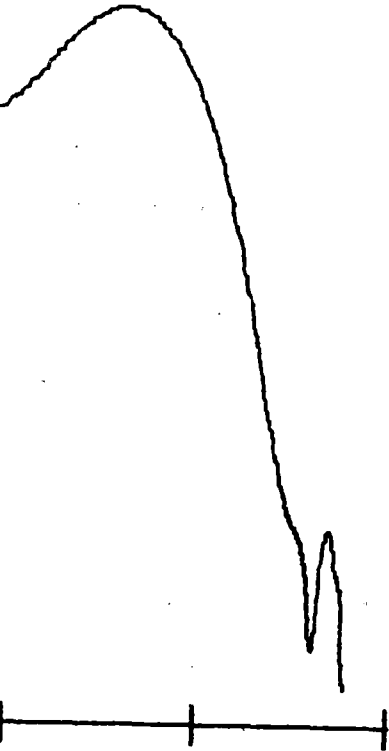
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

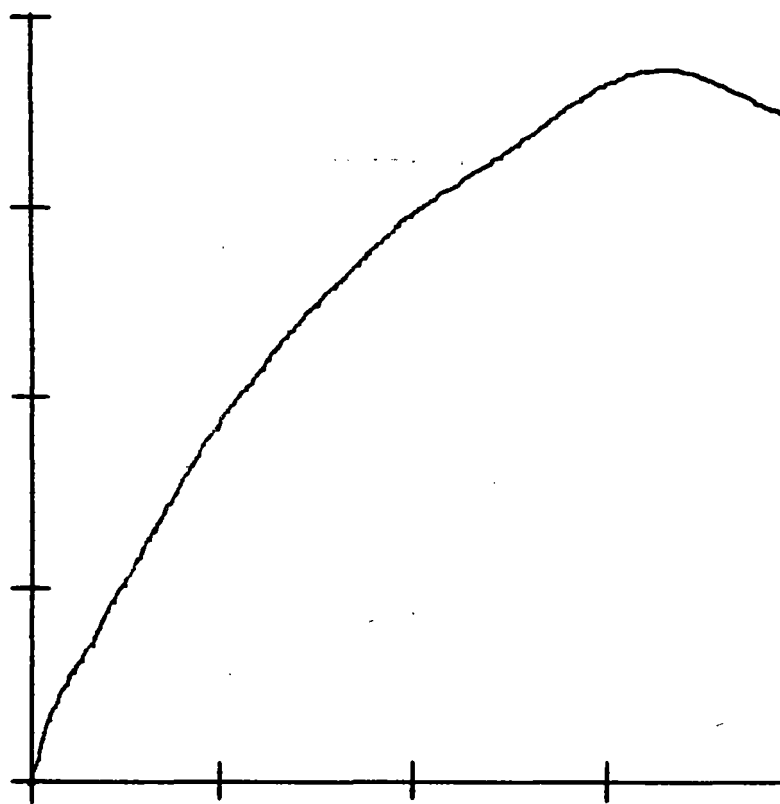
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 5.47 MPH @ 1 MSEC.





OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 9 T.T.# 330A

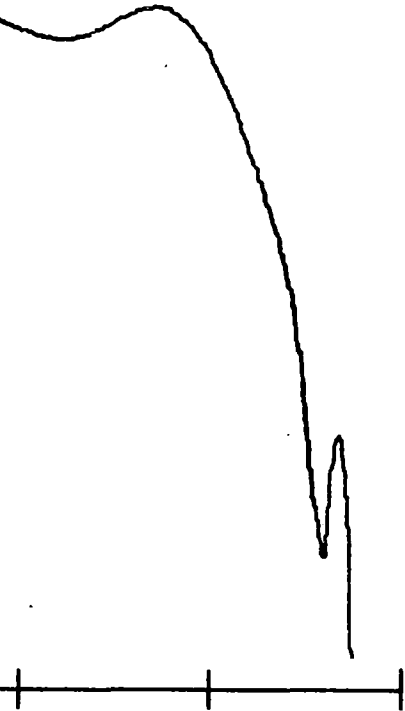
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

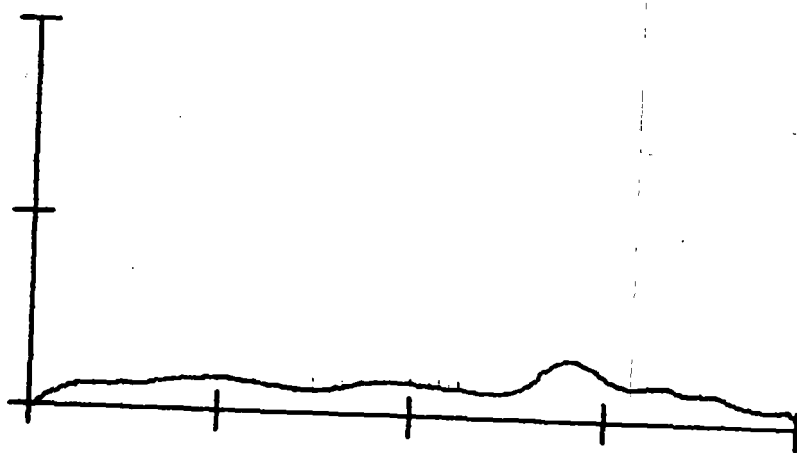
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 5.84 MPH @ 1 MSEC





OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 1 T.T.# 330 B

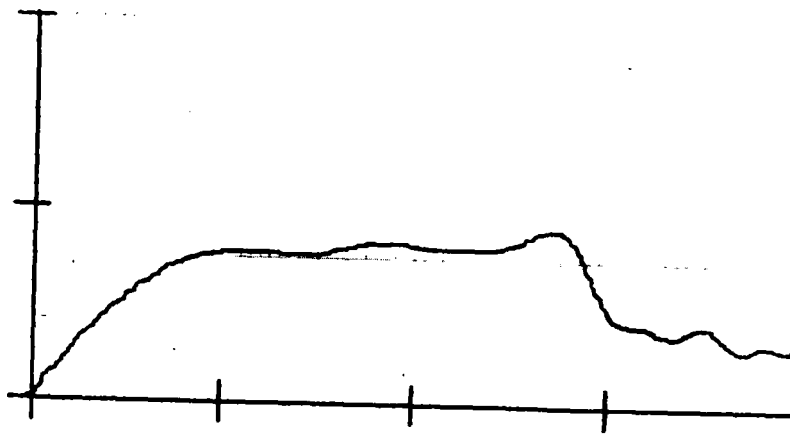
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-off FREQUENCY 10 HZ

12" STROKE 0.88 MPH 2 MSEC



OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 2 TT# 330B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

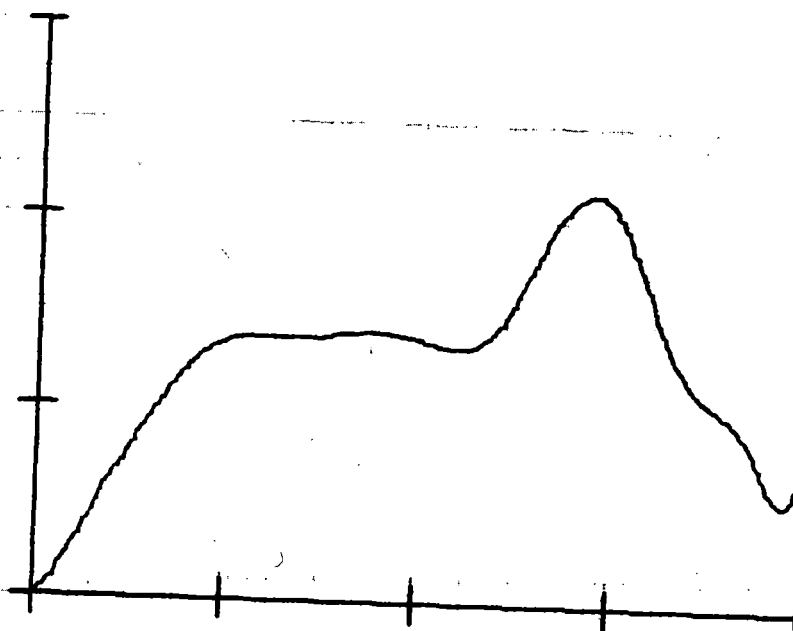
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 2.02 MPH @ 27 msec.



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OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 3 T.T. # 330B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

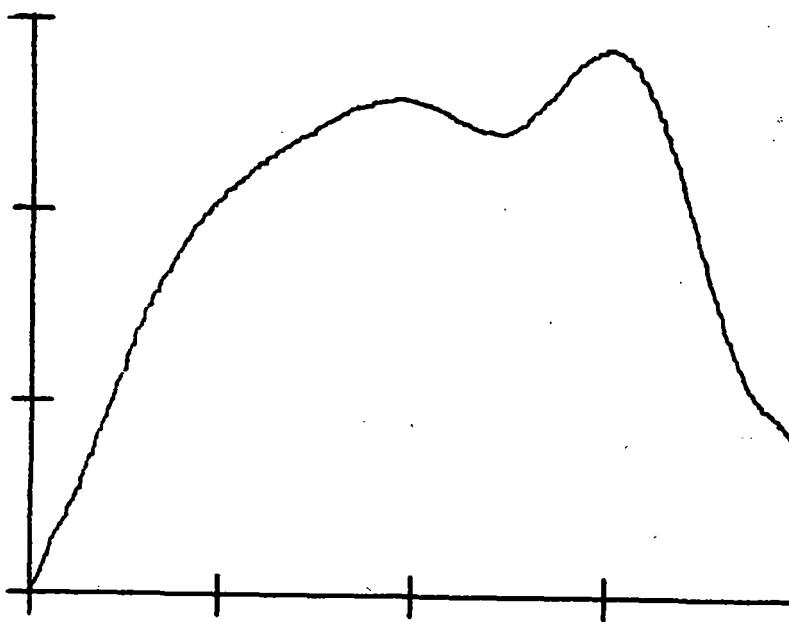
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 KHZ

12" STROKE 2.94 MPH @ 2 MSEC





OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 4 T.T. # 330B

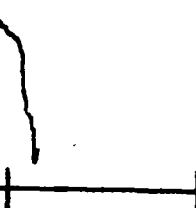
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

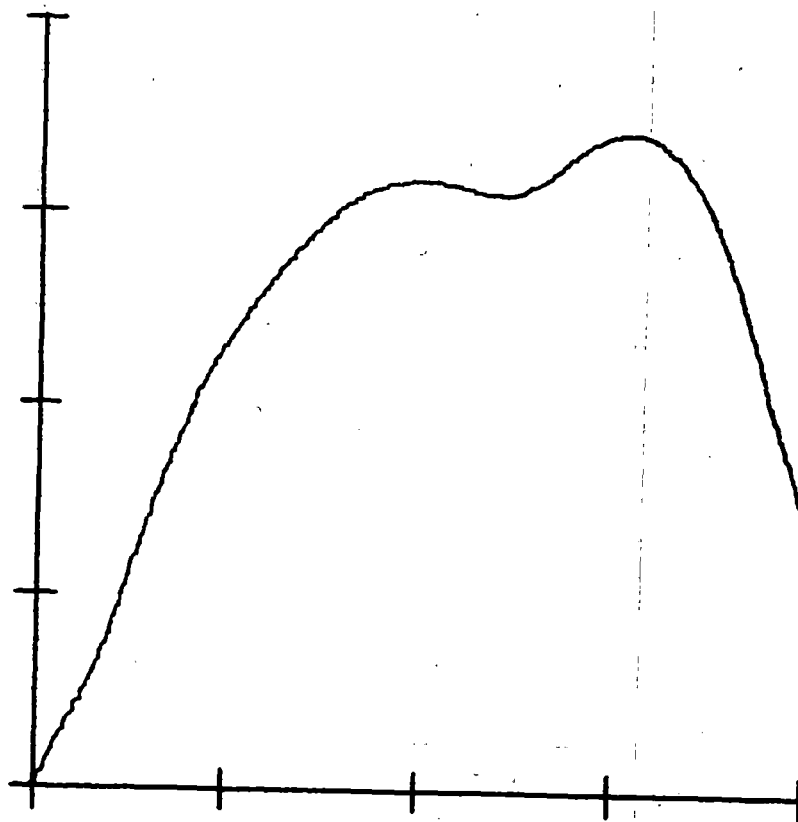
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 3.97 MPH @ 1 MSEC





OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN S T.T.# 330B

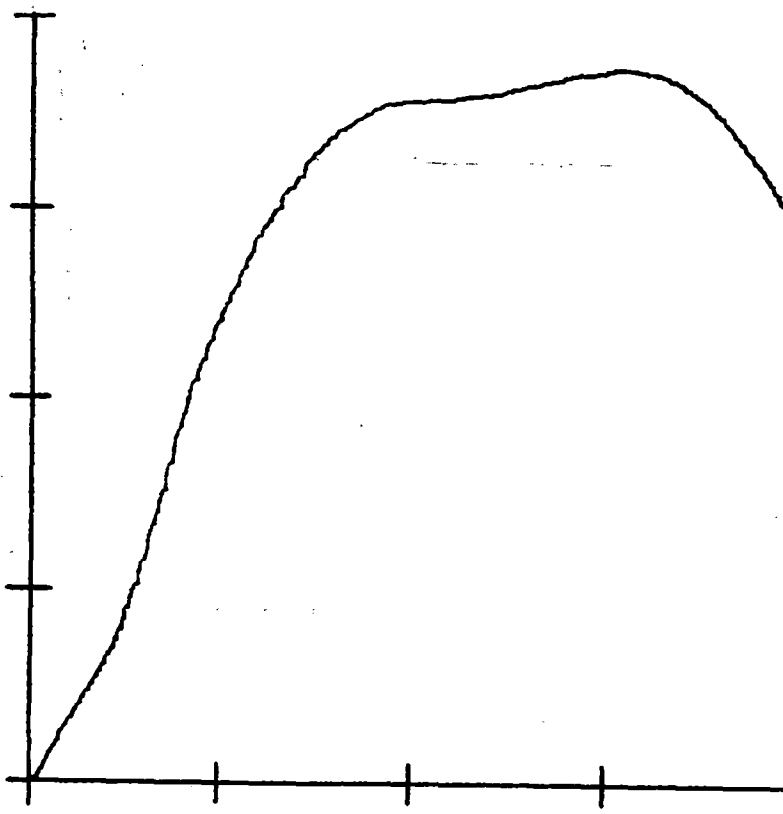
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 4.53 MPH @ 1 MSES



OPERATOR KAJ DATE 9-25-78

RD # C 1002 RUN 6 T.T. # 330B

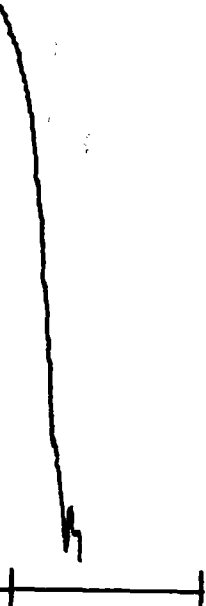
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

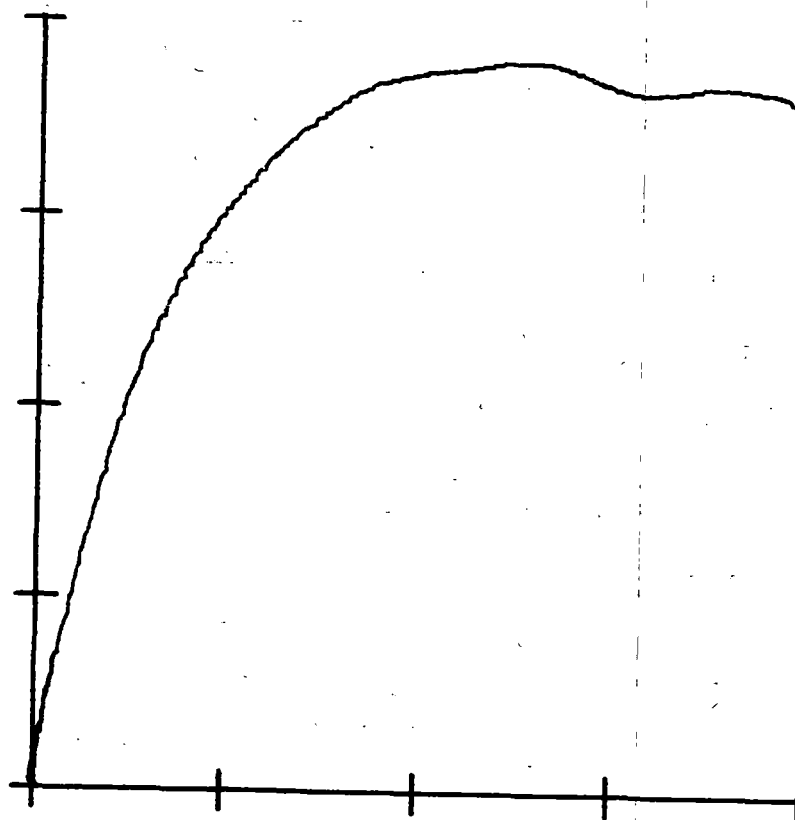
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 Hz

12" STROKE 5.08 MPH @ 1 MSEC





OPERATOR KAJ DATE 9-25-78

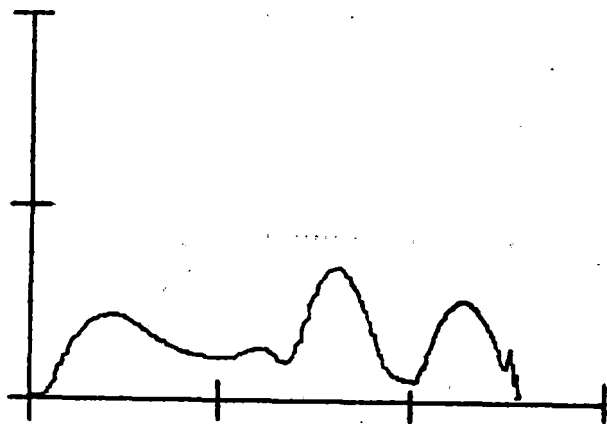
RD # C 1002 RUN 8 T.T. # 8308

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
12" STROKE 5.49 MPH @ .5 MSEC



OPERATOR KAJ DATE 9-26-78

RD# C 1002 RUN 1 T.T.# 330C

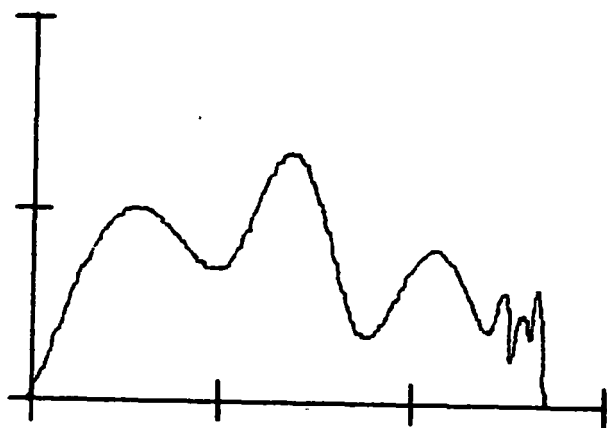
~~BUFFER~~ ~~UNIT~~
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

~~SHARP~~
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

9" STROKE 1.09 MPH @ 2MSB



OPERATOR KAJ DATE 9-26-78

RD # C 1002 RUN 2 T.T. # 3302

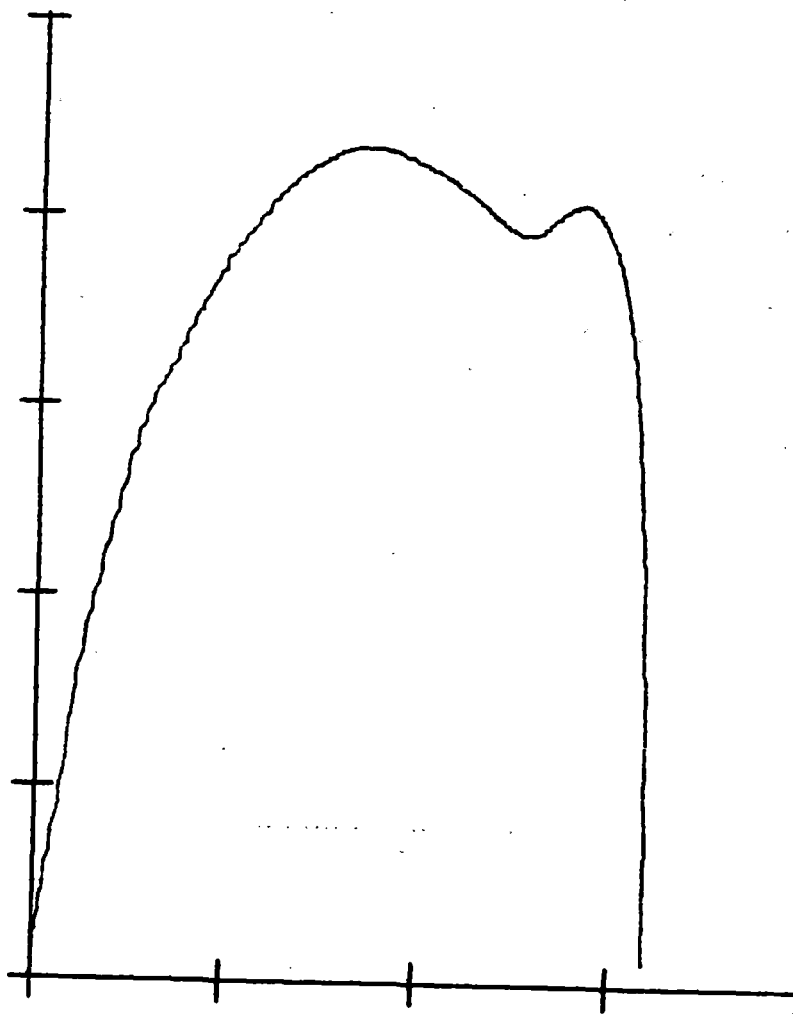
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 KHZ

9" STROKE 1.90 MPH @ 2MSEC



OPERATOR KAJ DATE 9-26-78

RD # C 1002 RUN 7 T.T. # 330C

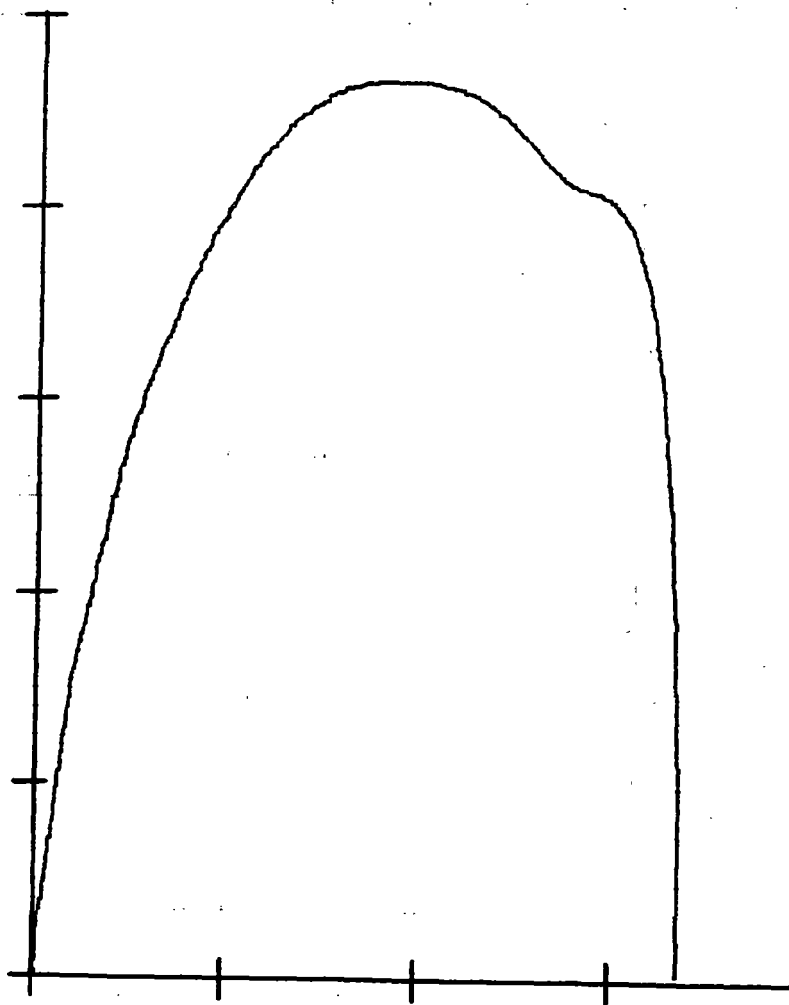
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 5.5 MPH 0.5 MSEC.



OPERATOR KAJ DATE 9-26-78

RD # C 1002 RUN 8 T.T.# 3300

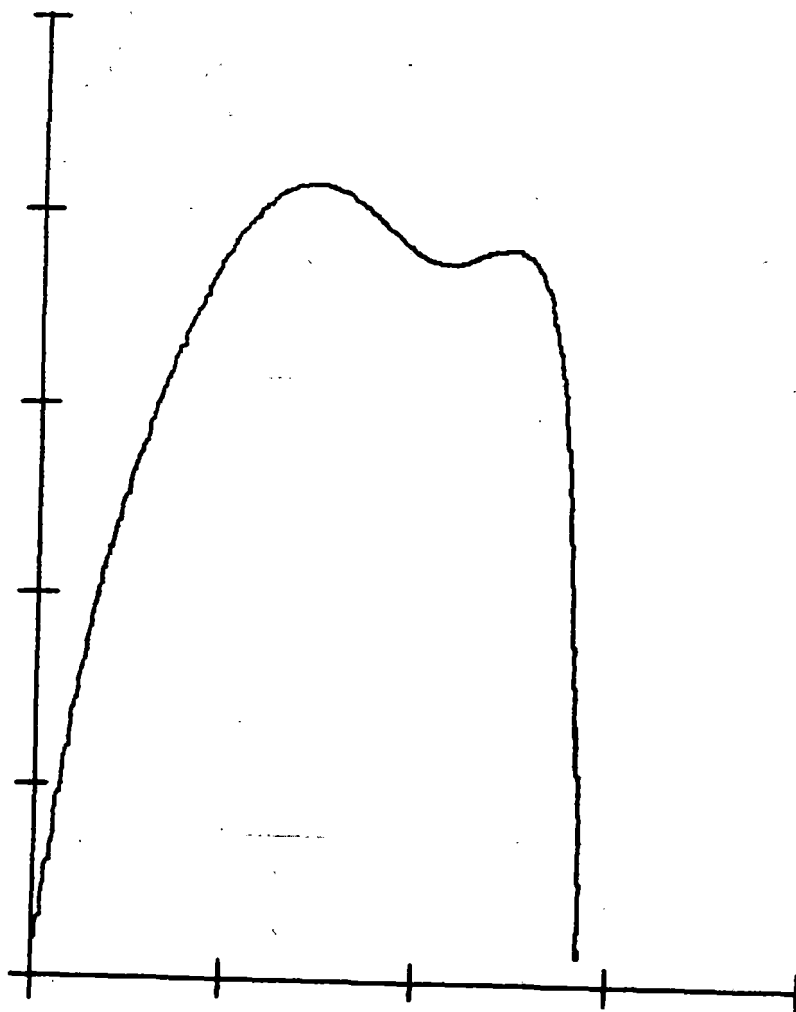
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 5.91 MPH @ .5MSEC



OPERATOR KAJ DATE 9-27-78

RD # 1002 RUN 9 T.T.# 3300

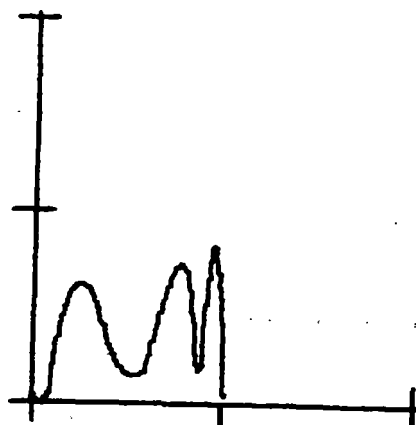
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 4.90 MPH @.57MSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 1 T.T.# 330D

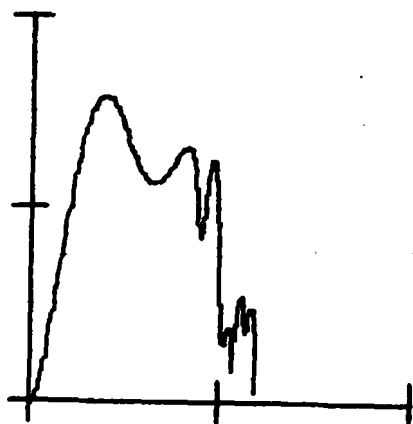
^{BUFFER}
TITLE FORCE ^{UNIT} VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE ^{SHARP}
CUT-OFF FREQUENCY 10 HZ

6" STROKE 0.91 MPH @ 1 MSEC



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 2 T.T. # 3300

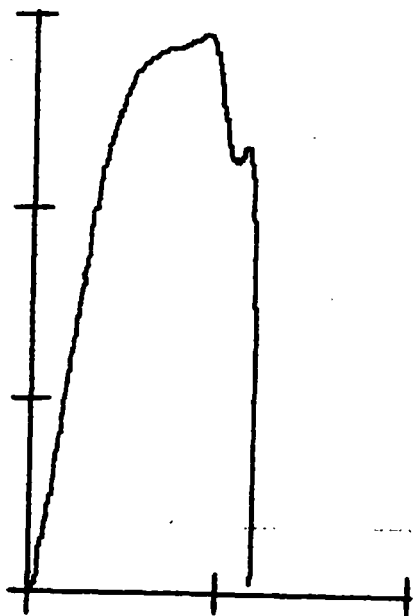
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

6" STROKE 1.90 MPH @ 1 MSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 3 T.T.# 330D

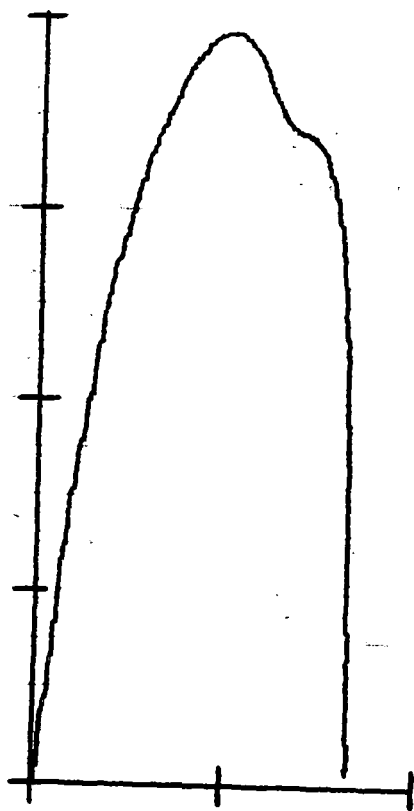
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

6" STROKE 3.05 MPH @.5 MSEC



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 4 TT.# 330 D

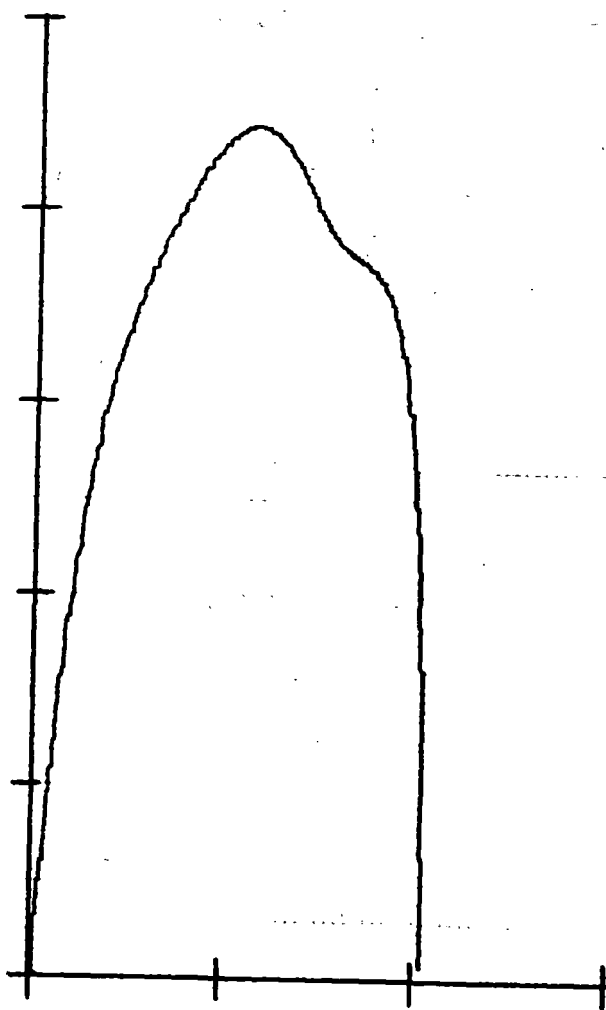
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

6" STROKE 3.94 MPH @ .5 MSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 5 T.T.# 330D

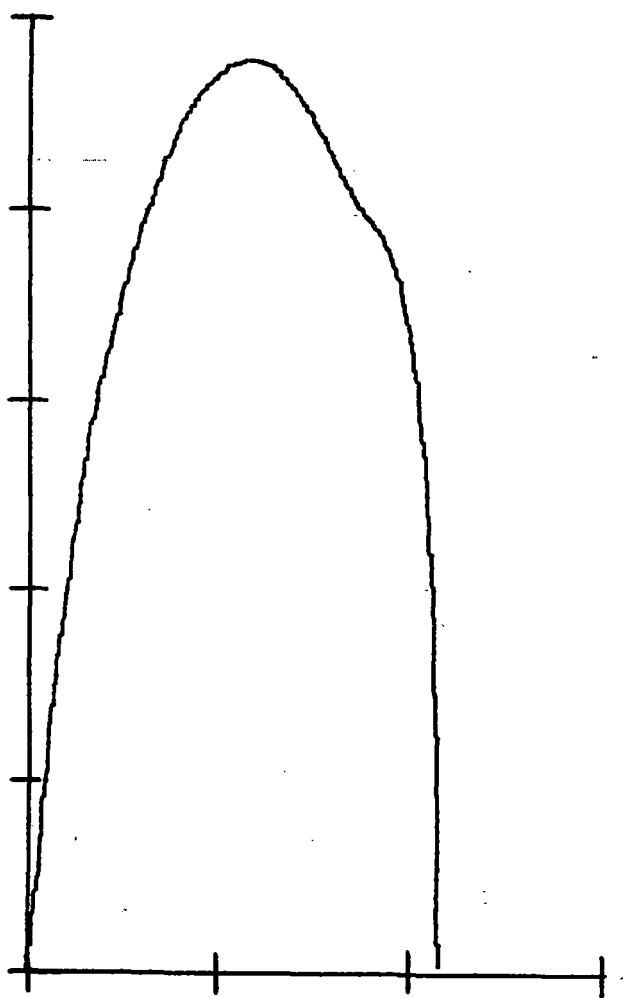
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

6" STROKE 4.53 MPH @.5 mSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 6 T.T. # 330D

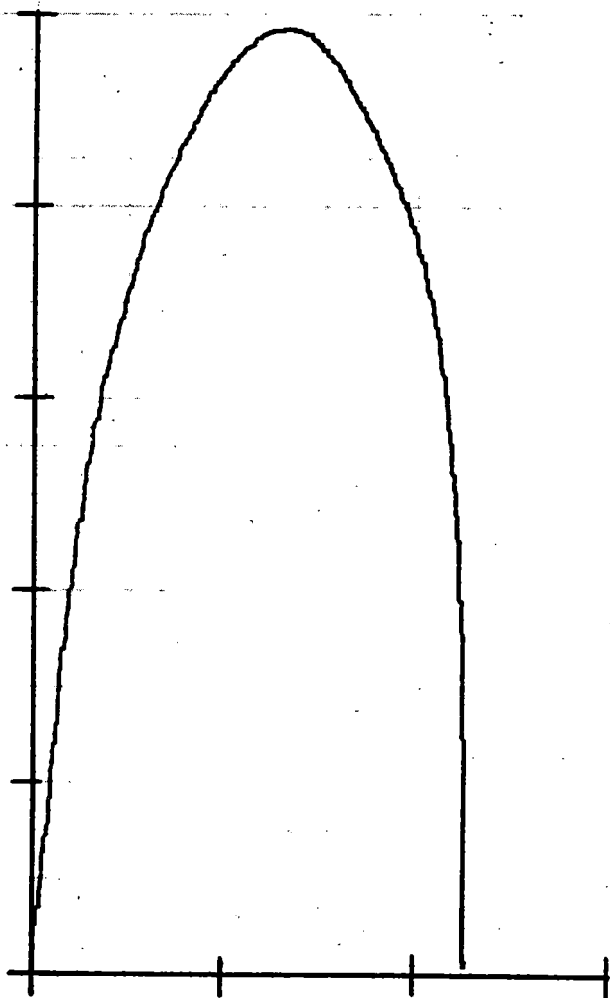
~~BUFFER~~ UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

~~SHAPE~~
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

6" STROKE 4.98 MPH @.5MSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 7 T.T.# 3300

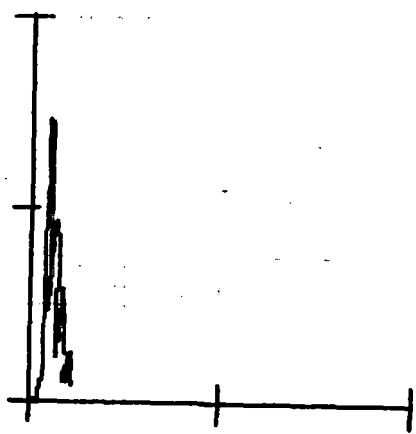
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

6" STROKE 5.45 MPH @ 5 msec.



OPERATOR KAJ DATE 9-27-78

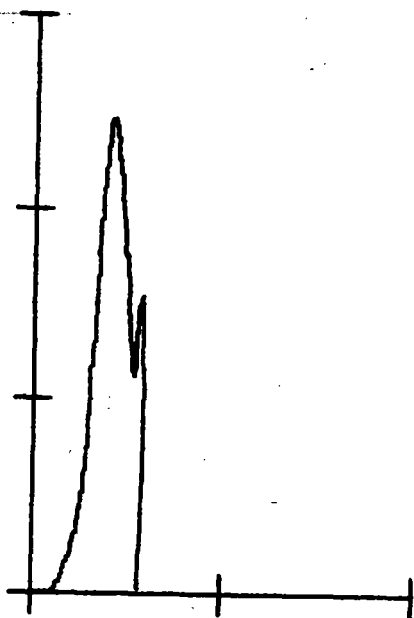
RD # C 1002 RUN 1 T.T.# 330E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
3" STROKE 1.04 MPH. @ 1MSEC



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 2 T.T. # 330E

BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

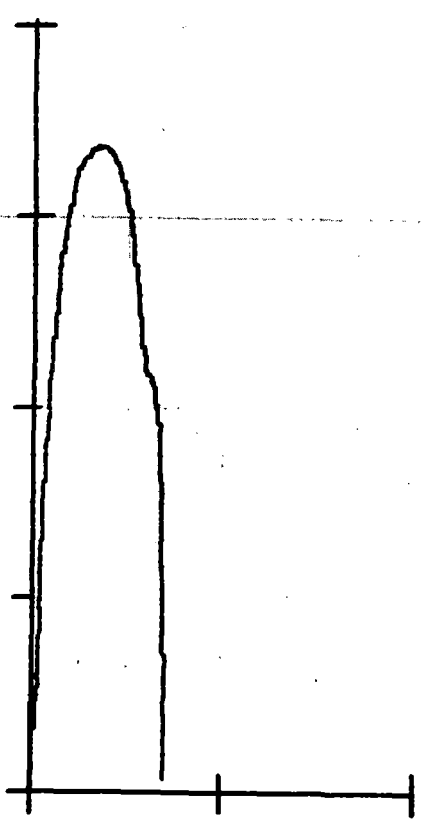
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

3" STROKE 1.96 MPH 0.5 MSEC.

175

175



OPERATOR KAJ DATE 9-27-78

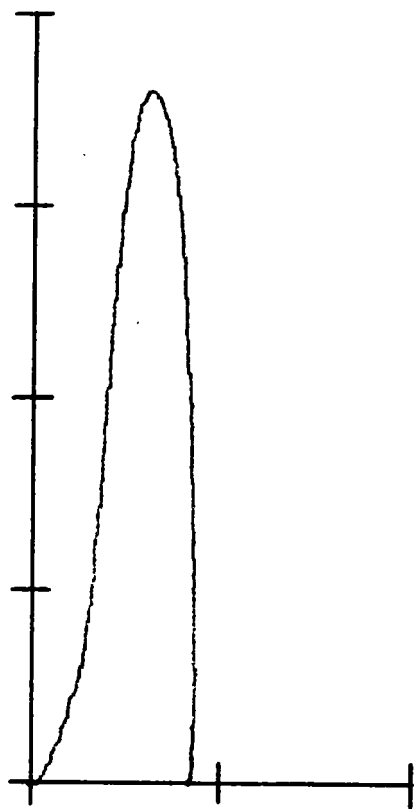
RD # C 1002 RUN 3 T.T.# 330E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
3" STROKE 2.90 MPH @ .5MSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 4 T.T. # 330E

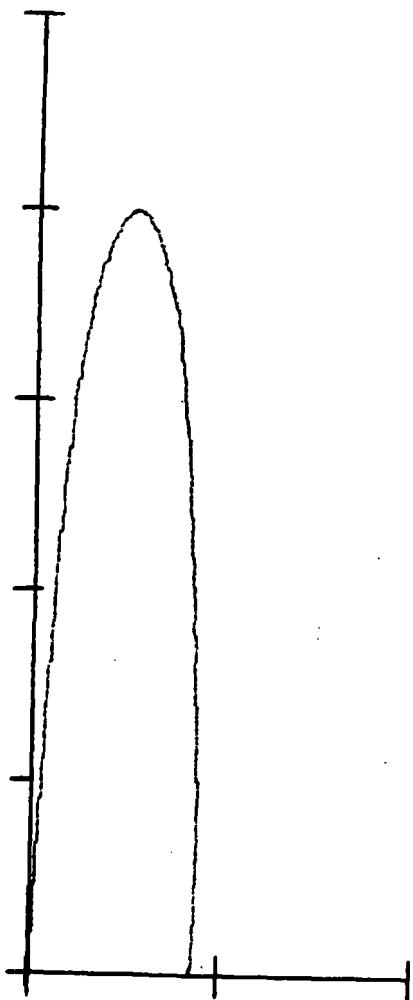
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3" STROKE 3.96 MPH @ .5 MSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 5 T.T.# 330E

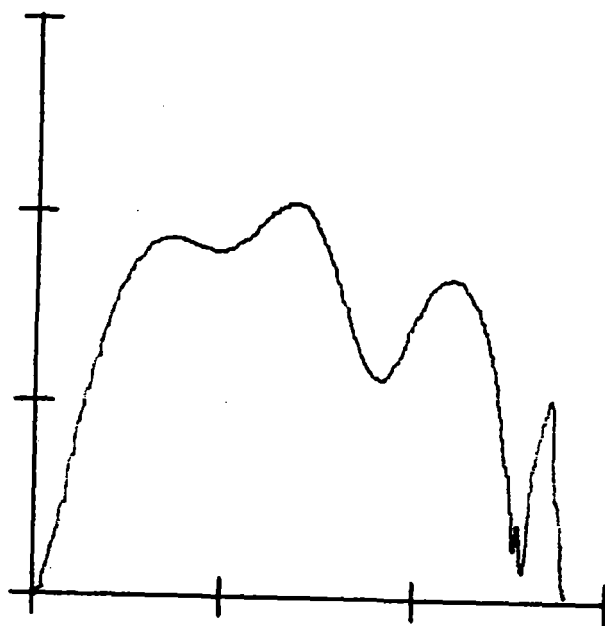
TITLE FORCE ^{BUFFER} VS. ^{UNIT} TRAVEL S.C.

X-AXIS 2 INCH PER MAJOR DIA

Y-AXIS 100,000 POUNDS PER MAJOR DIW.

FILTER TYPE ^{SHARP} CUT-OFF FREQUENCY 10 HZ

3" STROKE 4.40 MPH @.5 MSEC



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 1 T.T.# 330F

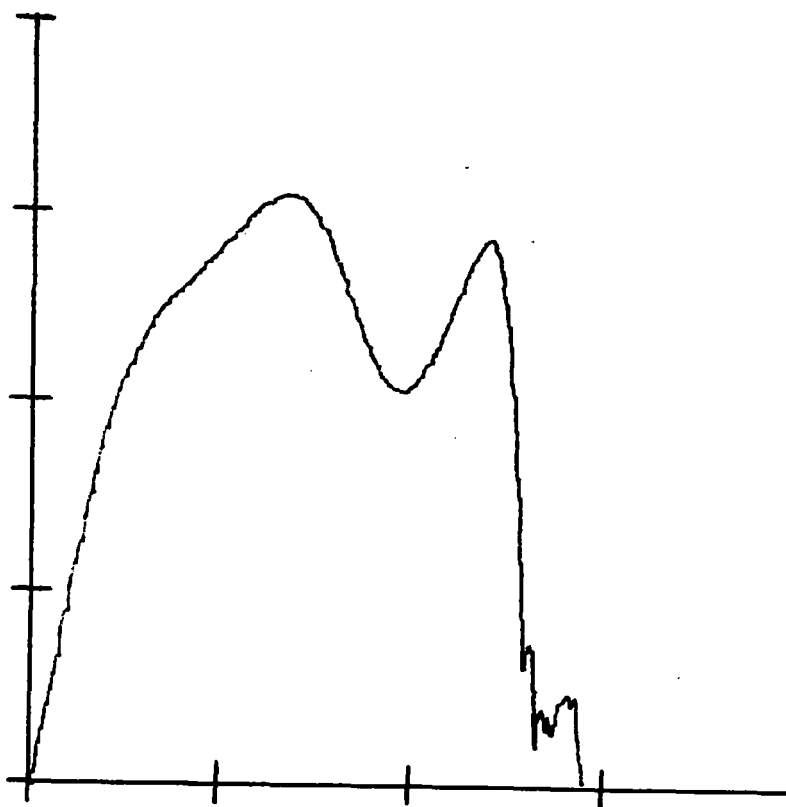
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 3.00 MPH @ 2 MSEC.



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 2 T.T.# 330F

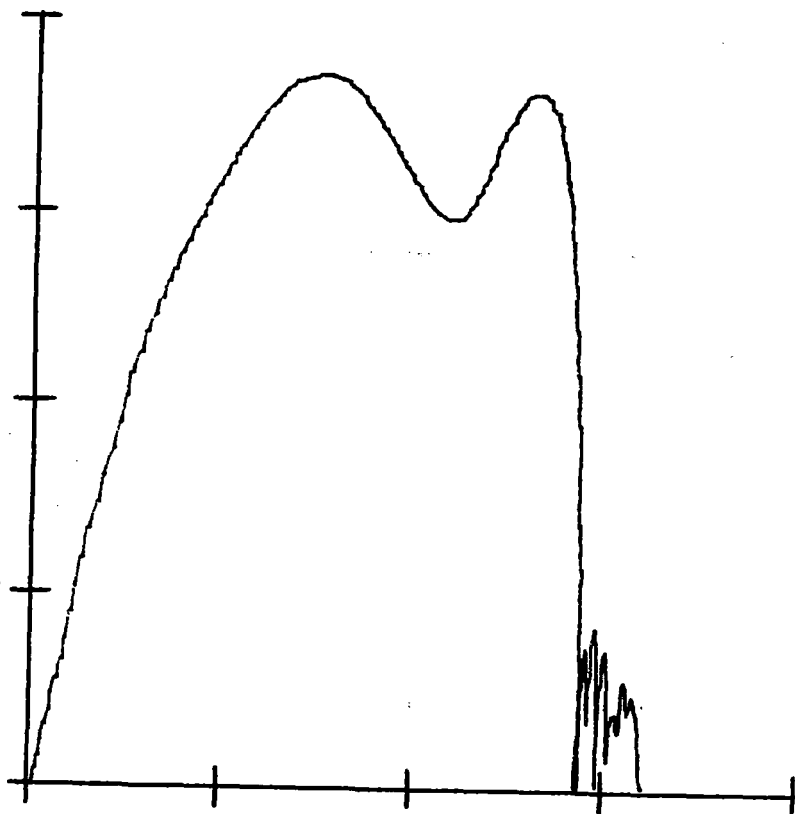
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
9" STROKE 3.92 MPH @2MSEC.

180



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 3 T.T.# 330 F

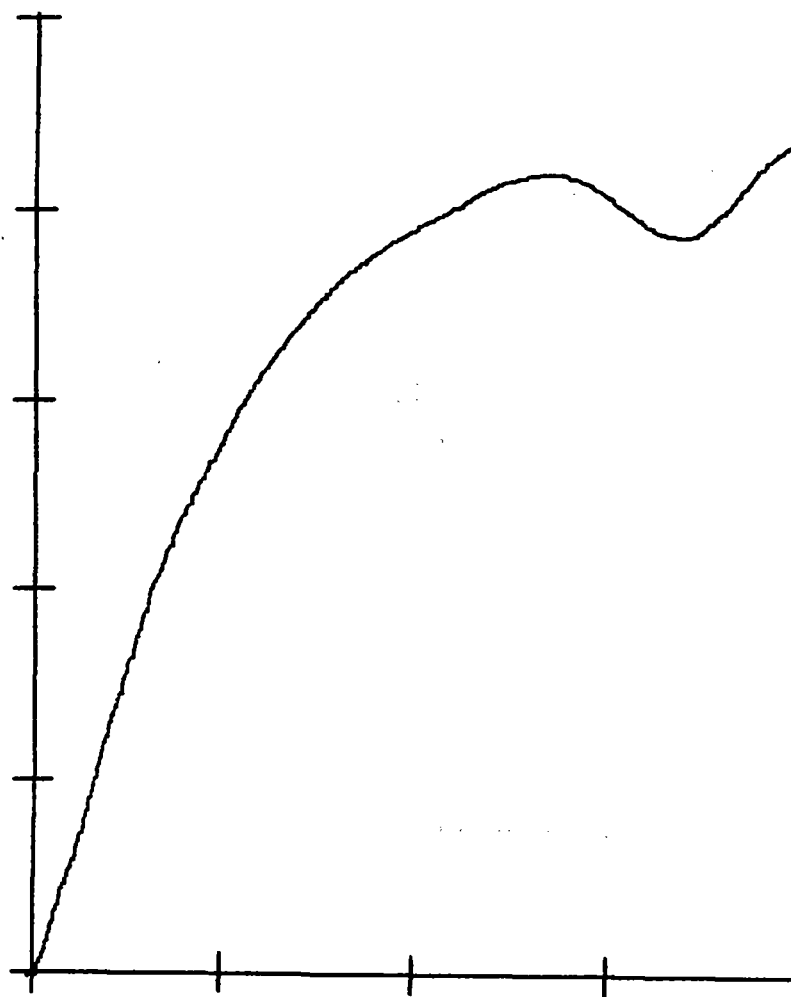
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 4.52 MPH @ 2 MSEC



OPERATOR KAJ DATE 9-27-78

RD # C 1002 RUN 4 T.T.# 330 F

BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

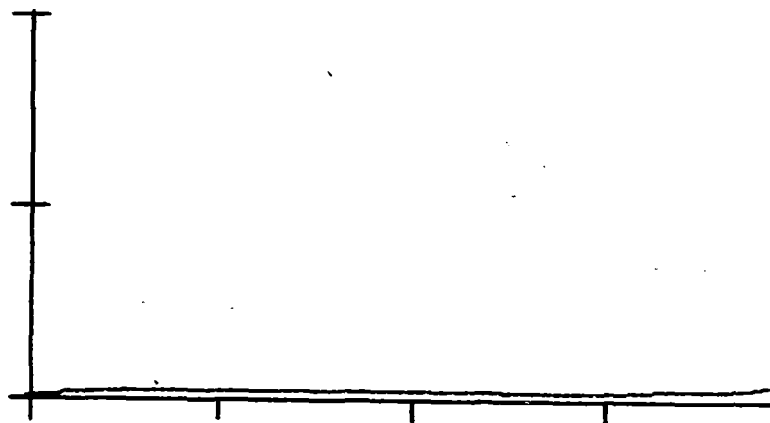
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ
12" STROKE 5.91 MPH. @ .5 mSEC.



10.2 Appendix 2

Force vs. Displacement Curves
For a Type 2, End-of-Car
Cushioning Unit



OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 1 T.T.# 329A

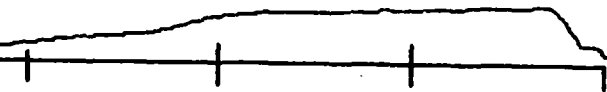
TITLE BUFFER UNIT VS.
FORCE TRAVEL S.C.

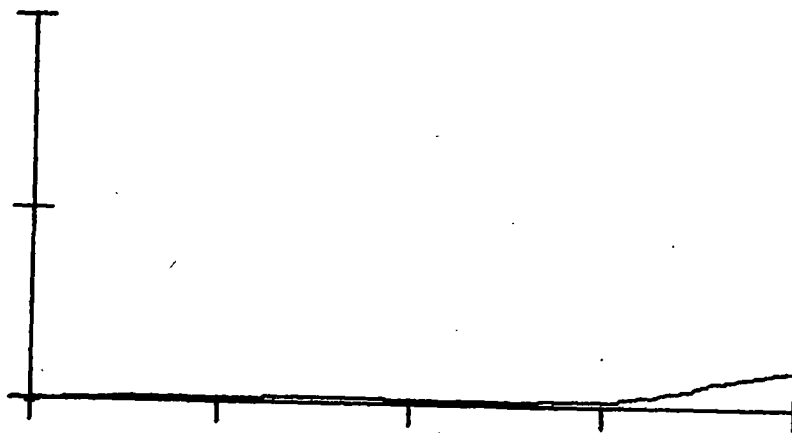
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 1.13 MPH @ 2 MSEC.





OPERATOR KAJ DATE 9-8-78

RD # G11 RUN 2 T.T.# 329A

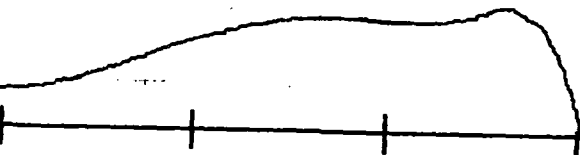
TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

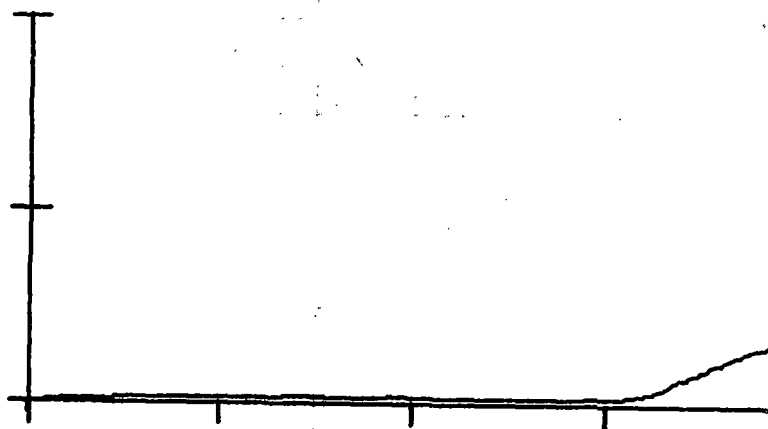
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 1.84 MPH @ 1MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 3 T.T.# 329A

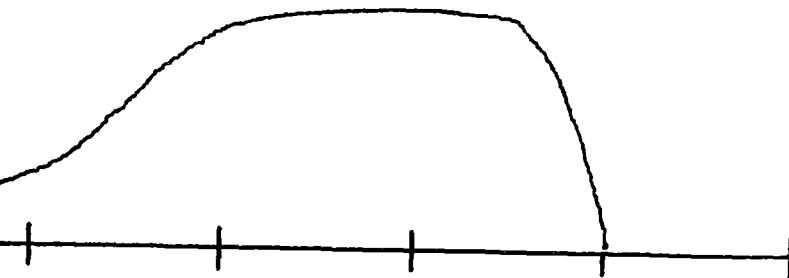
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

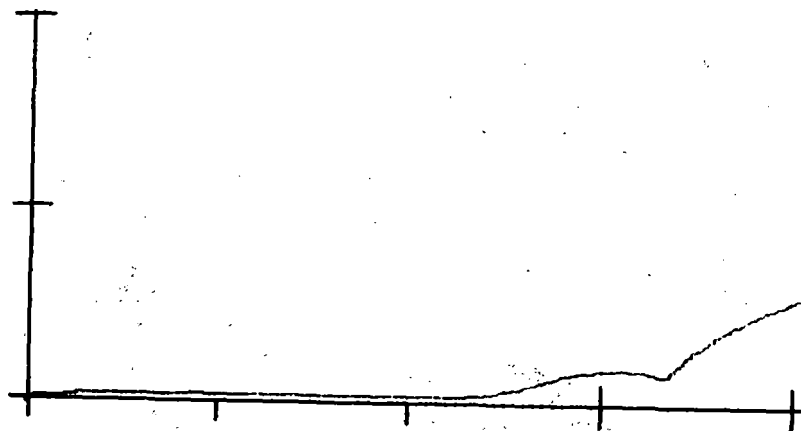
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

15' STROKE 2.86 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 4 T.T.# 329A

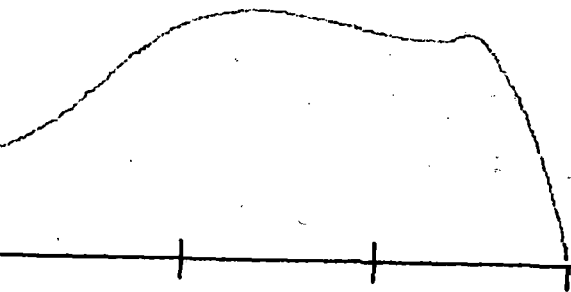
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

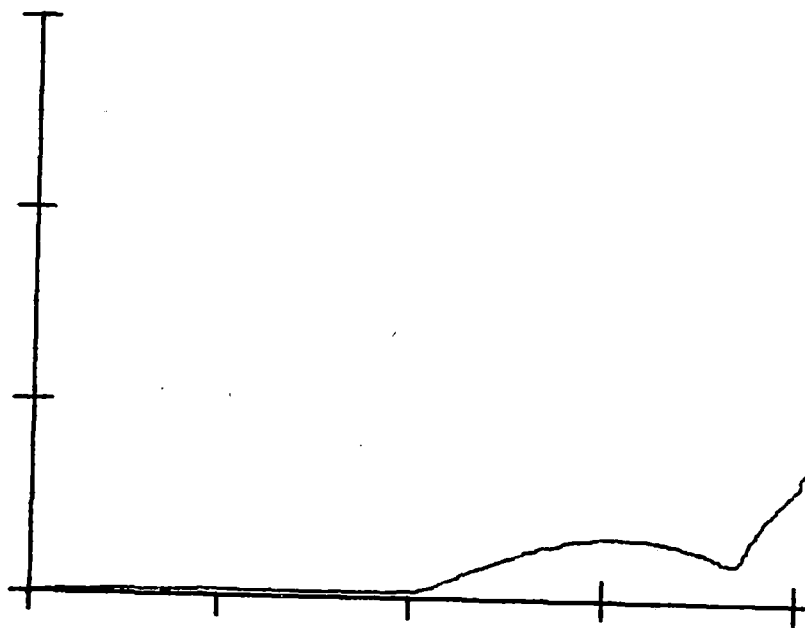
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 3.39 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 6 T.T. # 329A

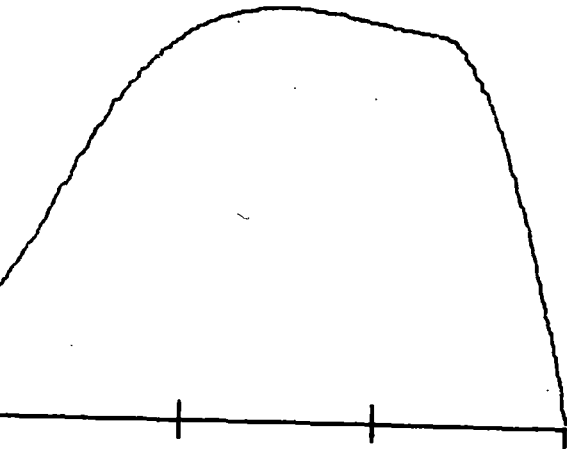
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C

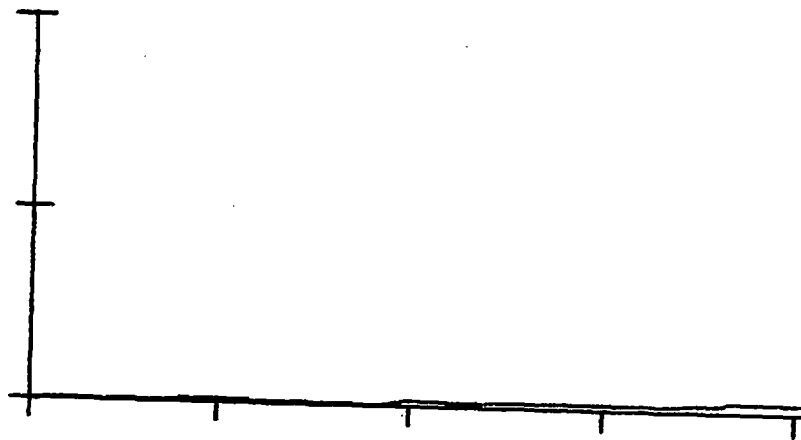
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 4.57 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 1 T.T. # 329B

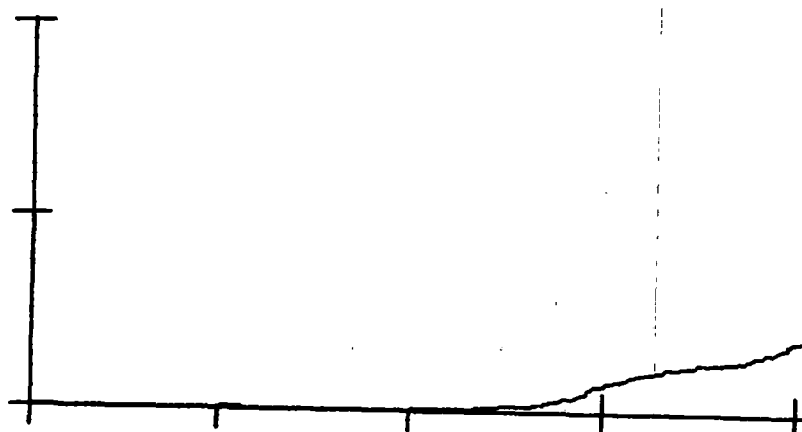
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 1.01 MPH @ 2 MSEC.



OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 2 T.T. # 3298

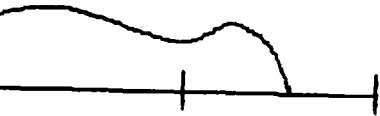
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C

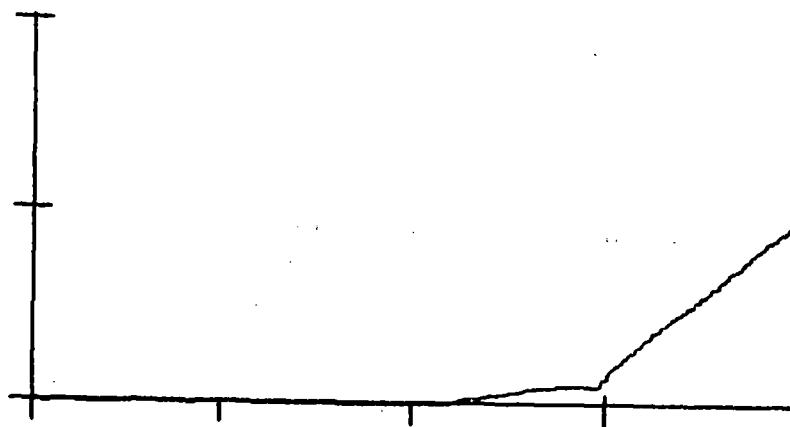
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

12" STROKE 1.86 MPH @ 1MSEC





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 3 T.T. # 3298

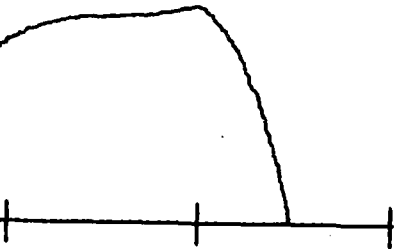
TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C

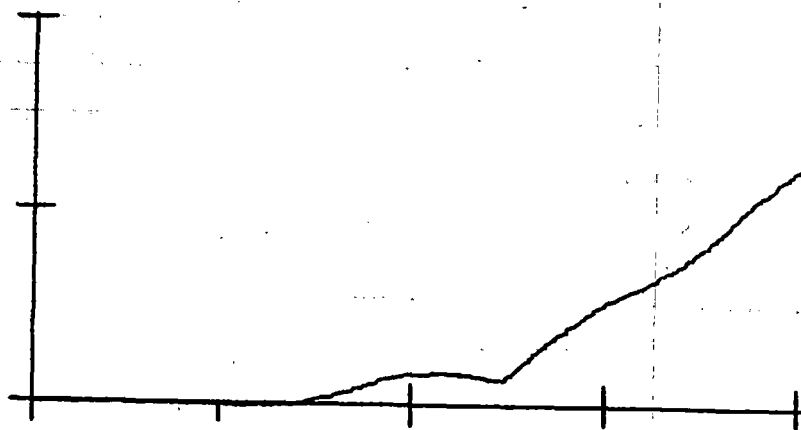
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 2.94 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 4 TT.# 3298

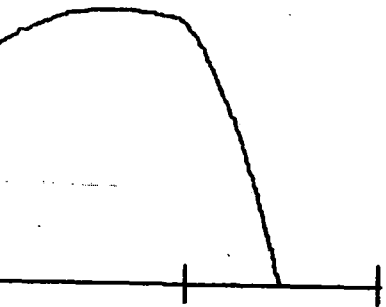
TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

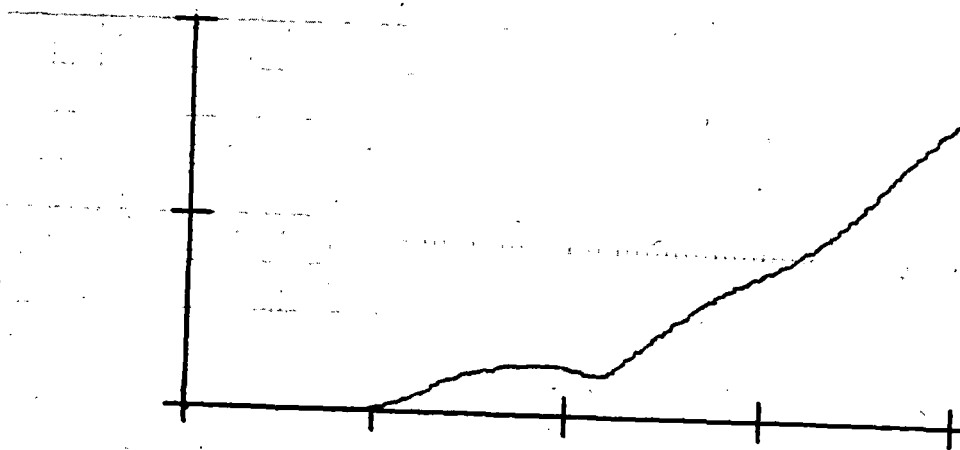
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 3.45 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 5 T.T. # 329R

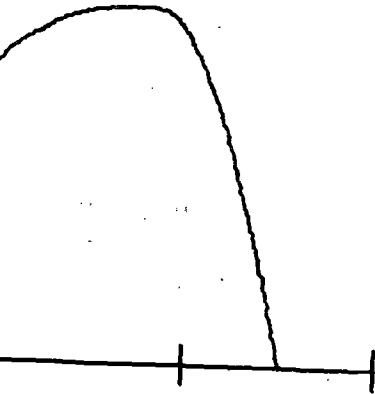
TITLE BUFFER VS. UNIT
FORCE TRAVEL SC.

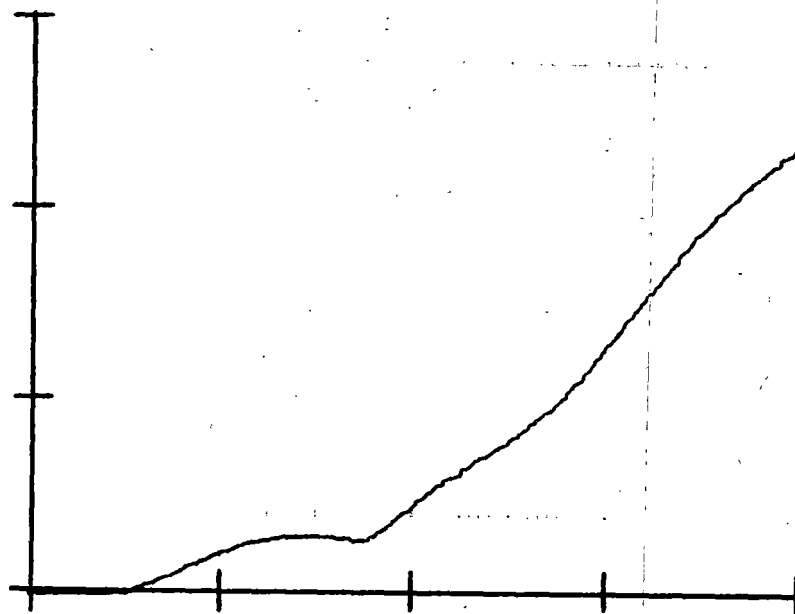
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 4.02 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 6 T.T.# 329B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

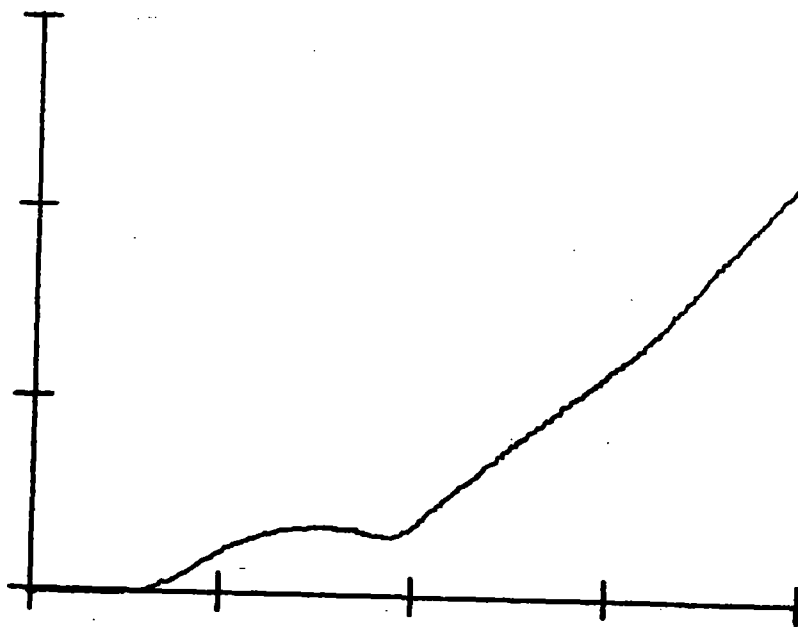
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 4.55 MPH @ .5MSEC.





OPERATOR KAJ DATE 9-8-78

RD # 611 RUN 7 T.T.# 329B

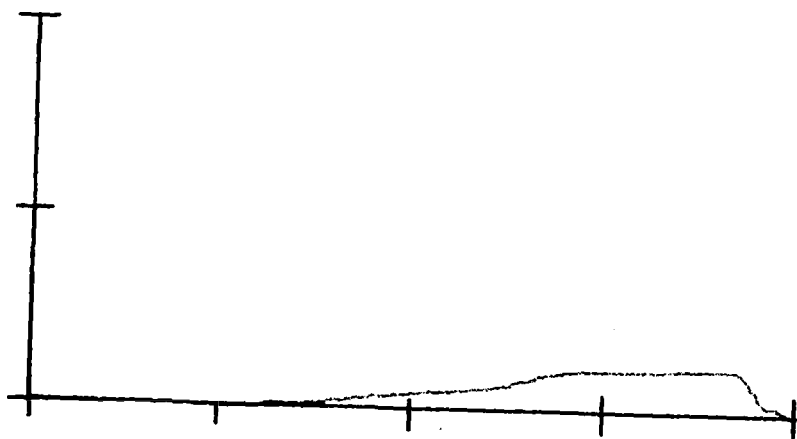
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
12" STROKE 5.05 MPH @ .5MSEC





OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 1 T.T. # 3290

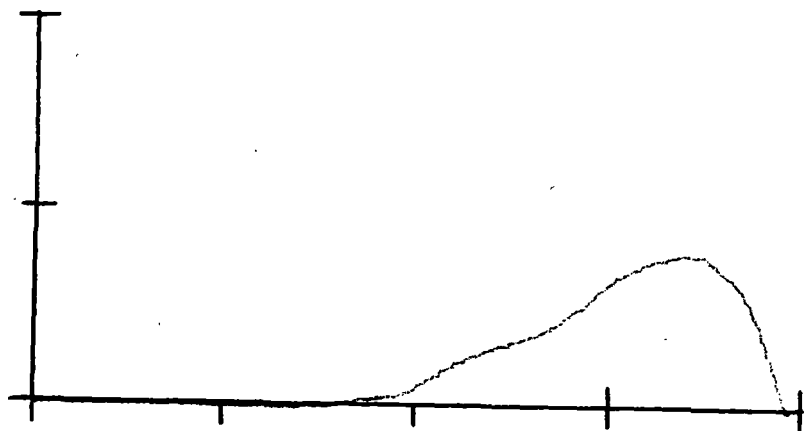
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 1.01 MPH @ 1 MSEC



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 2 T.T. # 3290

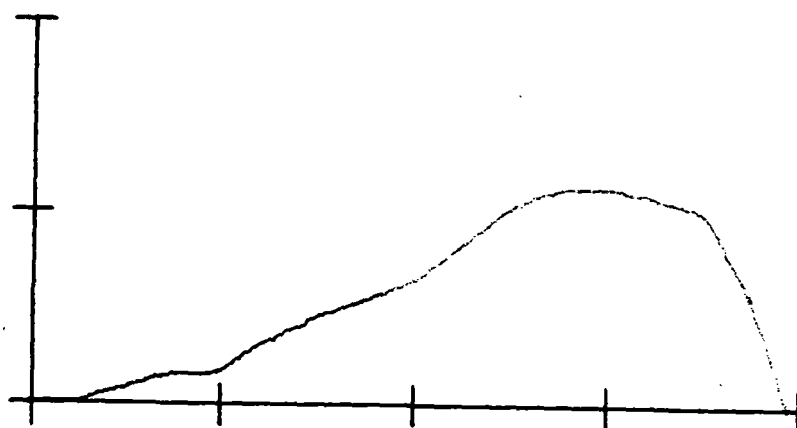
TITLE BUFFER UNIT
FORCE V6. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 1.88 MPH @ 1 MSEC



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 5 T.T. # 329C

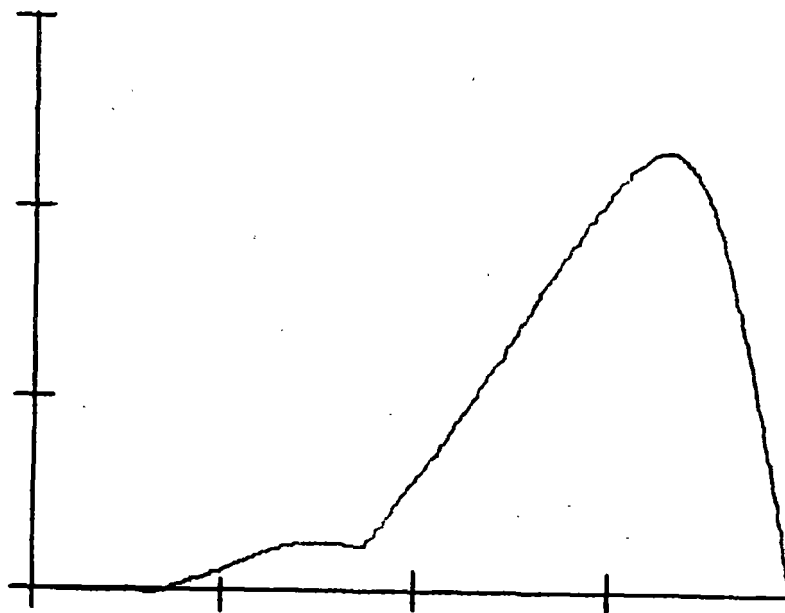
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

9" STROKE 2.98 MPH @ .5MSEC.



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 6 T.T. # 3290

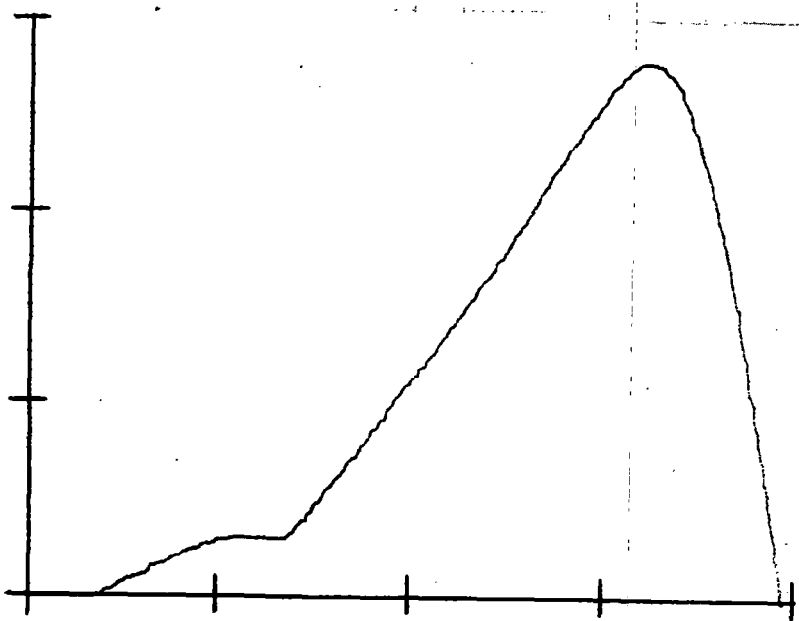
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

9" STROKE 3.98 MPH @.5MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 7 T.T. # 3290

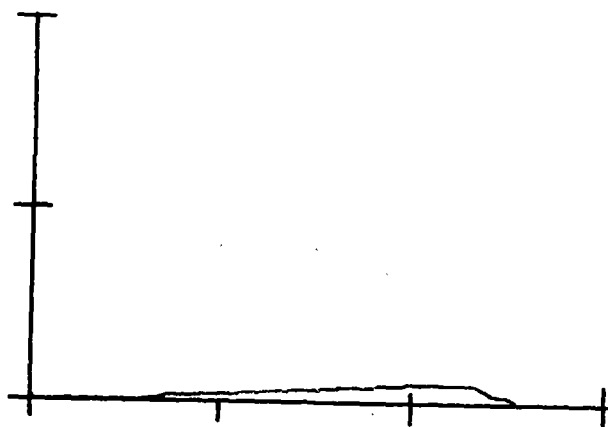
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-off FREQUENCY 10 HZ

9" STROKE 4.54 MPH @ .5MSEC.



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 1 T.T. # 3290

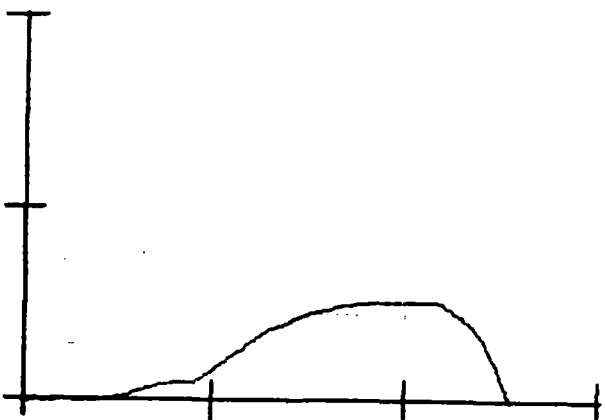
TITLE BUFFER UNIT
FORCE VS. TRAVEL SC.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

6" STROKE 0.95 MPH. @ 2 MSEC.



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 2 T.T.# 329D

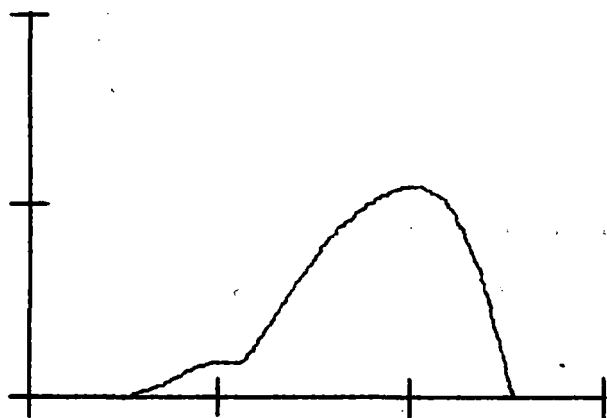
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

6" STROKE 1.93 MPH. @ .5MSEC.



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 3 T.T.# 329D

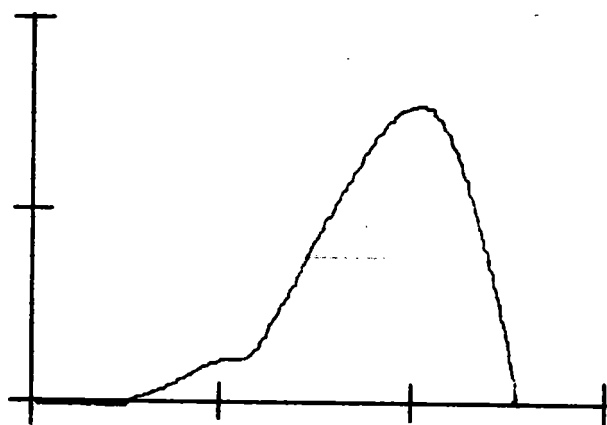
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

6" STROKE 2.85 MPH @ .5 msec



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 4 T.T. # 329D

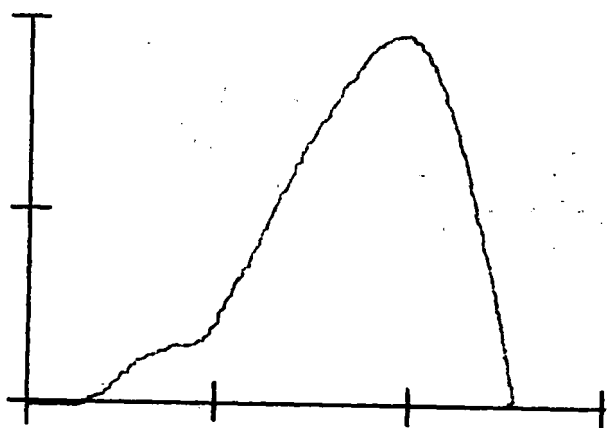
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

6" STROKE 3.45 MPH @.5 MSEC



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 5 T.T. # 329D

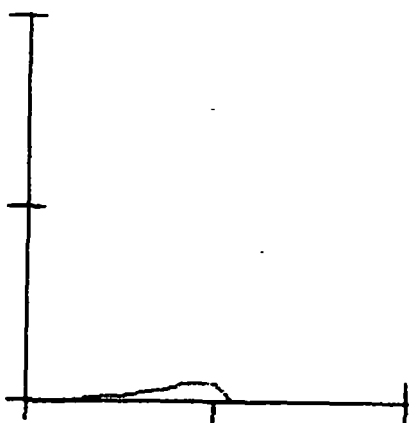
~~BUFFER~~ UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

~~SHARP~~
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

6" STROKE 4.05 MPH @ .5 MSEC.



OPERATOR KAJ DATE 9-11-78

RD # G11 RUN 1 T.T.# 329E

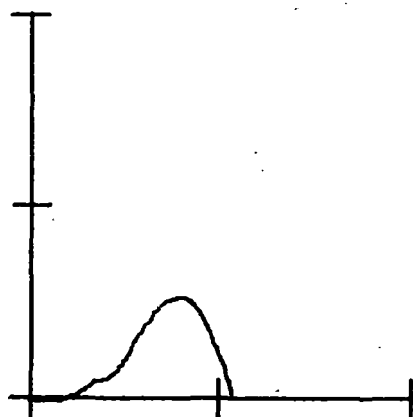
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3" STROKE 0.95 MPH @ 1 MSEC.



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 2 T.T.#329E

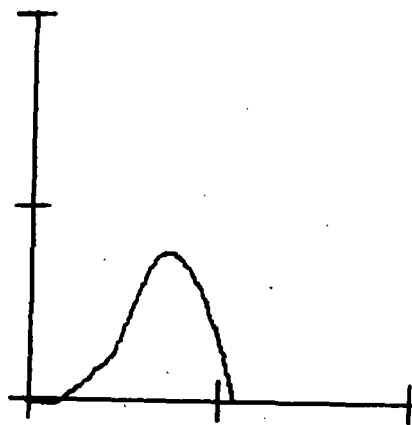
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3" STROKE 1.88 MPH @.5 MSEC



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 3 T.T. # 329E

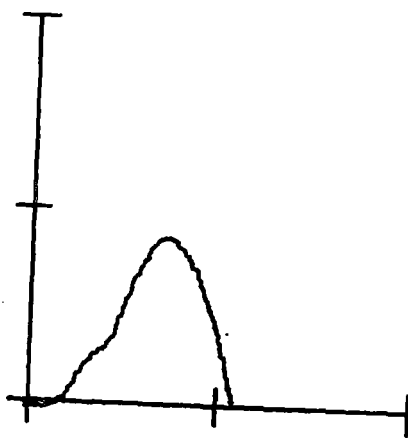
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-off FREQUENCY 10 HZ

3" STROKE 2.93 MPH @ .5 MSEC.



OPERATOR KAJ DATE 9-11-78

RD# 611 RUN 4 T.T.# 329E

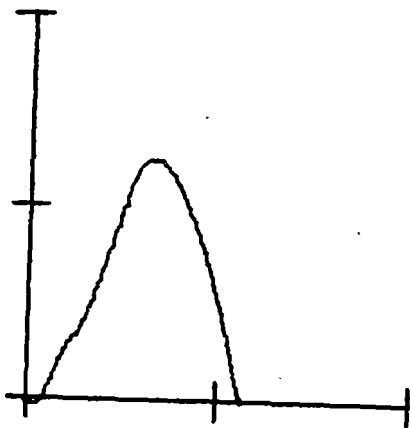
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 KZ

3" STROKE 3.41 MPH @ .5 MSEC.



OPERATOR KAJ DATE 9-11-78

RD # 611 RUN 5 T.T. # 329E

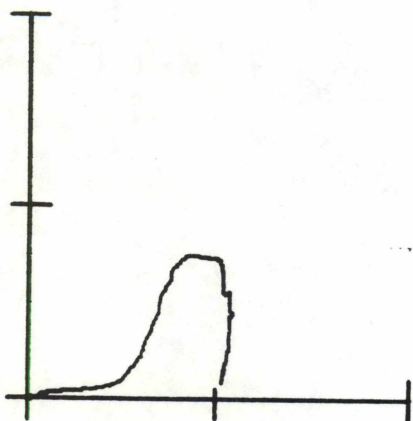
~~BUFFER~~ ~~UNIT~~
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

~~SHARP~~
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

3" STROKE 4.02 MPH @ .5 MSEC.



OPERATOR KAJ DATE 8-31-78

RD # 611 RUN 1 TT. # 328B

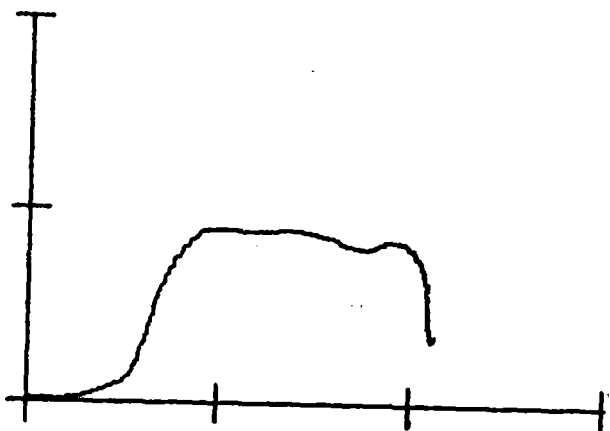
TITLE BUFFER UNIT
FORCE V6 TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 1.04 MPH @ 1MSEC.



OPERATOR KAJ DATE 8-31-78

RD # 611 RUN 2 T.T. # 328B

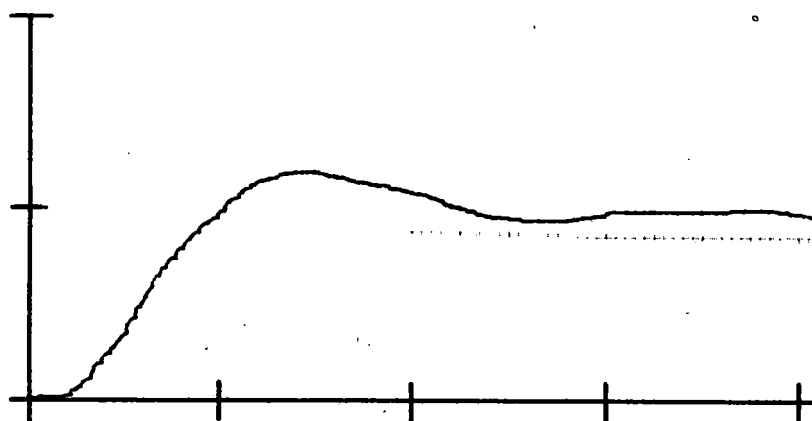
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 1.78 MPH @ 1 MSEC.



OPERATOR KAJ DATE 8-31-78

RD# 611 RUN 3 T.T.# 328B

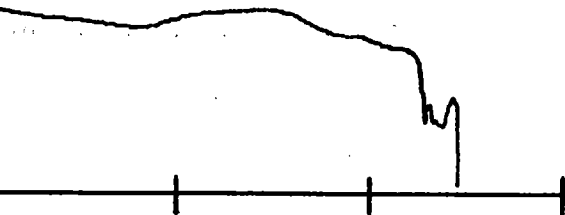
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

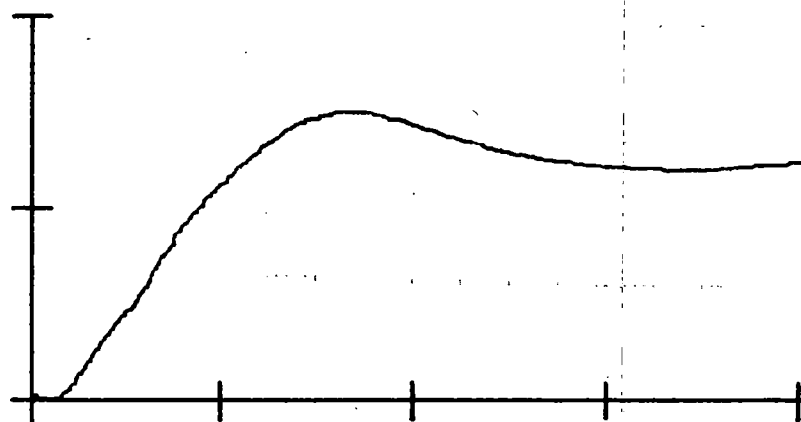
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ

15" STROKE 23 MPH @ 2 MSEC.





OPERATOR KAJ DATE 8-31-78

RD # 611 RUN 4 T.T.# 3288

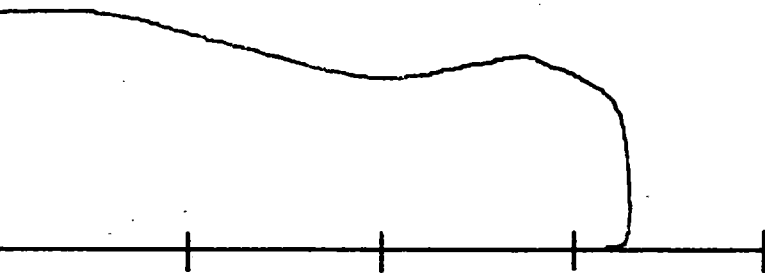
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

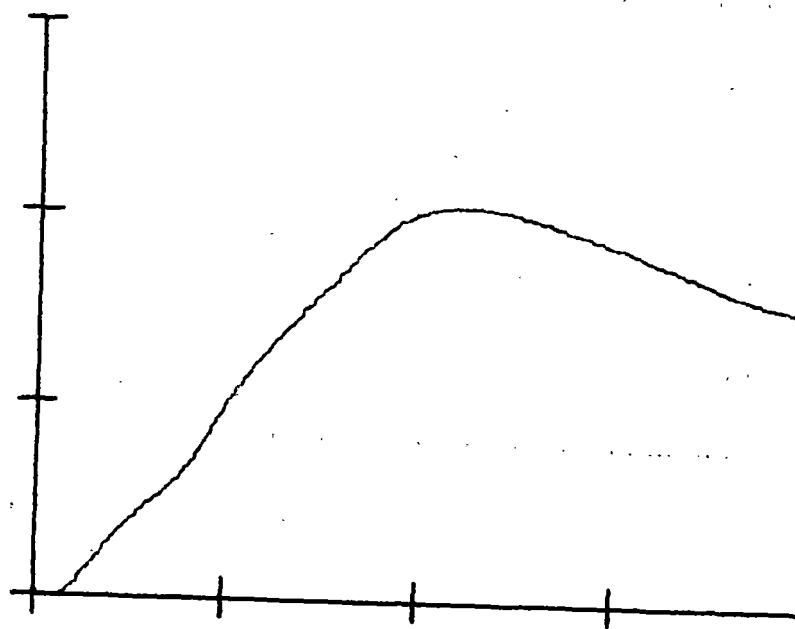
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 4.01 MPH @ 1 MSEC





OPERATOR KAJ DATE 8-31-78

RD # 611 RUN 5 T.T.# 328B

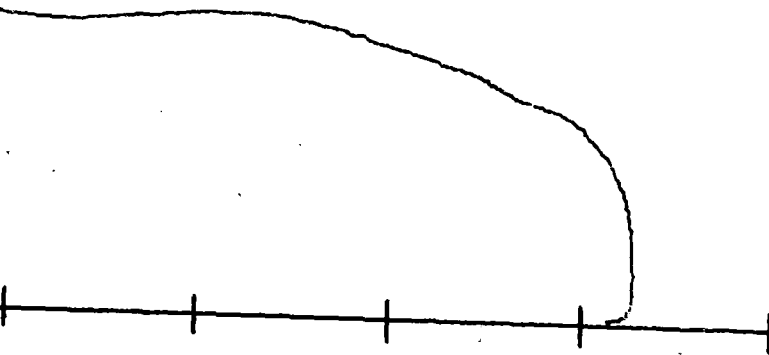
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

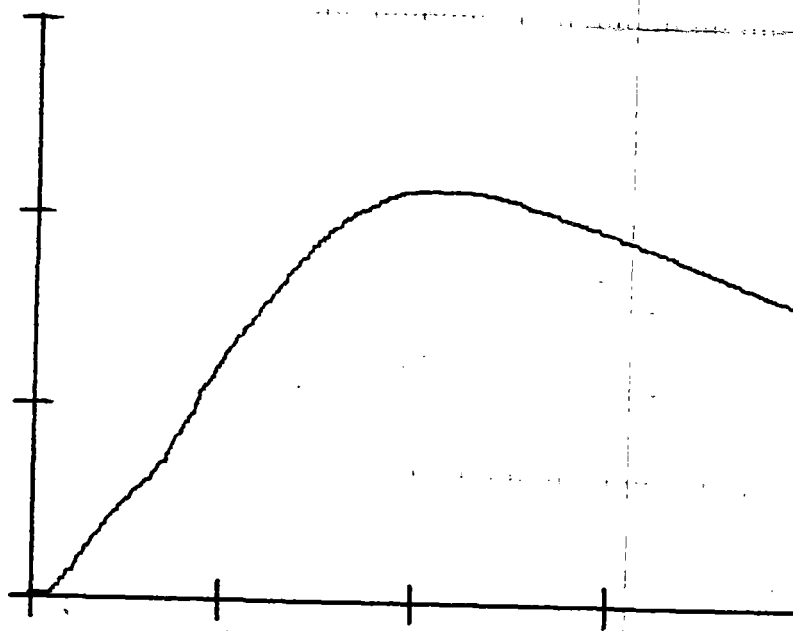
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 5.17 MPH @ .5 MSEC.





OPERATOR KAJ DATE 8-31-78

RD # 611 RUN 6 T.T. # 328B

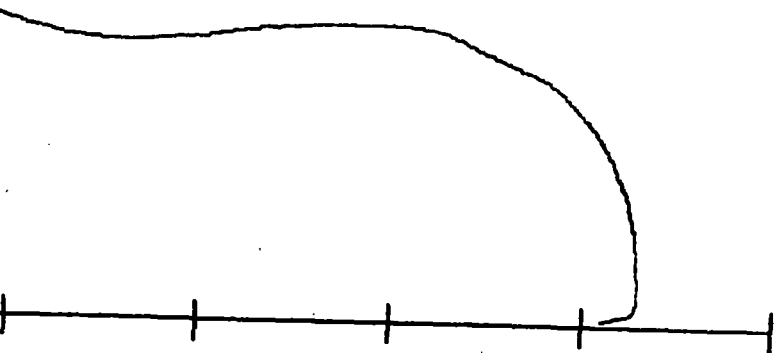
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C

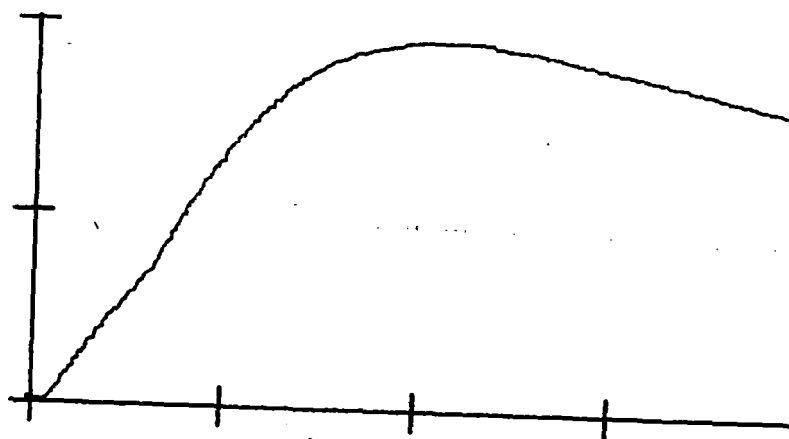
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ

15" STROKE 5.55 MPH @ .5 MSEC





OPERATOR KAJ DATE 8-31-78

RD # 611 RUN 7 T.T.# 328B

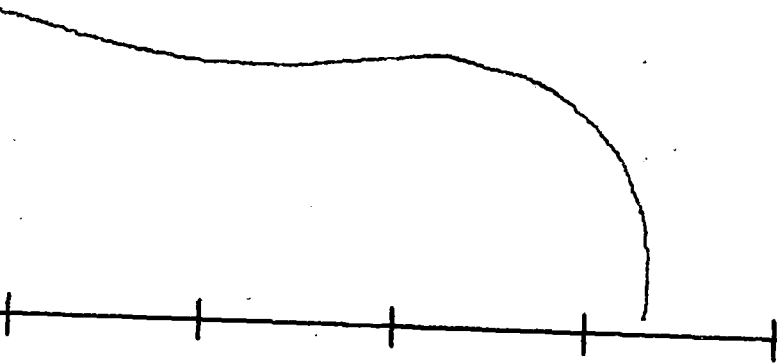
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

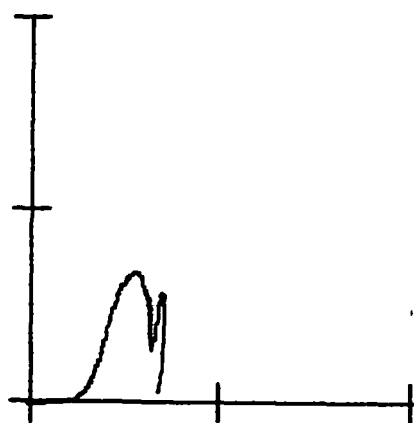
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

15" STROKE 5.90 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 1 T.T.# 3280

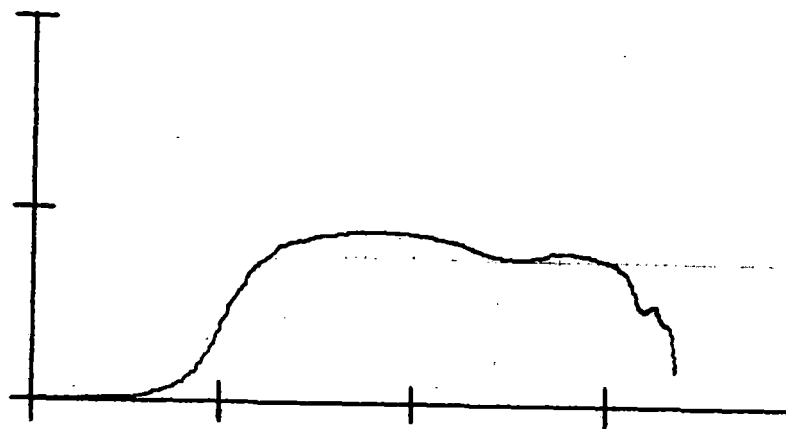
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE .94 MPH @ .5msec



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 2 T.T. # 3280

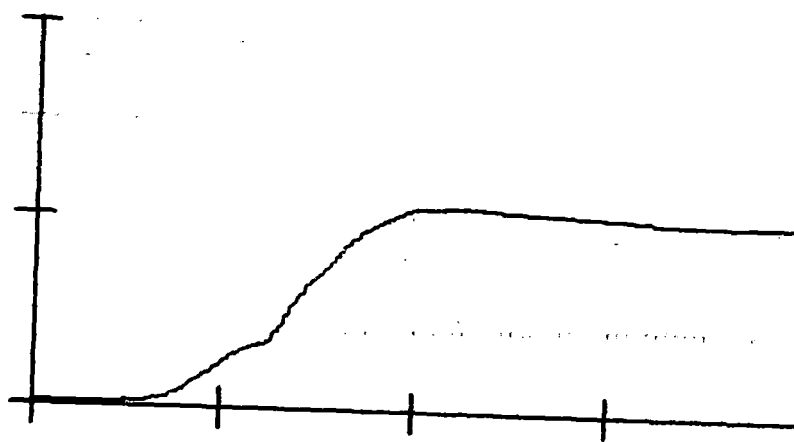
TITLE BUFFER UNIT.
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE \approx 2 MPH @ 1MSEC



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 3 T.T.# 328C

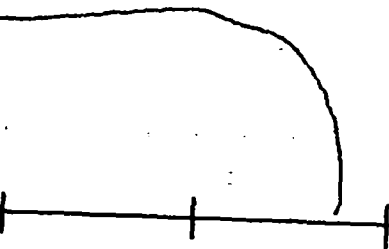
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

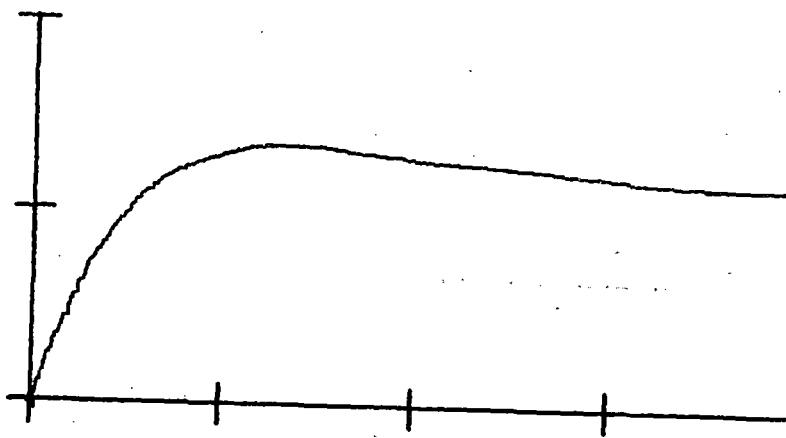
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

12" STROKE 3.03 MPH @ .5 MSEC.





OPERATOR KAJ DATE 9-1-78

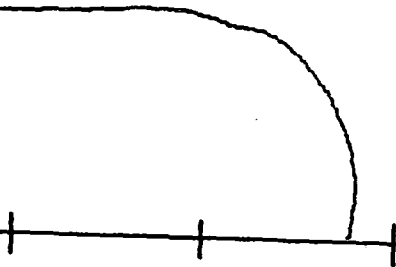
RD # 611 RUN 4 T.T. # 3280

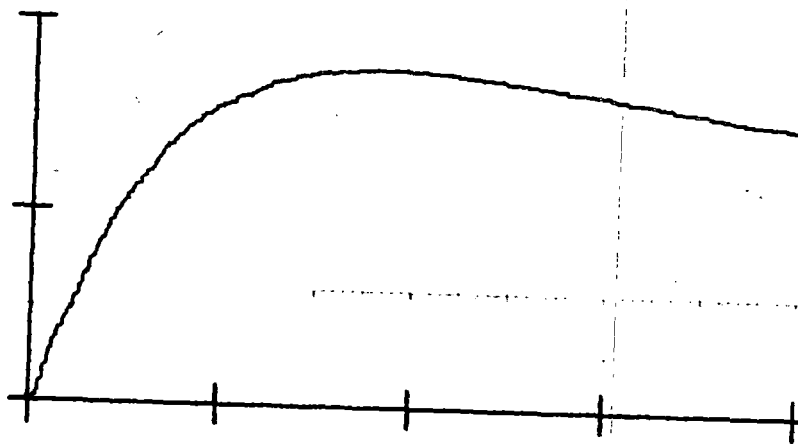
TITLE FORCE VS. TRAVEL UNIT. S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ
12" STROKE 4.11 MPH @ .5 MSEC





OPERATOR KAJ DATE 9-1-78

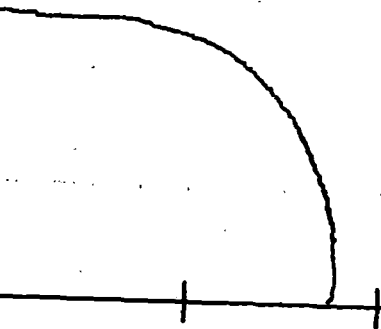
RD # 611 RUN 5 T.T.# 329C

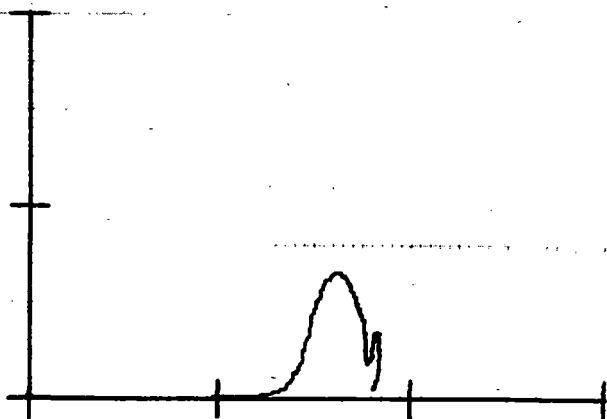
~~BUFFER~~ UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

~~SHARP~~
FILTER TYPE CUT-OFF FREQUENCY 10 HZ
12" STROKE 5.16 MPH @ .5msec





OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 1 T.T. # 328D

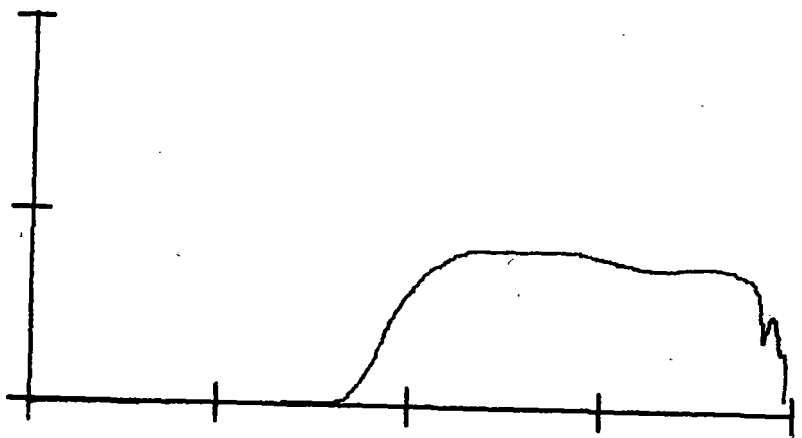
~~BUFFER~~ ~~UNIT~~
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

~~SHARP~~
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

9" STROKE 0.98 MPH @ 1 MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 2 T.T.# 3280

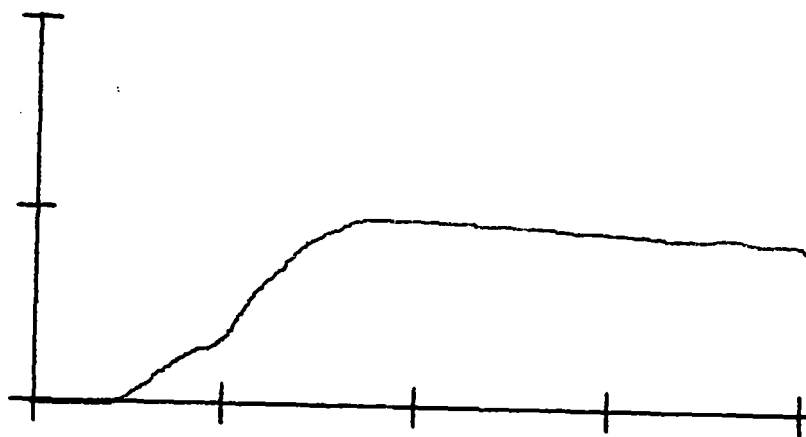
TITLE BUFFER FORCE VS. UNIT TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ

9" STROKE 1.85 MPH @ 1MSEC



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 3 T.T. # 328D

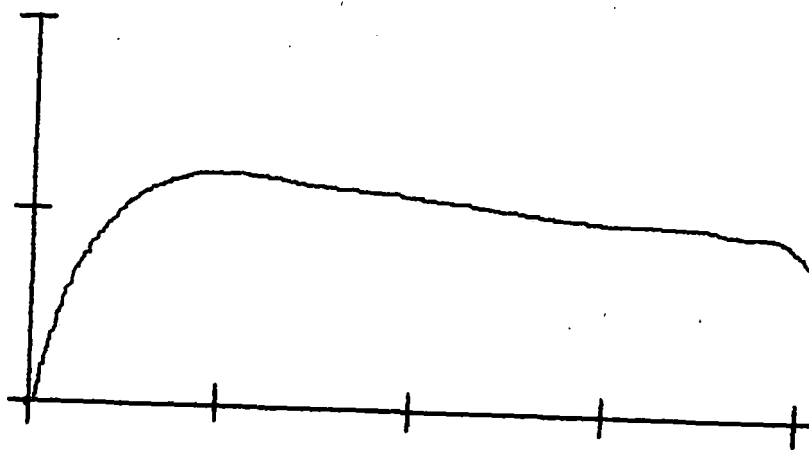
TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 3.05 MPH @ .5MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 4 T.T.# 328D

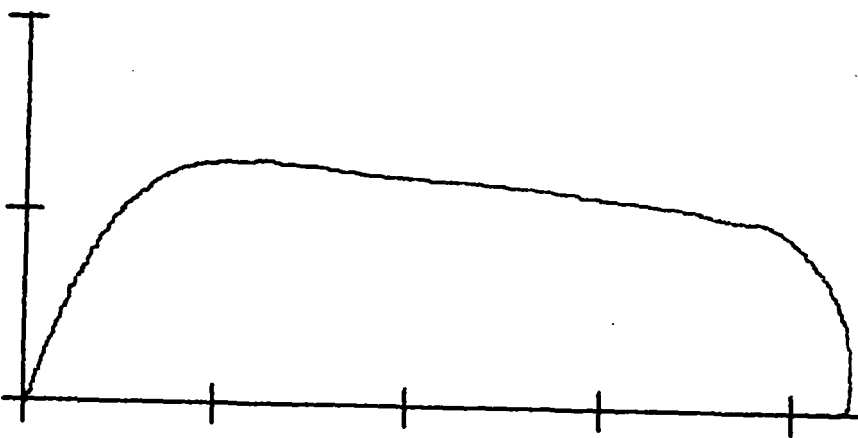
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 3.49 MPH @ .5 MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 5 T.T.#328D

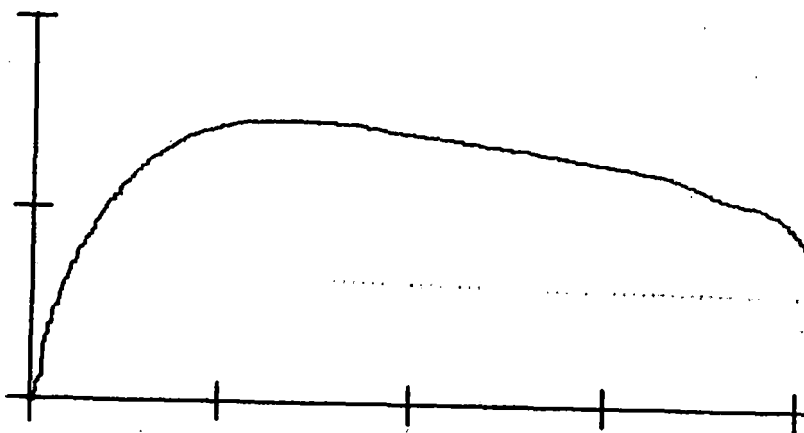
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

9" STROKE 3.98 MPH @ .5 MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 6 T.T. # 328D

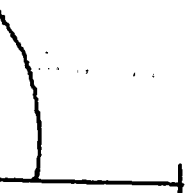
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

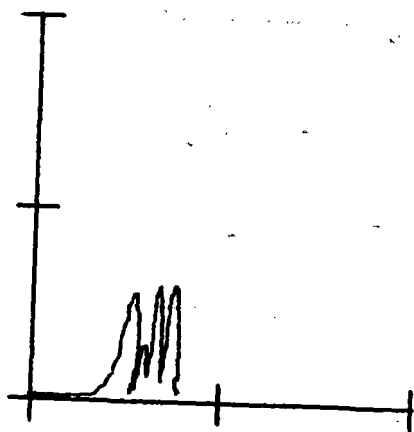
X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

9" STROKE 4.56 MPH @ .57MSEC.





OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 1 T.T. # 328E

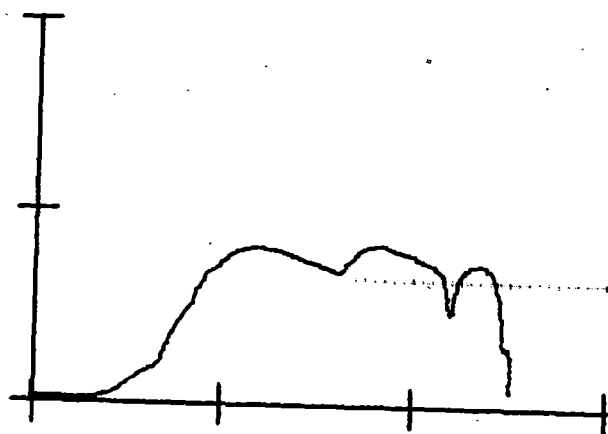
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ

6" STROKE .93 MPH @ 2 MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 2 T.T. #328E

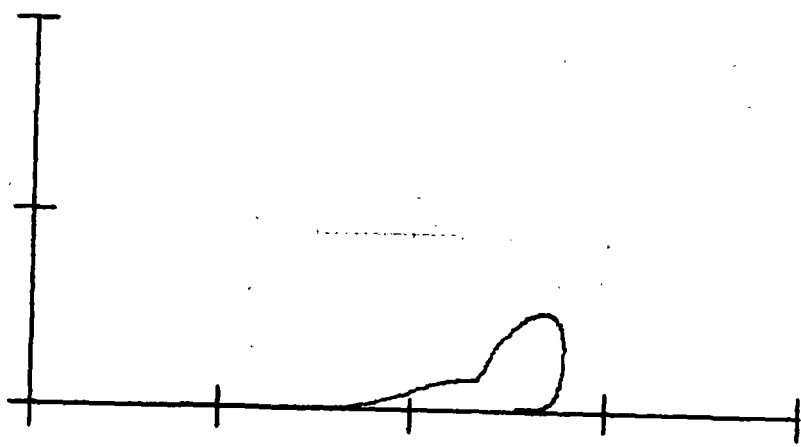
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.
SHARP

FILTER TYPE CUT-OFF FREQUENCY 10 HZ

6" STROKE 1.90 MPH @ 1 MSEC



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 3 T.T. # 328E

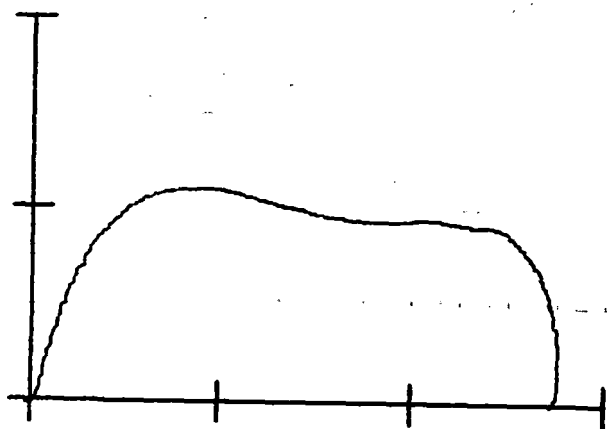
TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

6" STROKE 2.97 MPH @.5 MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 4 T.T. # 328E

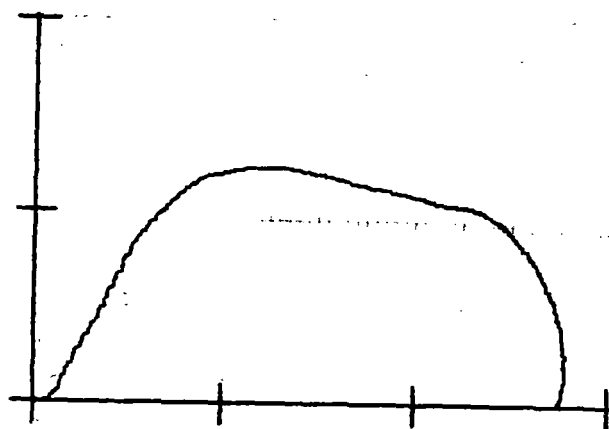
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

6" STROKE 3.50 MPH @ .5 msec.



OPERATOR KAJ DATE 9-1-78

RD # G11 RUN 5 T.T.# 328E

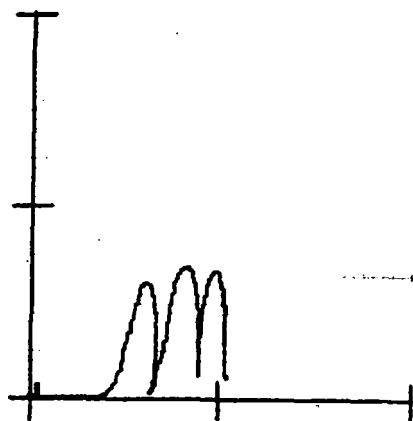
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

6" STROKE 3.93 MPH @ .5MSEC.



OPERATOR KAJ DATE 9-1-78

RD # 611 RUN 1 T.T.# 32BF

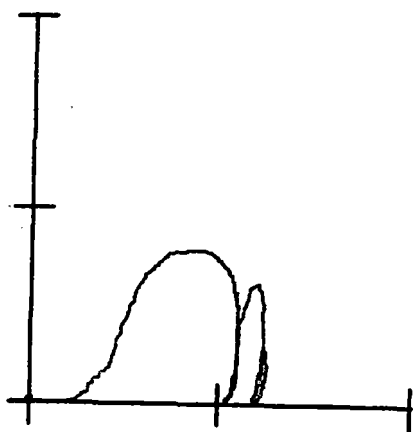
TITLE BUFFER
FORCE vs. UNIT
TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3" STROKE 1.03 MPH @ 1 MSEC



OPERATOR KAJ DATE 9-5-78

RD # 611 RUN 2 T.T. # 328F

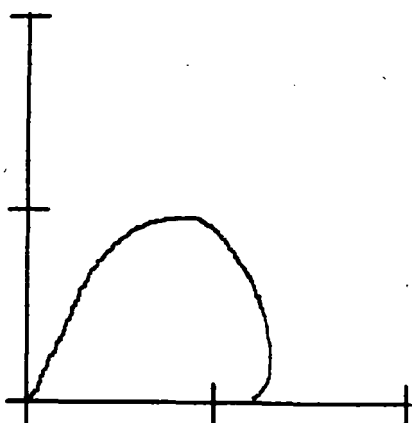
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ

3" STROKE 1.86 MPH @ 1MSEC.



OPERATOR KAJ DATE 9-5-78

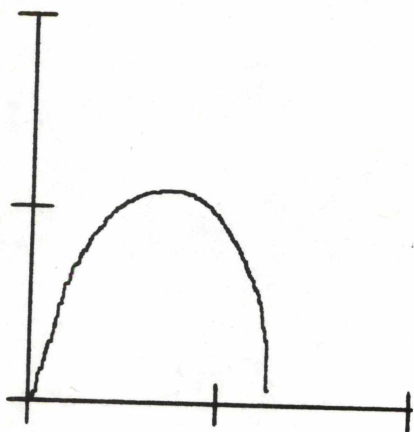
RD # 611 RUN 3 T.T.# 328E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
3" STROKE 2.93 MPH @.2 MSEC.



OPERATOR KAJ DATE 9-5-78

RD # 611 RUN 4 T.T.# 328F

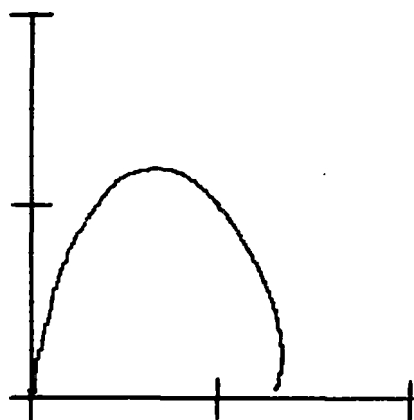
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

3" STROKE 3.40 MPH @ .2 MSEC.



OPERATOR KAJ DATE 9-5-78

RD # 611 RUN 5 T.T. # 328F

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 2 INCHES PER MAJOR DIV.

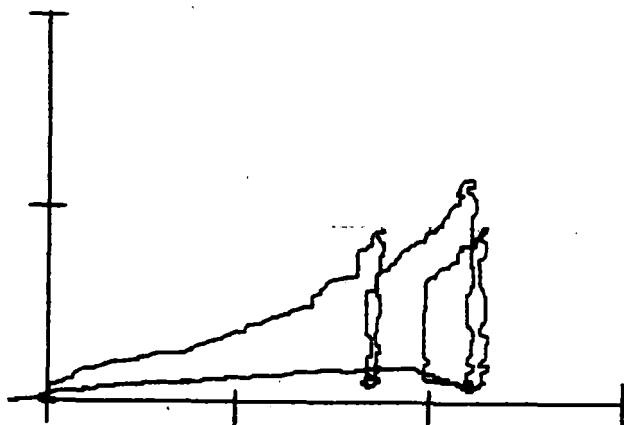
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3" STROKE 4.05 MPH @.2 MSEC

10.3 Appendix 3

Force vs. Displacement Curves
For a Rubber-Friction Draft Gear



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 1 T.T. # 331 B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

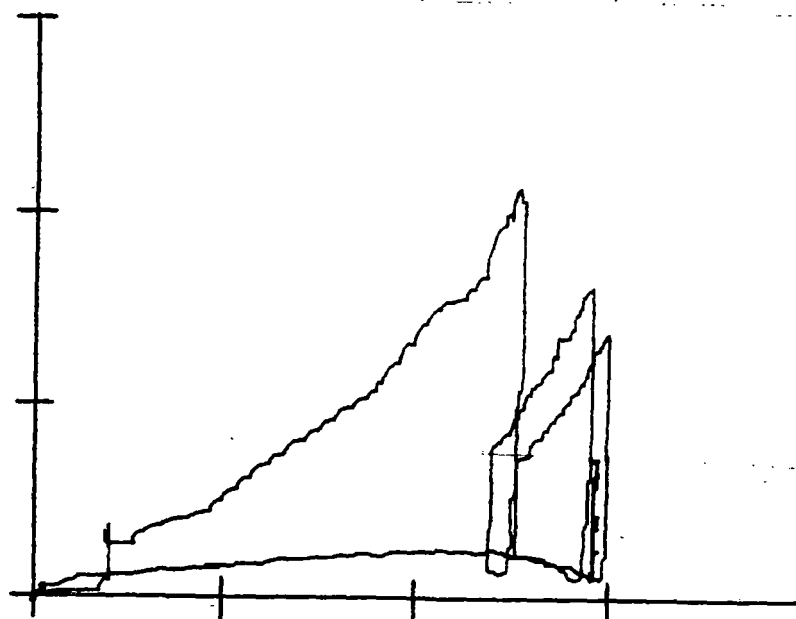
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

1-10 MPH

2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 2 T.T.# 331B

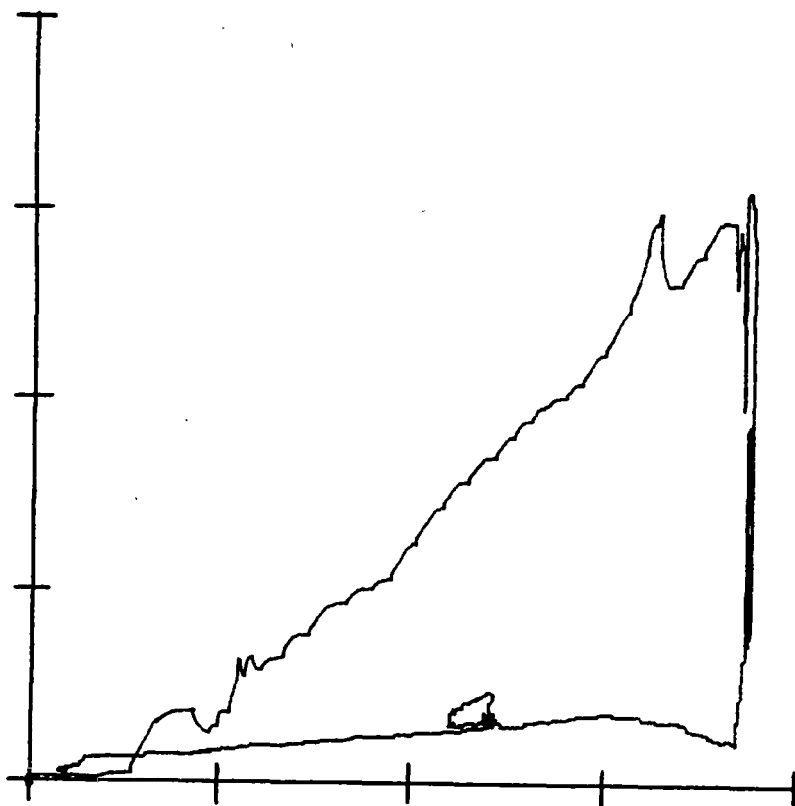
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 100 HZ
@ 2 msec.

1.94 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 3 T.T. # 331 B

TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

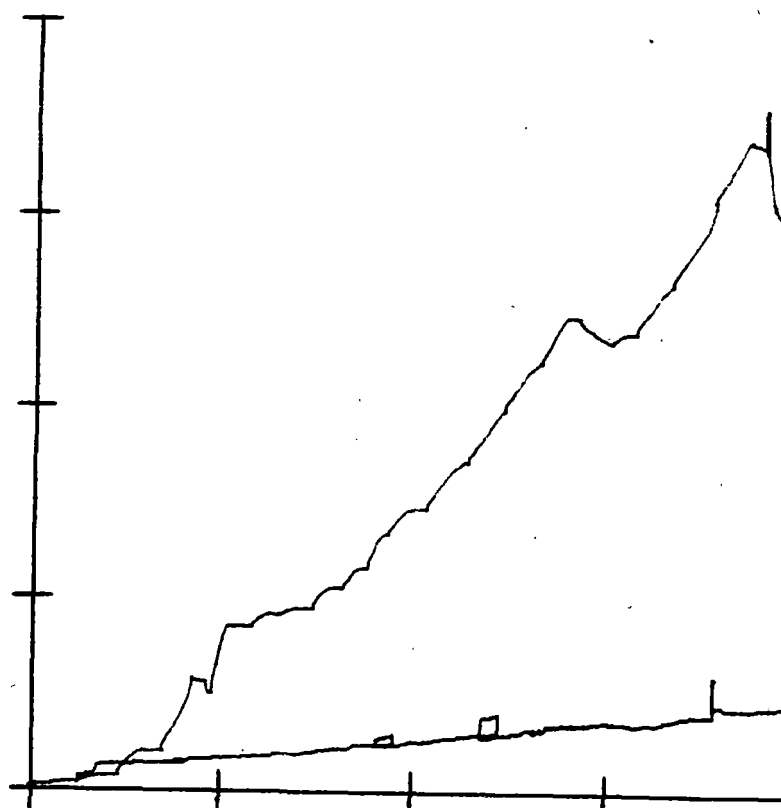
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

2.91 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 4 T.T. # 331B

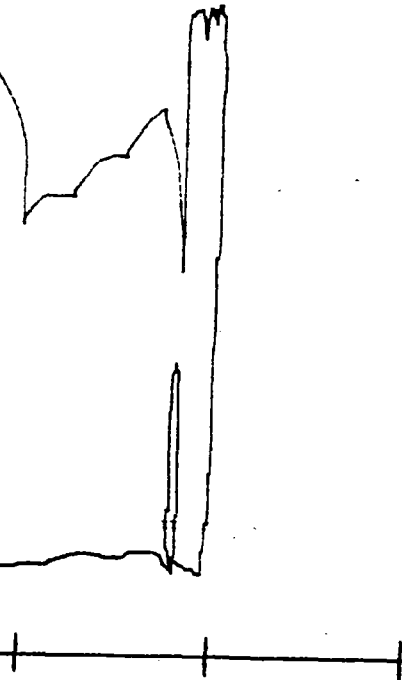
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

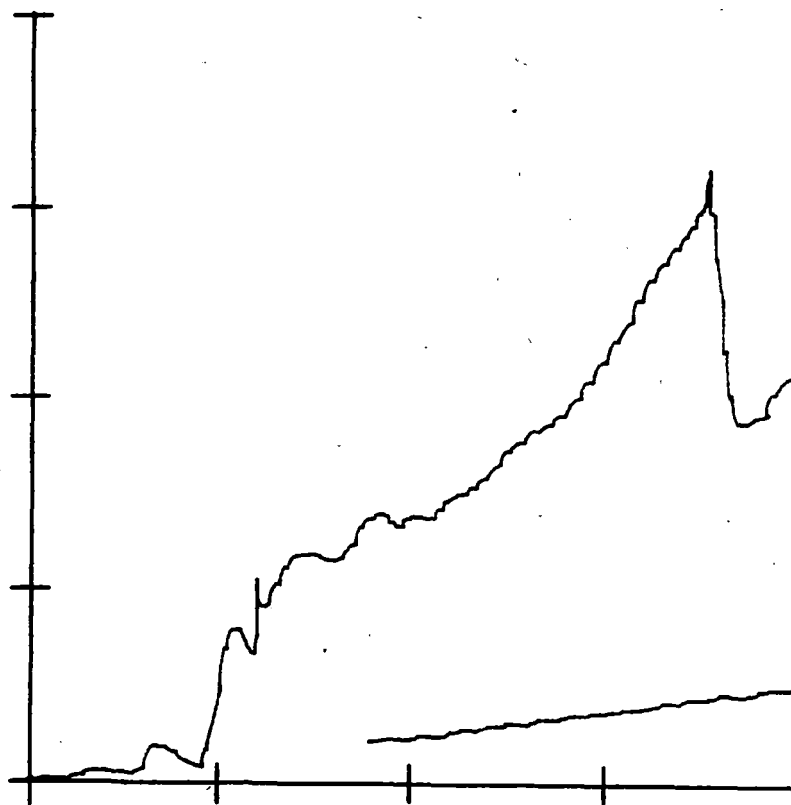
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 100 HZ

3.48 MPH @ 2 MSEC.





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 5 T.T. # 3318

TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

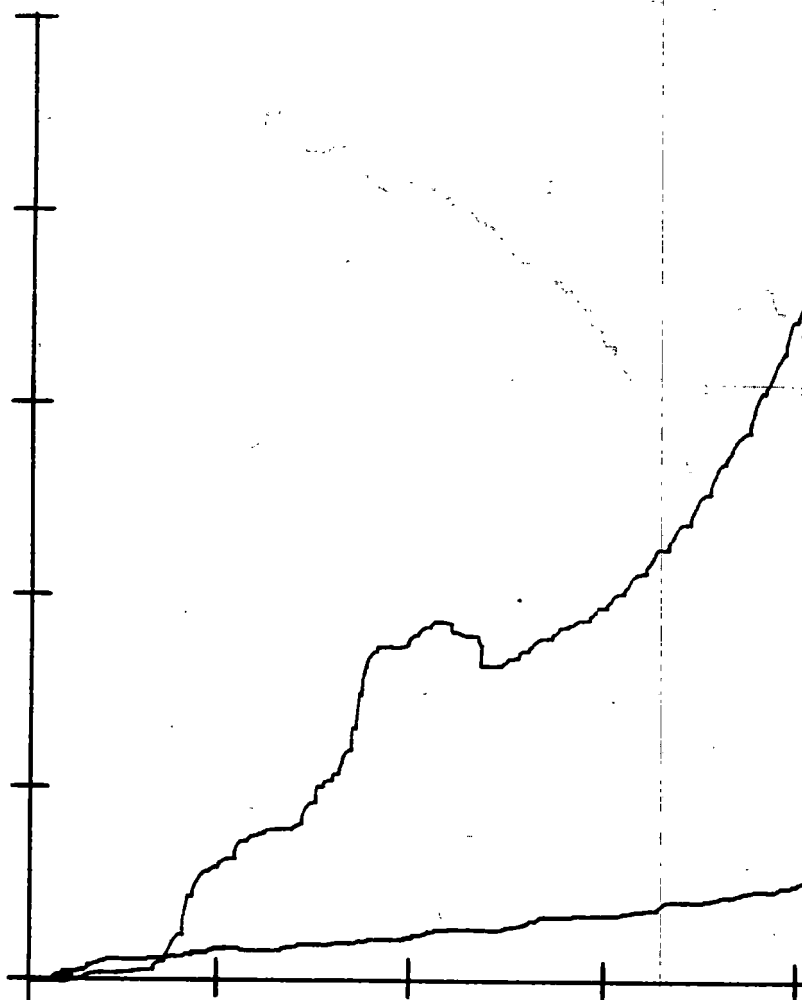
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

4.04 MPH

@ .5 MSEC.





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 7 T.T. # 331B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

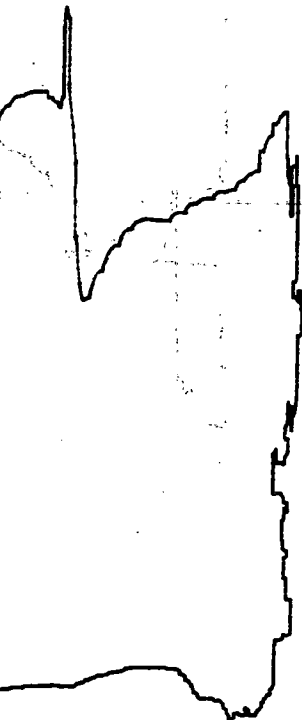
X-AXIS 1/2 INCH PER MAJOR DIV.

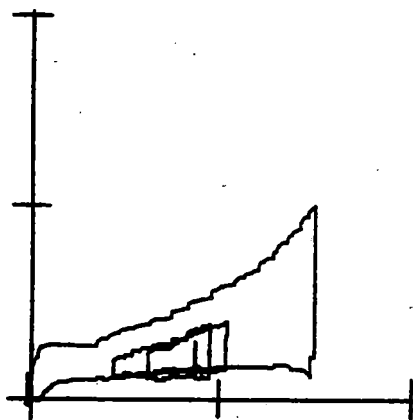
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

5.00 MPH

0.5 MSEC.





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 1 T.T.# 331C

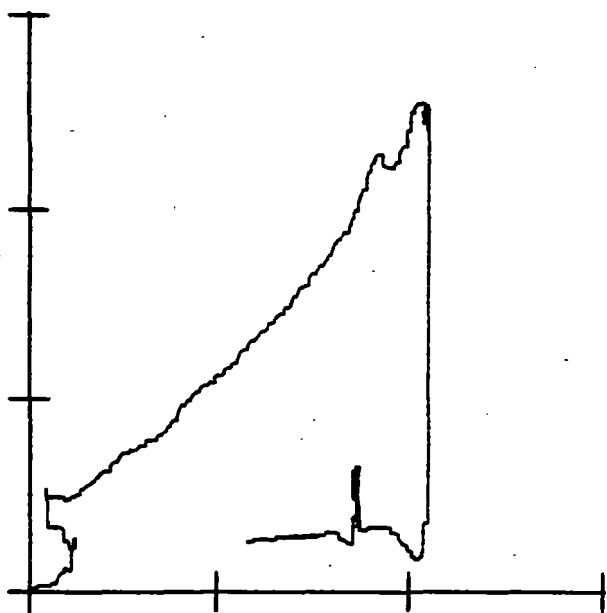
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
Q 2 MSEC.

1.11 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 2 T.T.# 331C

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

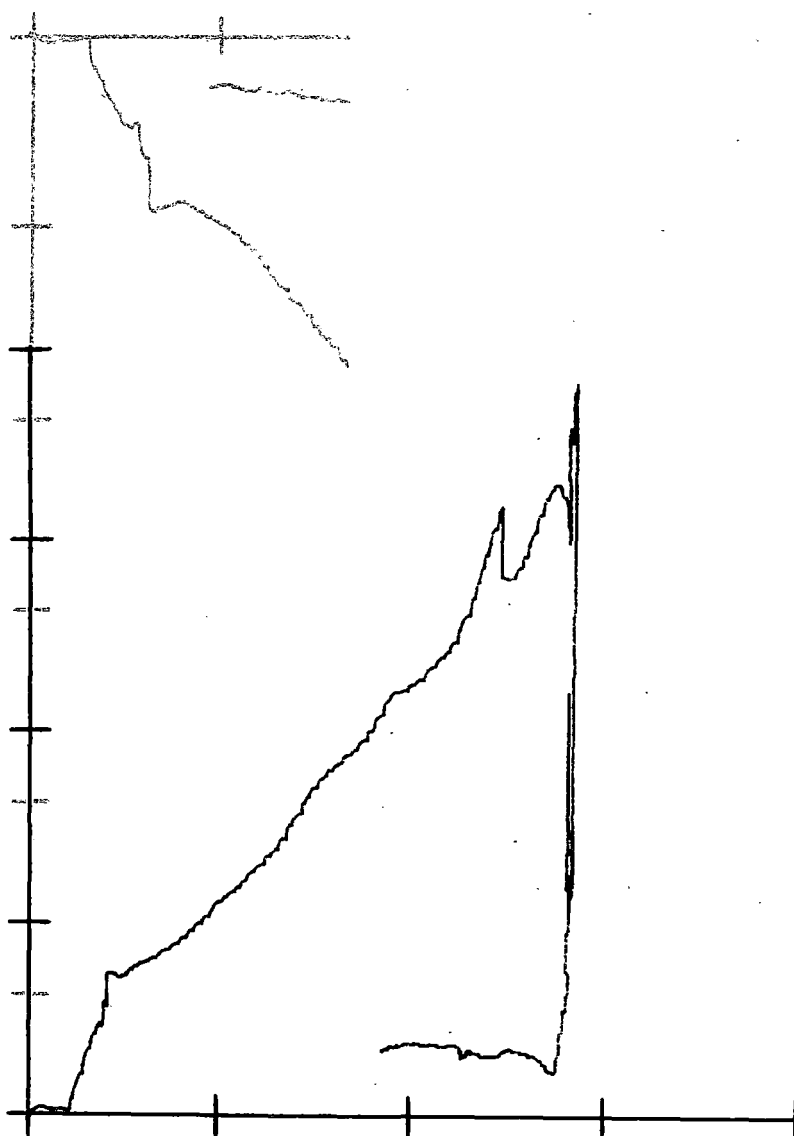
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

● .5 MSEC.

2.14 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 3 T.T.# 331C

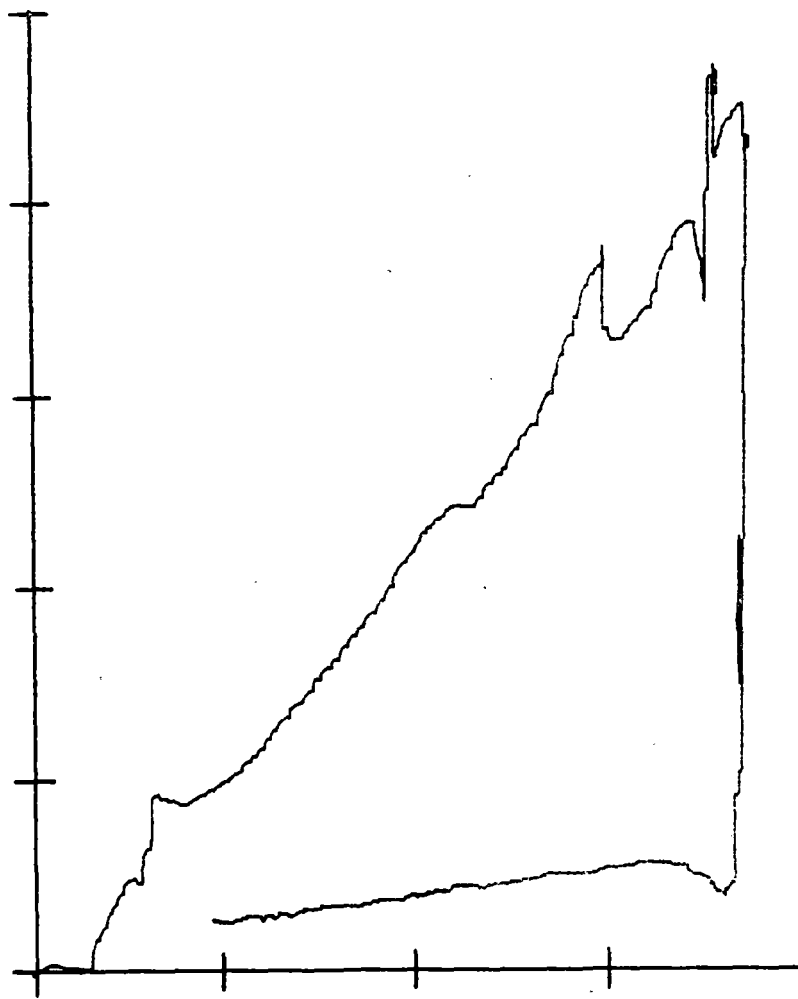
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ .5 MSEC.

2.93 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 4 T.T.# 3310

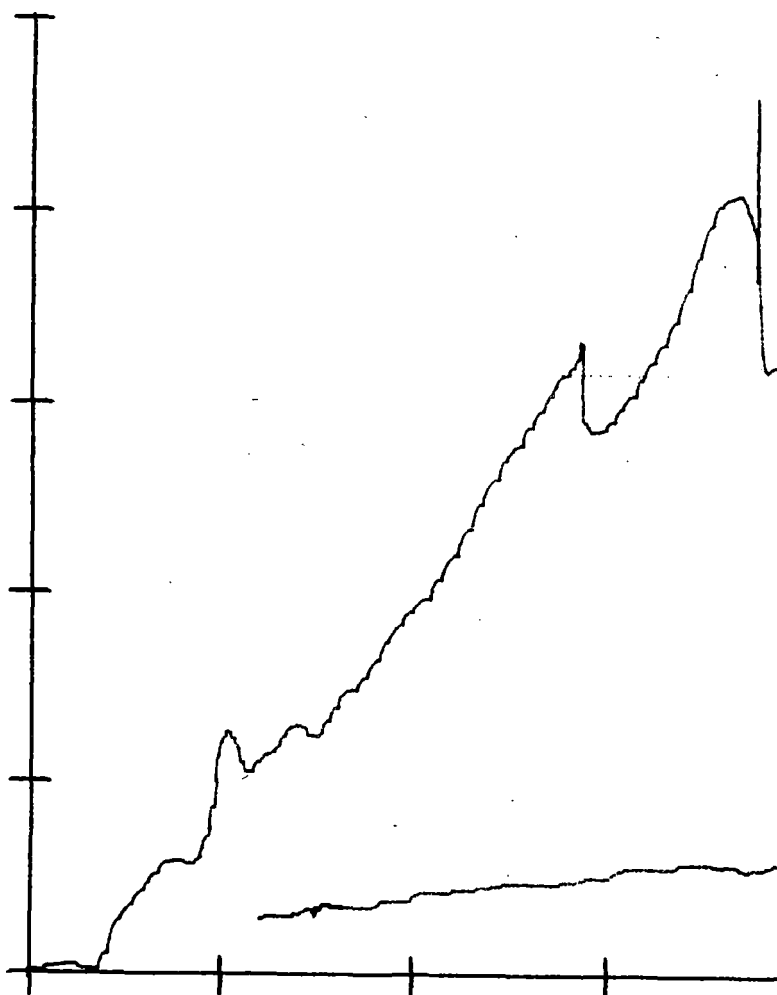
TITLE FORCE VS. TRAVEL S.C.
BUFFER UNIT

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ .5 MSEC.

3.27 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 5 T.T.# 3310

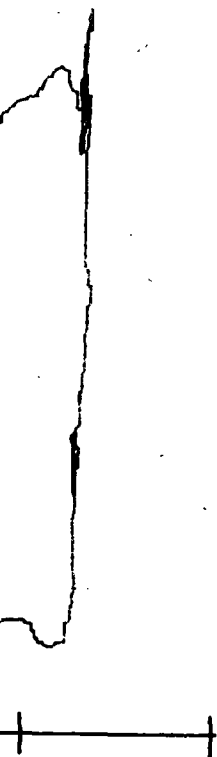
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

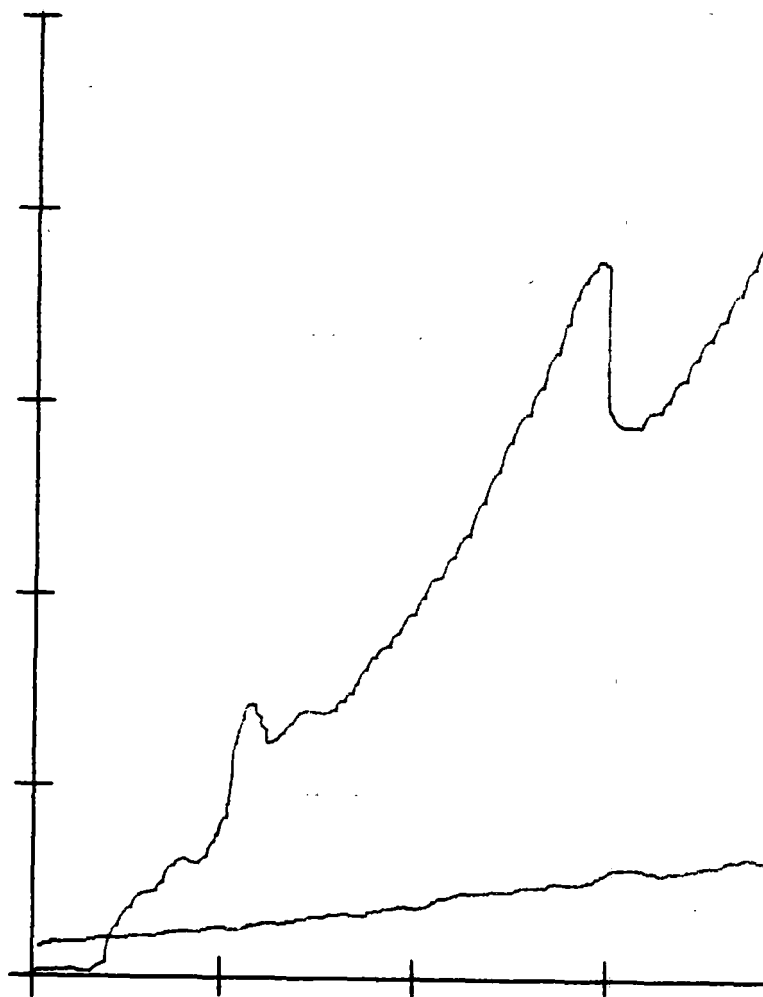
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
0.5 msec.

3.96 MPH





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 6 T.T. # 331C.

TITLE FORCE VS. TRAVEL S.C.

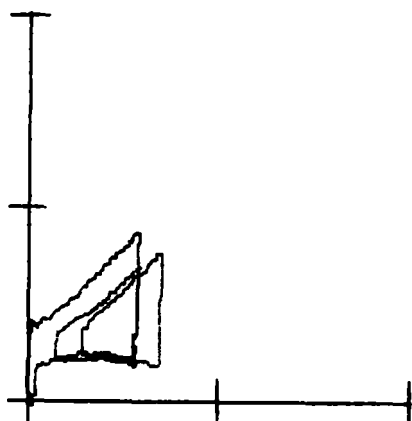
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 100 HZ

4.35 MPH

0.5 MSEC.



OPERATOR KAJ DATE 10-12-78

RD. # 611 RUN 1 T.T. # 331D

TITLE BUFFER UNIT VS. TRAVEL S.C. S.C.

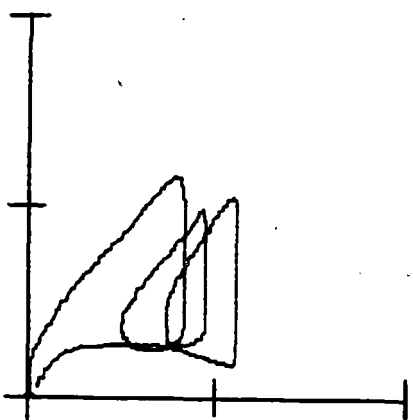
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 1 MSEC.

1.06 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 2 T.T. # 331D

TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

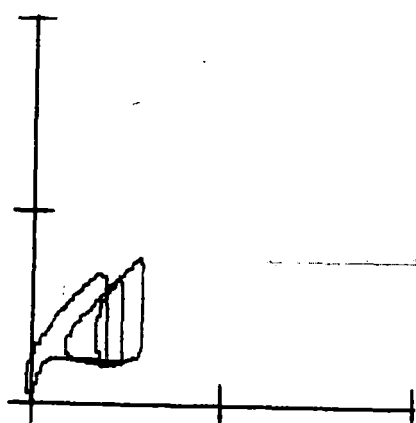
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.06 MPH

@ 1 MSEC



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 3 T.T. # 331 D

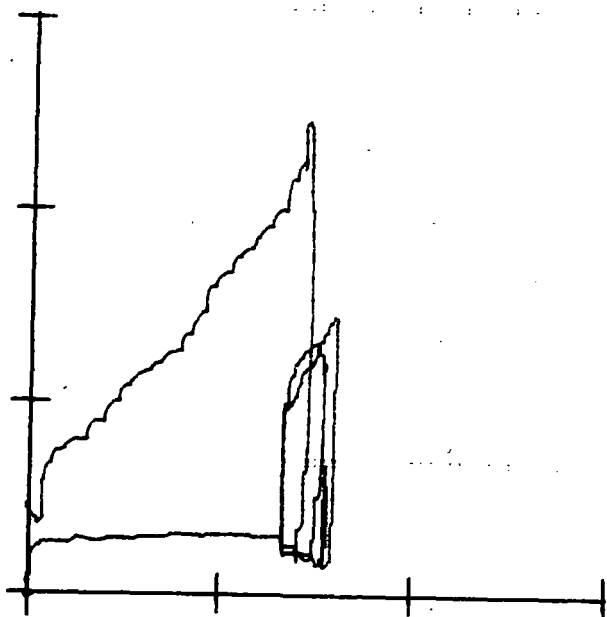
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 1 MSEC

0.99 MPH.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 4 T.T. # 331D

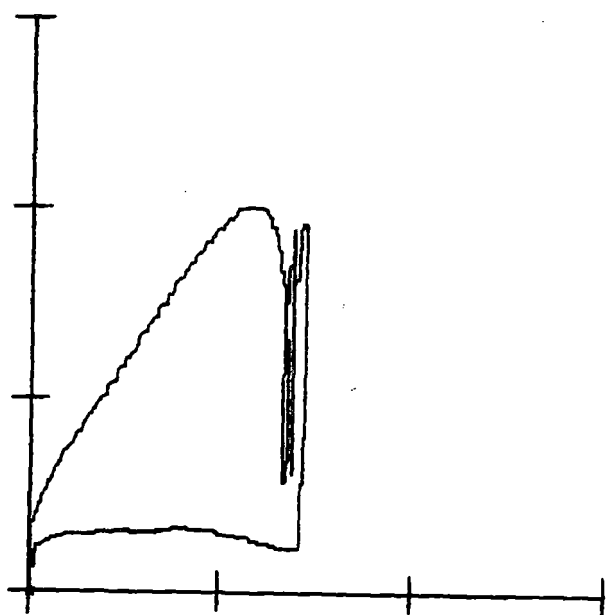
TITLE FORCE VS. TRAVEL S.O.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ 2 MSEC.

1.94 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 5 T.T. # 331D

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

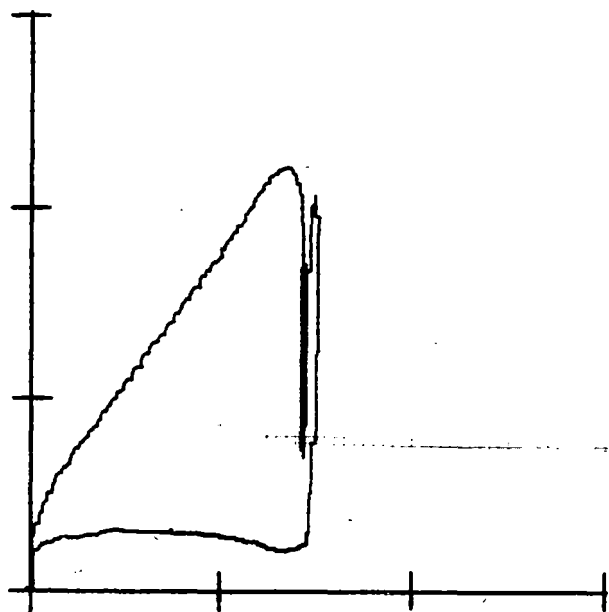
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.12 MPH

@ 1MSEC



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 6 T.T. # 3310

BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

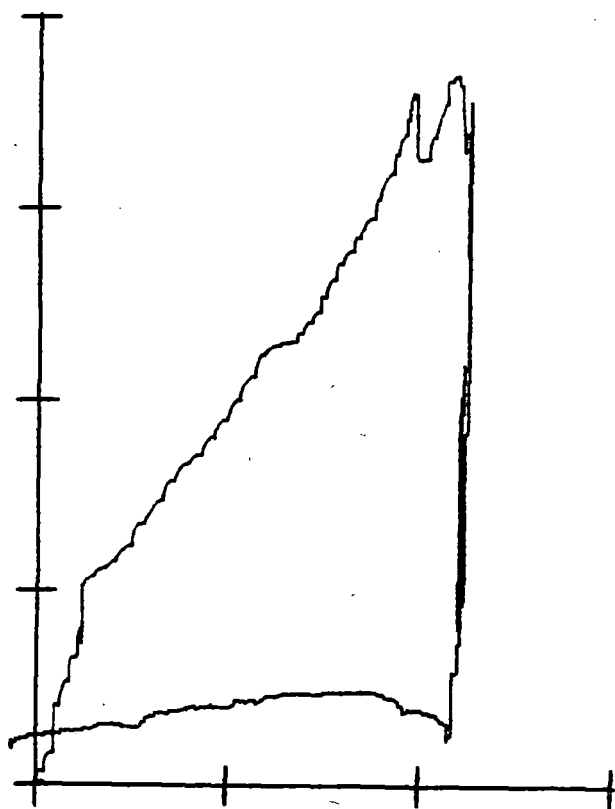
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS. PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 1 MSEC.

2.03 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 7 T.T. # 331D

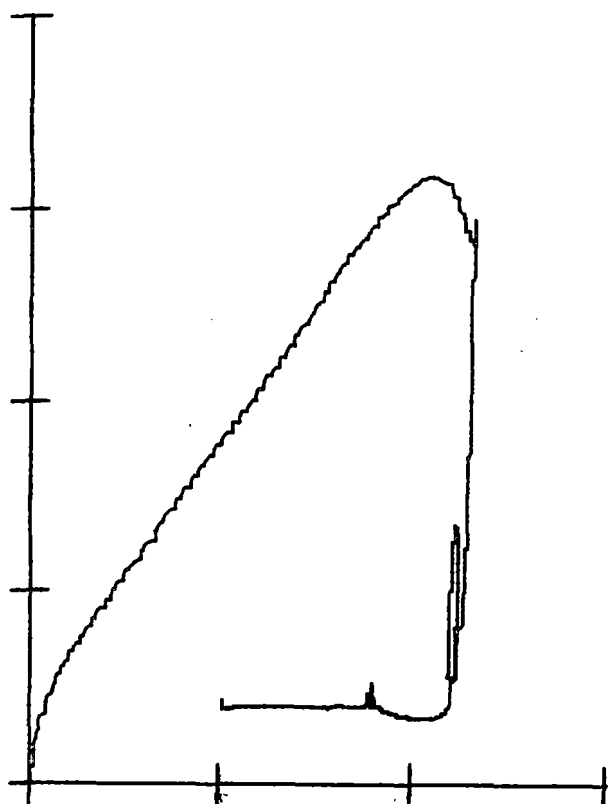
TITLE BUFFER UNIT UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ 1 MSEC.

2.96 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 8 T.T.# 331D

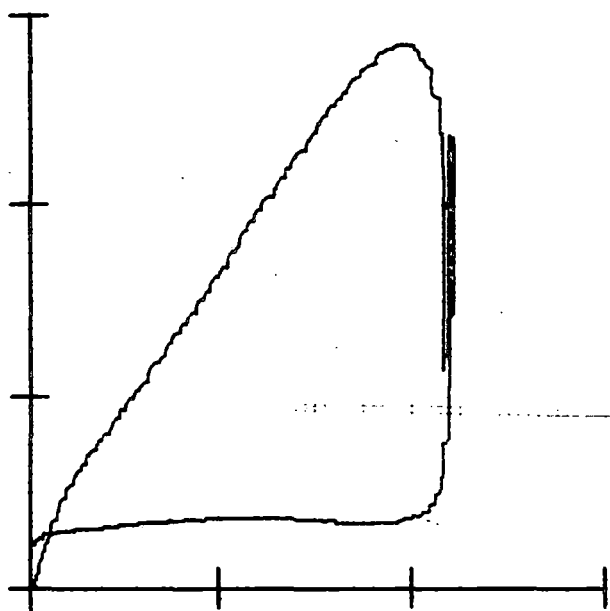
TITLE BUFFER UNIT
FORCE VS. TIME S.C.

X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 1MSEC.

2.97 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 9 T.T.# 331D

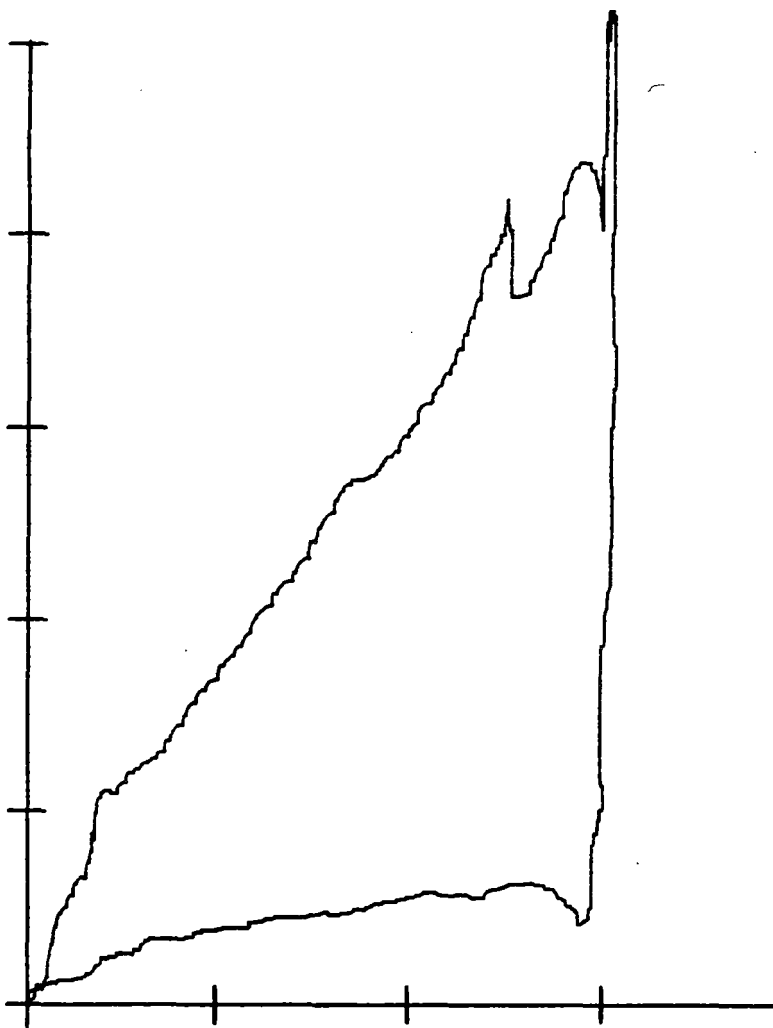
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 1MSEC.

2.93 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 10 T.T.# 331D

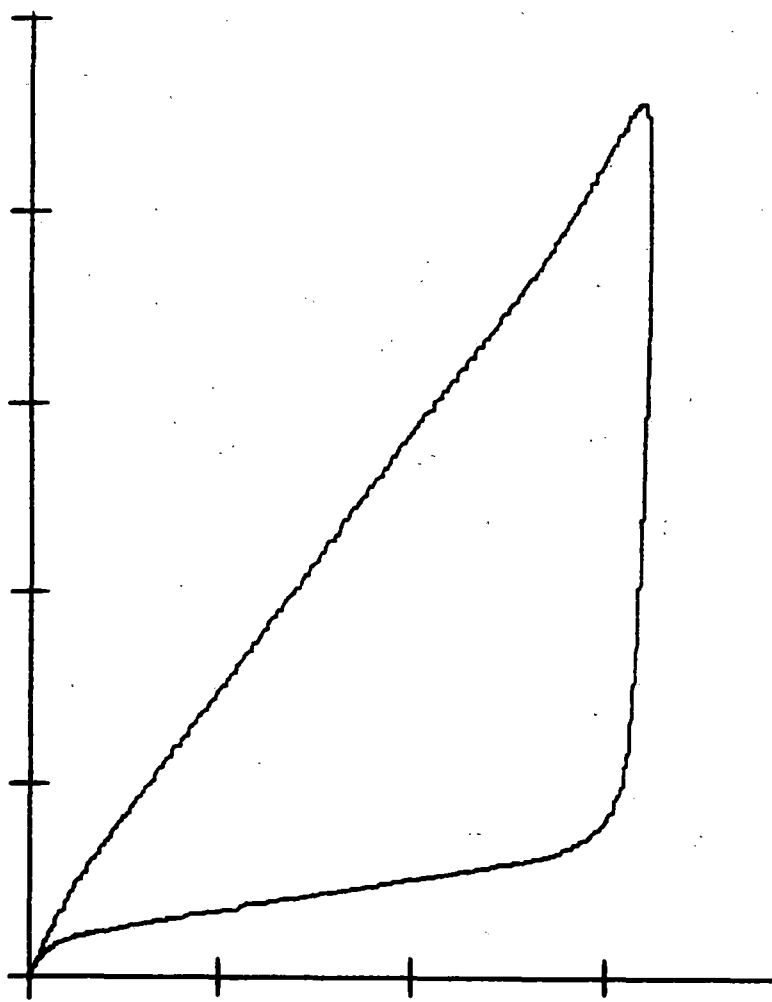
TITLE ^{BUFFER} FORCE ^{UNIT} VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE ^{SHARP} ~~QVT-OFF~~ FREQUENCY 100 HZ
@ .5 msec.

3.32 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 11 T.T. # 331D

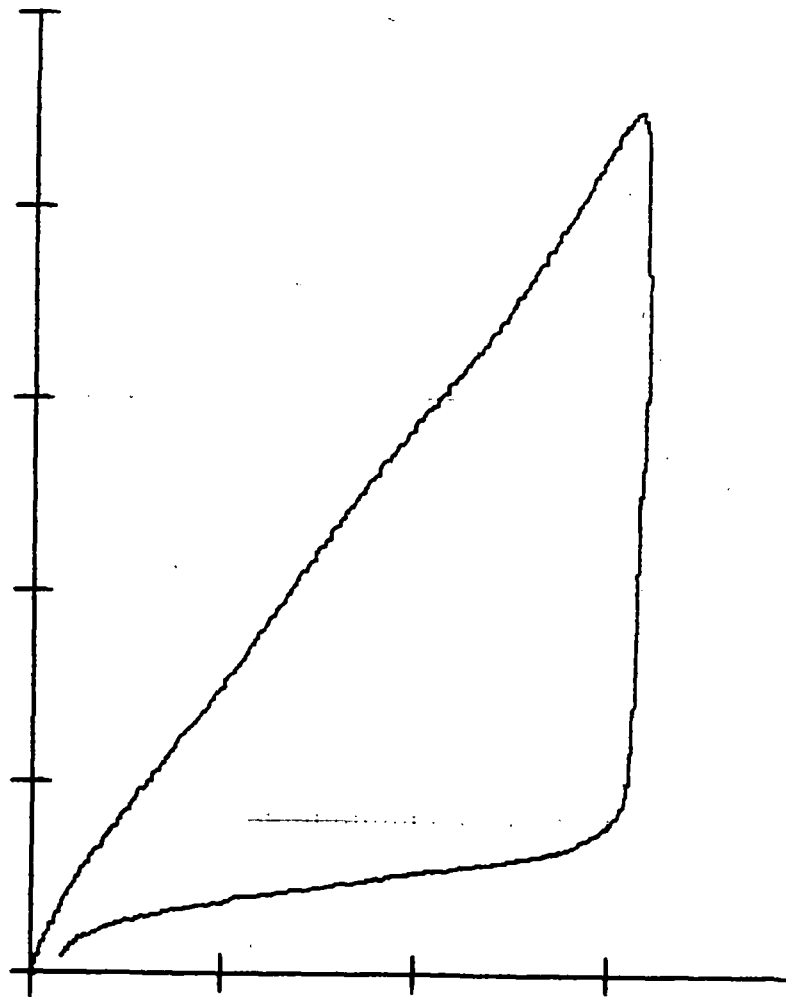
TITLE BUFFER UNIT FORCE VS. TRAVEL S.C. S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP FREQUENCY 10 HZ
CUT-OFF 0.5 MSEC.

3.41 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 12 T.T.# 331D

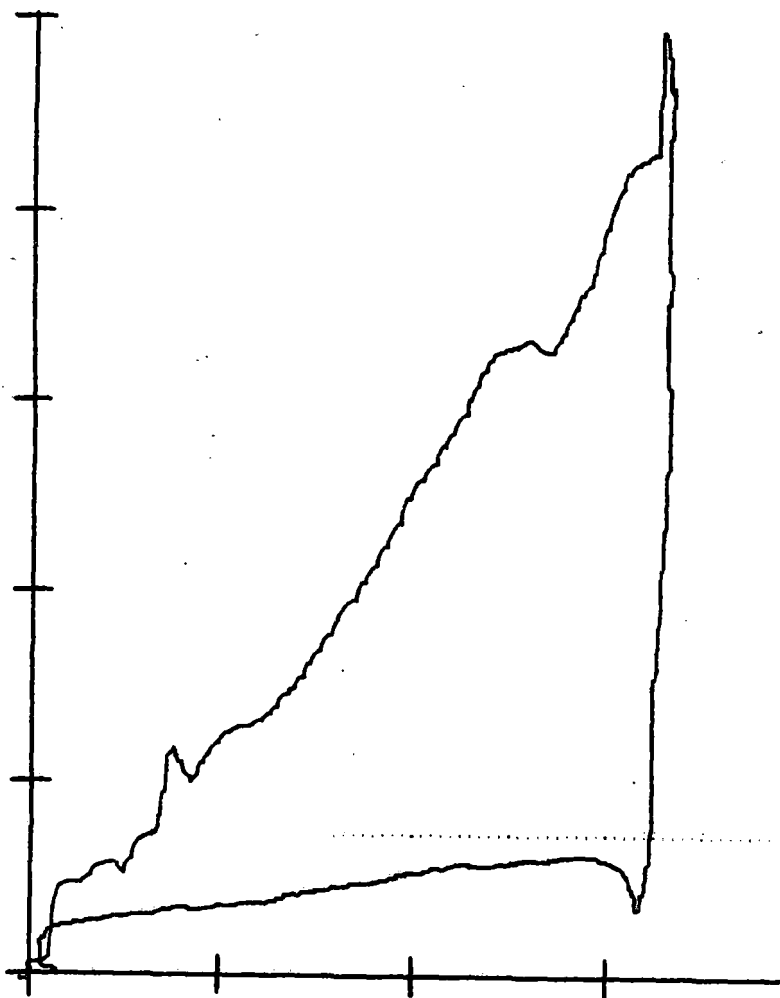
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.E.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@.5 MSEC

3.38 MPH



OPERATOR KAJ DATE 10-12-78

RD # G11 RUN 13 T.T.# 331D

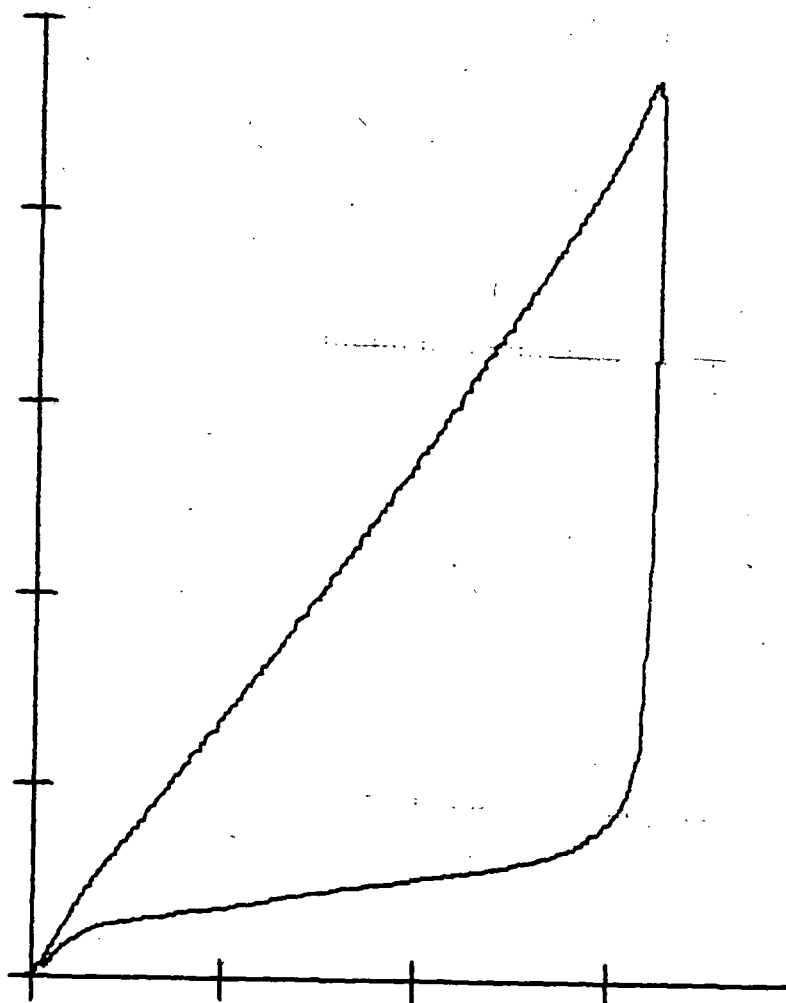
TITLE BUFFER UNIT VS TRAVEL S.C. S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@. 5MSEC.

3.97 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 14 T.T.# 331D

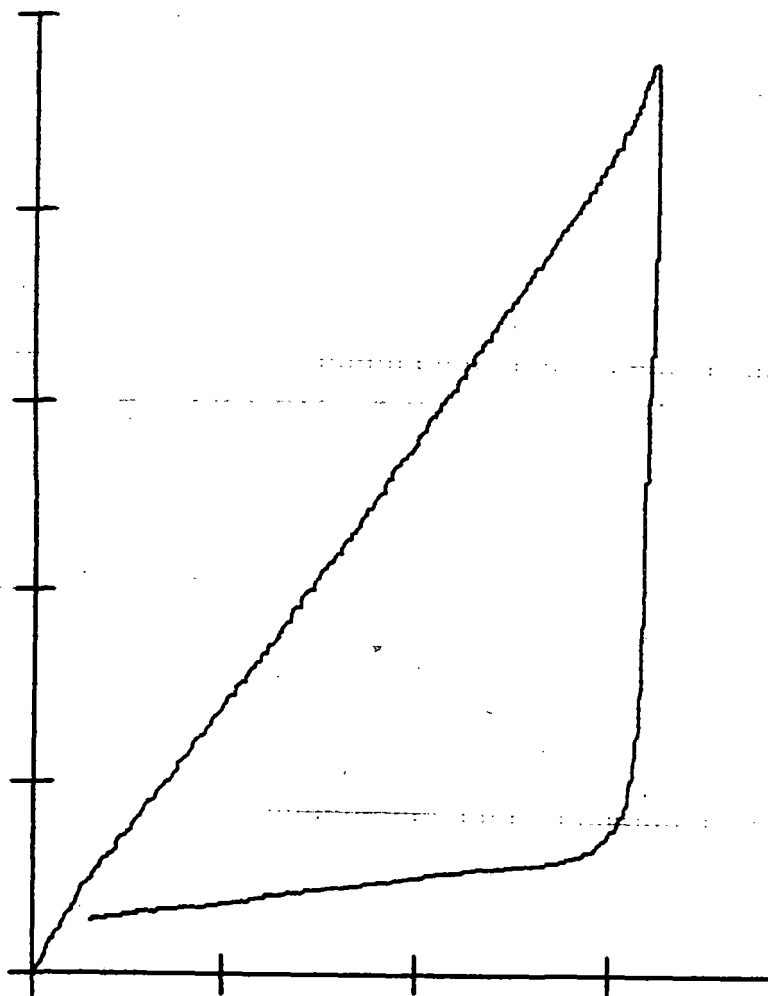
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ .5 MSEC.

3.97 MPH -



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 15 T.T. # 331D

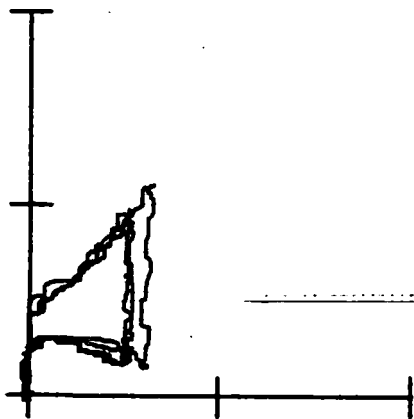
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 10 HZ
0.5 MSEC.

3.96 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 1 T.T. # 331E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

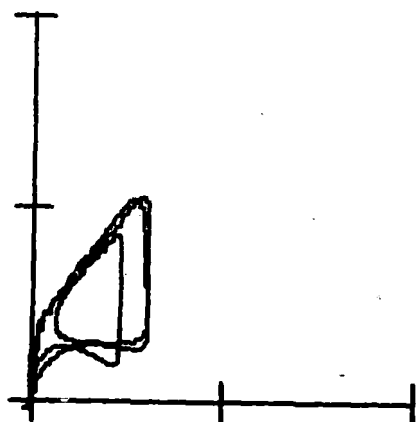
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 100 HZ

@ 17MSER.

1.16 MPH



OPERATOR KAJ DATE 10-12-78

RD # 6.11 RUN 2 T.T. # 331E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

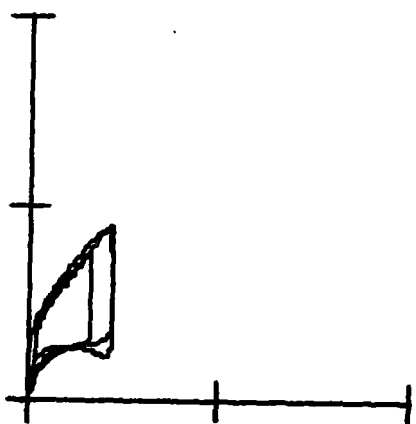
X-AXIS 1/2 INCH PER INCH OF DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

@ 1 MSEC.

1.24 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 3 T.T. # 331E

TITLE BUFFER UNIT FORCE VS. TRAVEL S.C. S.C.

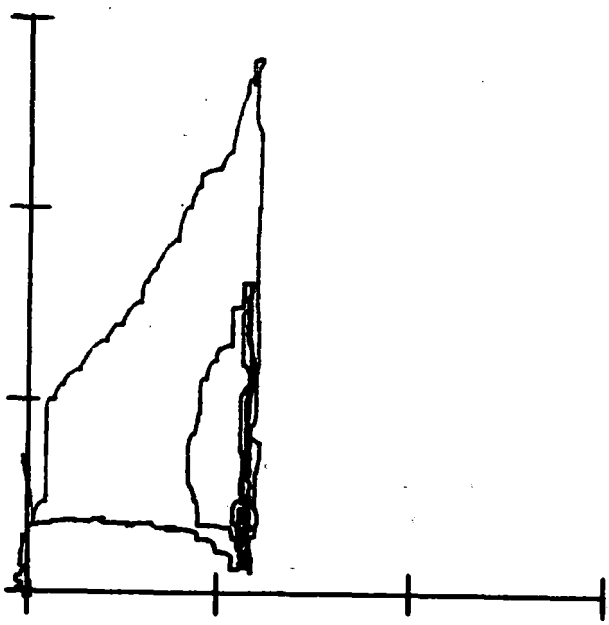
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 1 MSEC.

1.08 MPH

Figure 1



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 4 T.T. # 331E

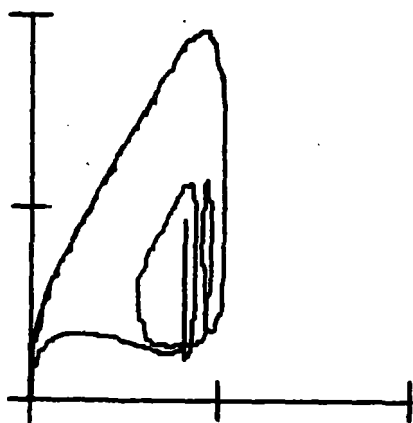
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 100 HZ
@ 2 MSEC.

2.11 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 5 T.T.# 331E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

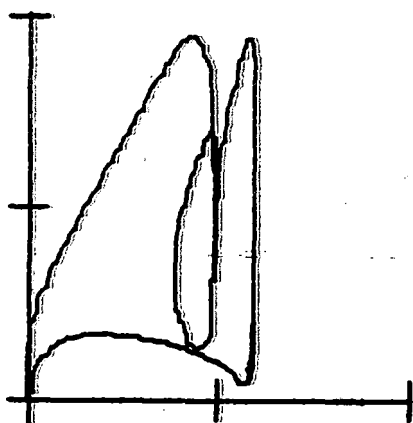
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

@ 2 MSEC.

2.02 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 6 T.T. # 331E

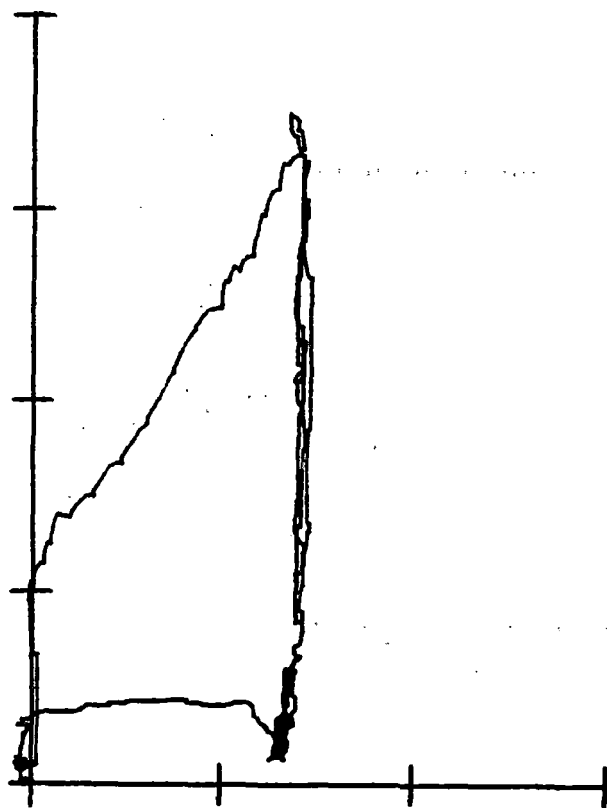
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2 MSEC.

2.02 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 7 T.T. # 331E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

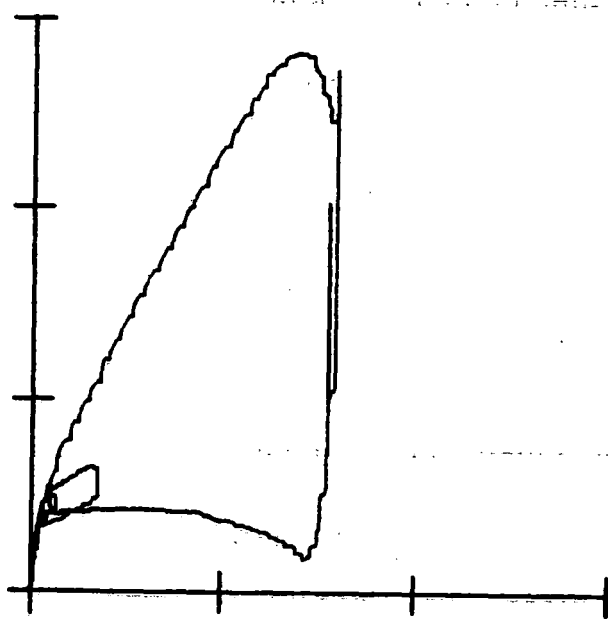
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2 MSEC.

2.92 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 8 T.T. # 331E

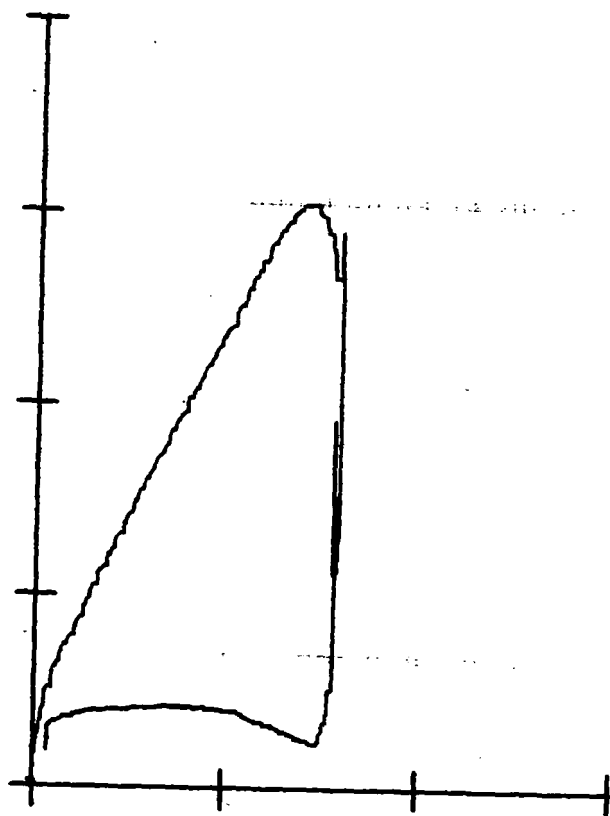
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2MSEC.

2.97 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 9 T.T.# 331E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

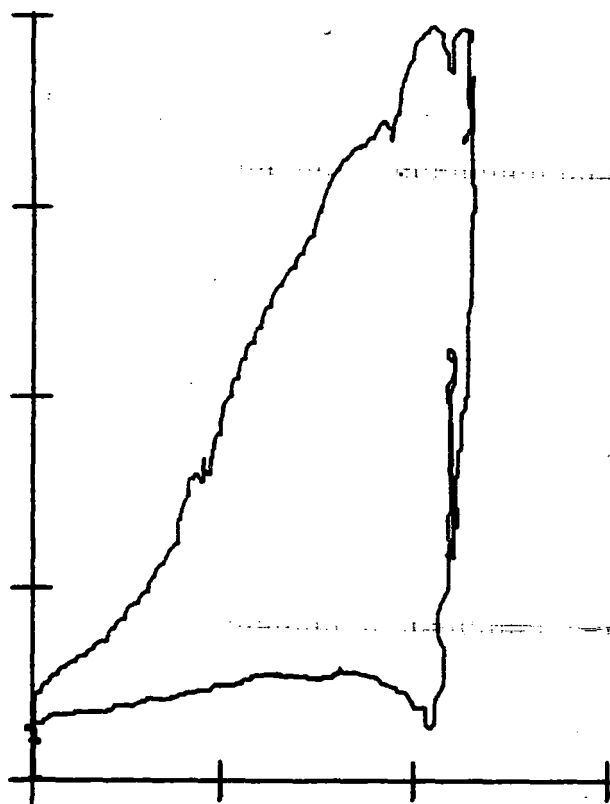
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 1 MSEC.

2.91 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 10 T.T.# 331E

~~BUFFER~~ ~~UNIT~~
TITLE FORCE VS. TRAVEL S.C.

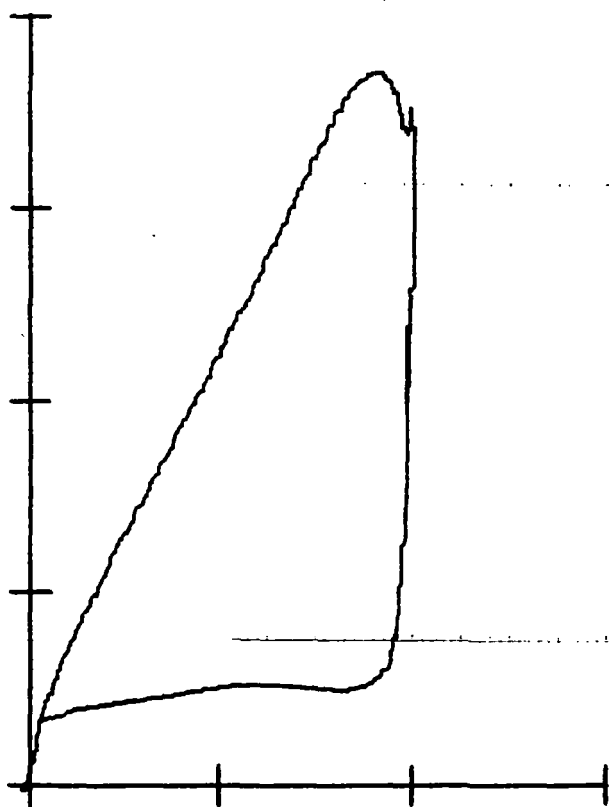
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

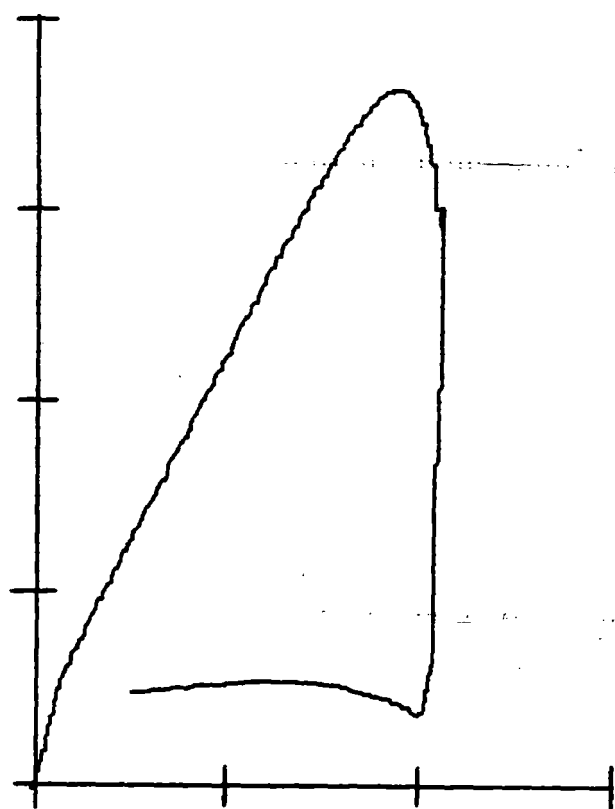
FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@.5MSEC.

3.52 MPH



OPERATOR KAJ DATE 10-12-78
RD # 611 RUN 11 T.T. # 331E
~~UNIT~~
TITLE FORCE VS. TRAVEL S.C.
X-AXIS 1/2 INCH PER MAJOR DIV.
Y-AXIS 100000 POUNDS. PER MAJOR DIV.
FILTER TYPE ~~SHARP~~
~~OUT-OFF~~ FREQUENCY 10 HZ
3.41 MPH @ .5 MSEC.



OPERATOR KAL DATE 10-12-78

RD # 611 RUN 12 T.T. # 331E
BUFFER UNIT

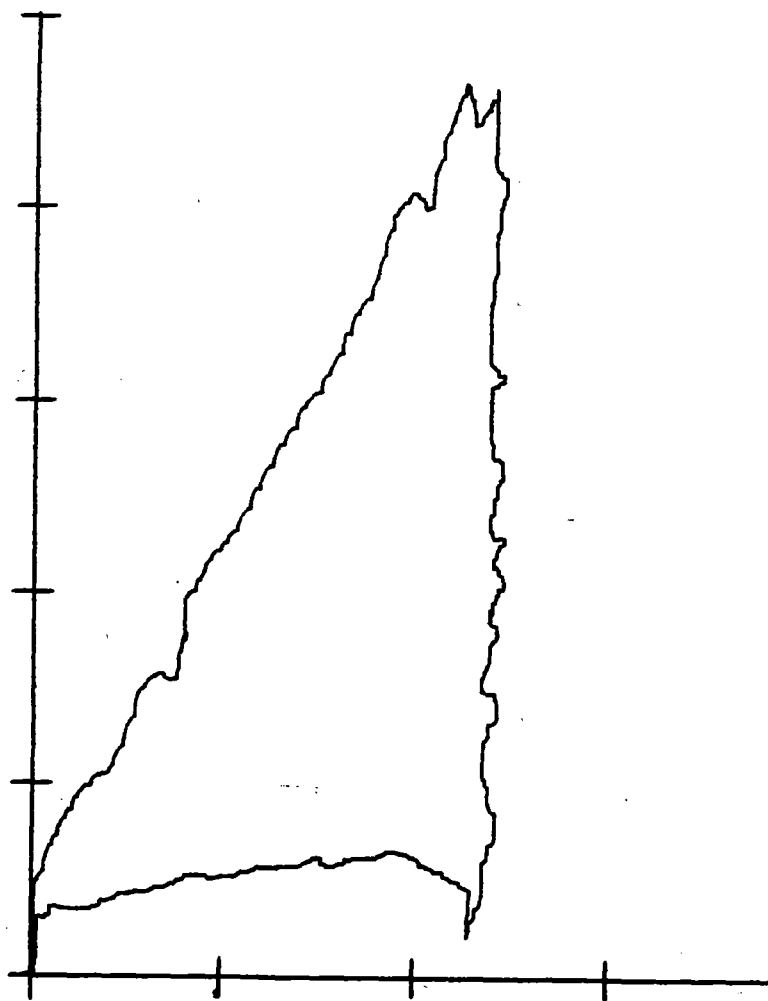
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ .5 msec.

3.37 MPH



OPERATOR KAL DATE 10-12-78

RD # 611 RUN 13 T.T.# 331E
BUFFER UNIT

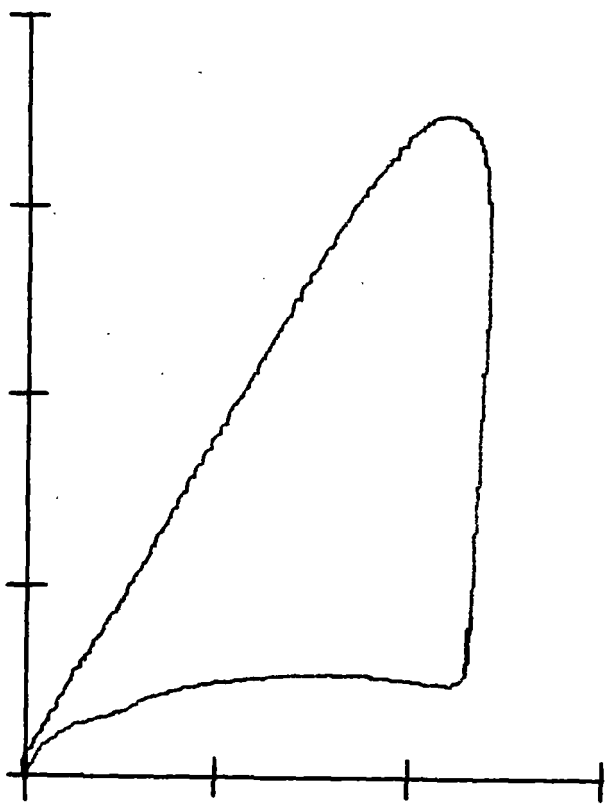
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ .5 msec.

3.96 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 14 TT # 331E

TITLE BUFFER UNIT UNIT
FORCE VS. TRAVEL S.C.

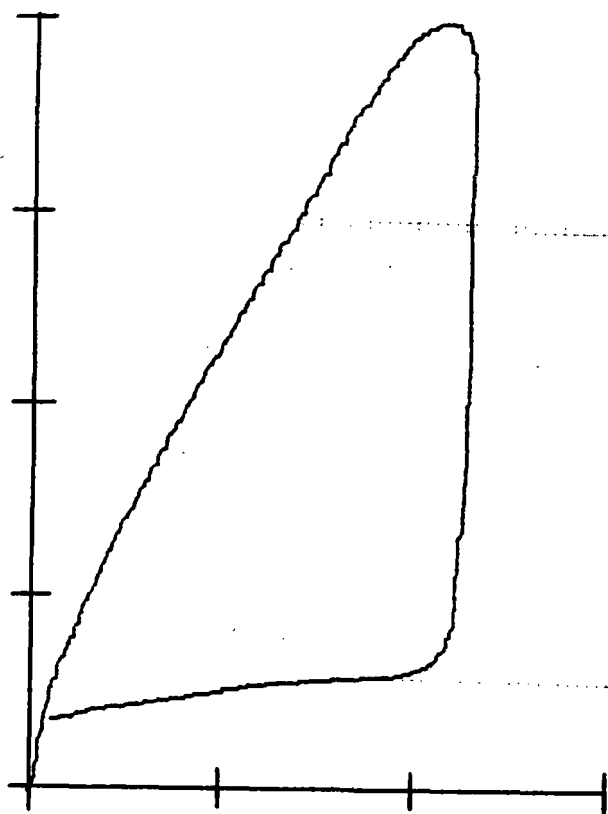
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@.5MSEC

3.93 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 15 T.T. # 331E

TITLE FORCE VS. TRAVEL S.C.

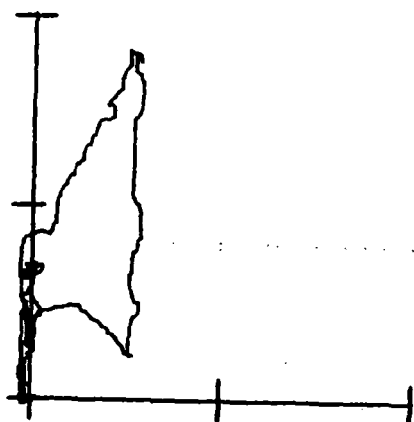
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE CUT-OFF ^{SHARP} FREQUENCY 10 HZ

3.86 MPH

@.5 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 1 T.T. # 331E

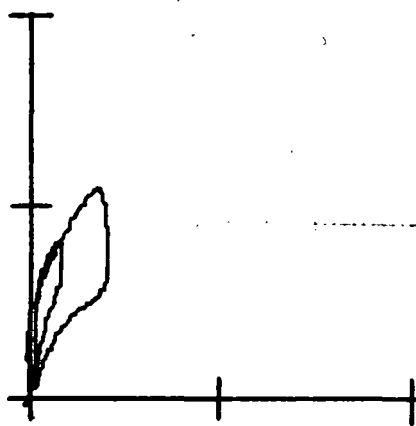
~~BUFFER~~ UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE ~~CUT-OFF~~ ^{SHARP} FREQUENCY 100 HZ
@ 1MSEC.

1.37 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 2 T.T. #331F

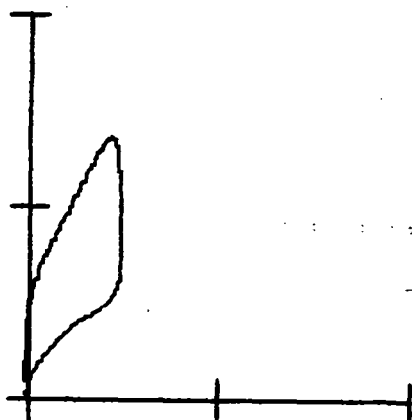
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 1 MSEC.

1.29 MPH



OPERATOR KAL DATE 10-12-78

RD # 611 RUN 3 T.T. # 331F

TITLE BUFFER UNIT FORCE VS. TRAVEL S.C. S.C.

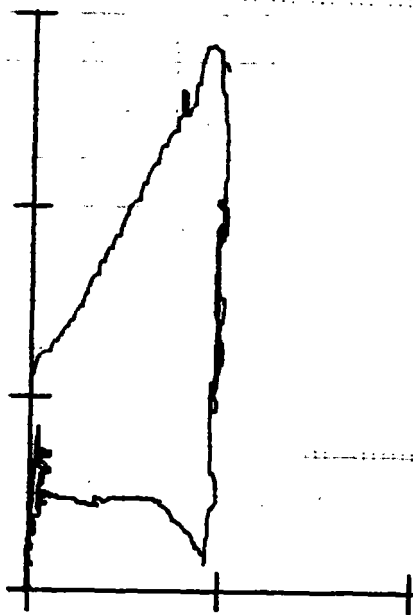
X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS. PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ

@.5 MSEC

1.28 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 4 T.T.# 331F

BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

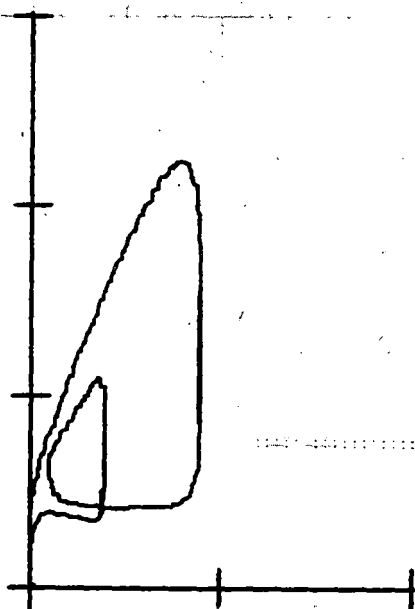
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 100 HZ

2.09 MPH

@ 1MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 5 T.T. # 331F

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

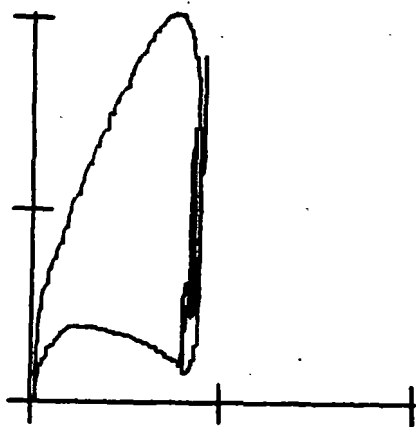
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 1 msec.

2.10 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 6 T.T. # 331F

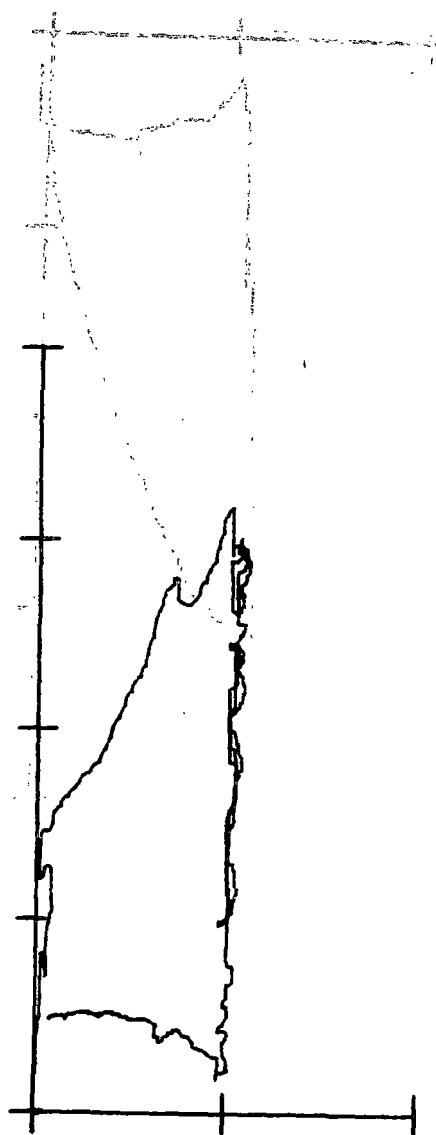
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
OUT-OFF FREQUENCY 10 HZ
@ 2 MSEC

2.07 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 7 T.T. # 331F

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

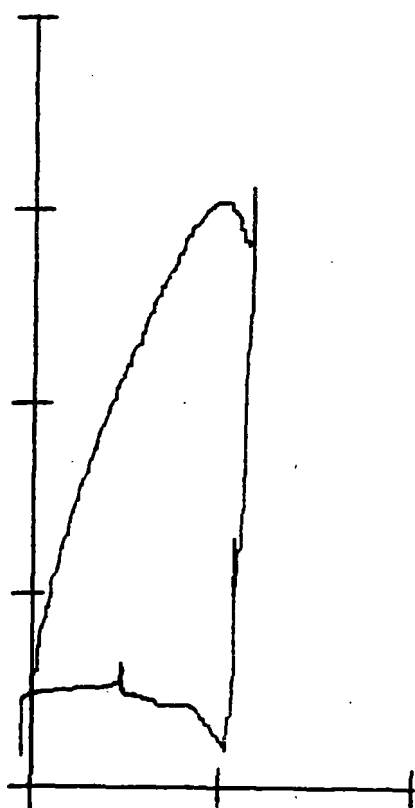
X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS. PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

2.79 MPH

@ .5 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN B T.T.# 331F

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

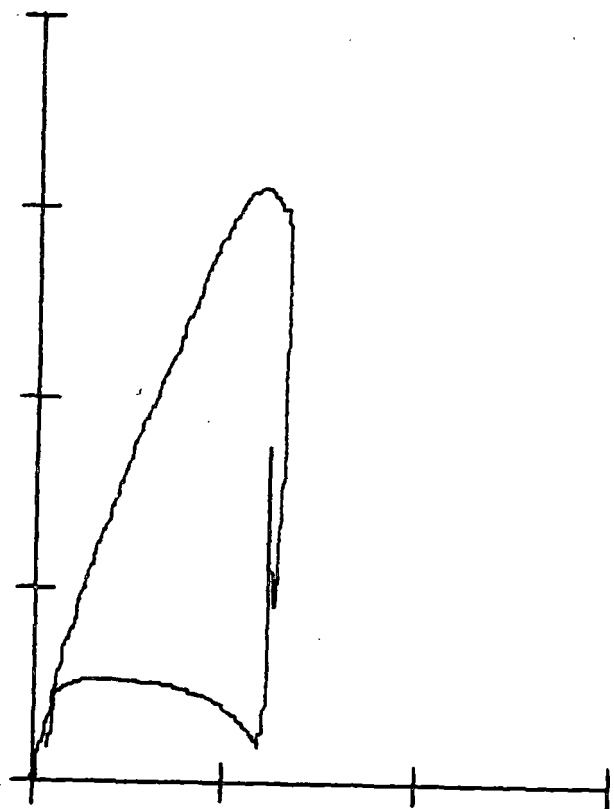
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 1msec

2.97



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 9 T.T. # 331F

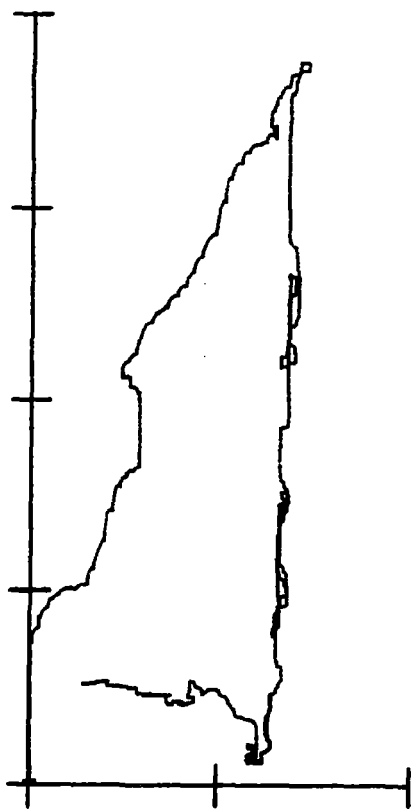
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 1 MSEC

2.81 MPH.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 10 T.T. #331F

BUFFER UNIT

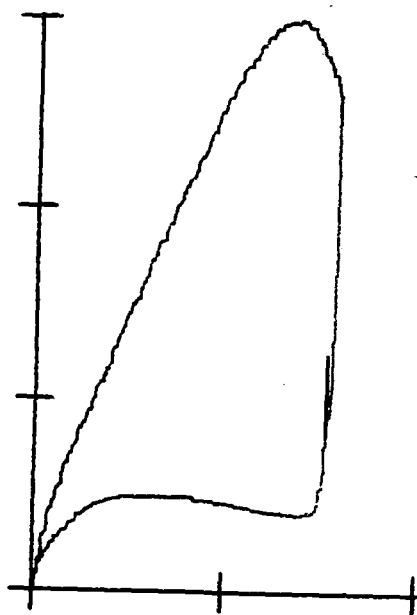
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@.5 msec.

3.40



OPERATOR KAJ DATE 10-12-70

RD # 611 RUN 11 T.T.# 331F

TITLE BUFFER UNIT
FORCE VS. TIME S.C.

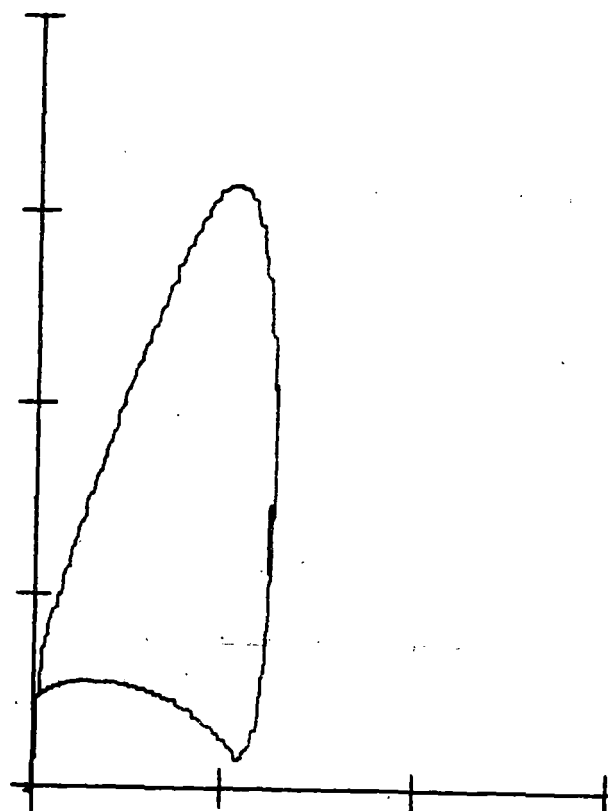
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@.5 MSEC.

3.39 MPH



OPERATOR KHJ DATE 10-12-78

RD # 611 RUN 12 T.T # 331 F

TITLE FORCE VS. TRAVEL ^{BUFFER} ^{UNIT} S.C.

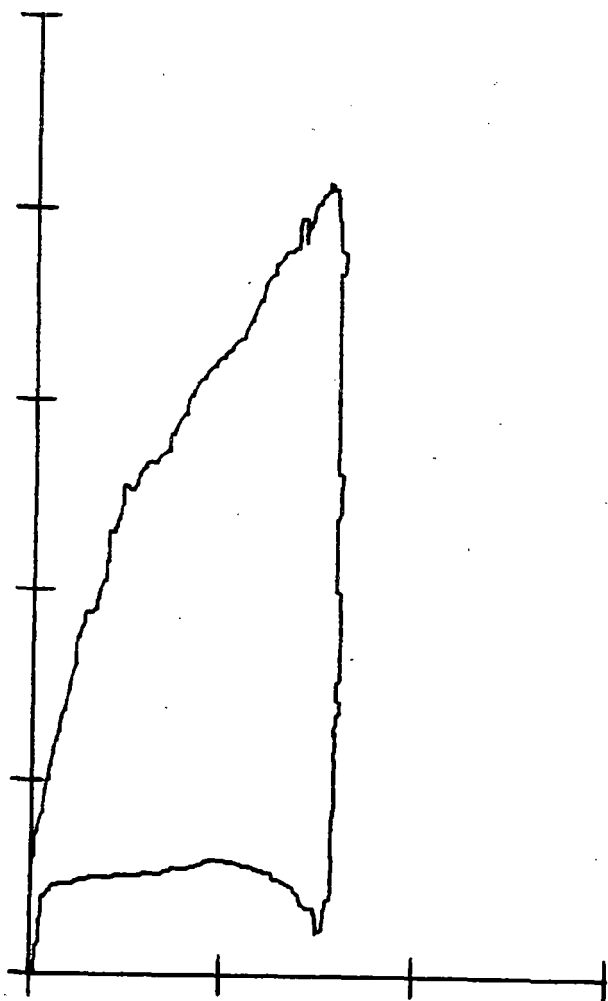
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE ^{SHARP} CUT-OFF FREQUENCY 10 HZ

3.48 MPH

@ .5 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 13 T.T.# 331F

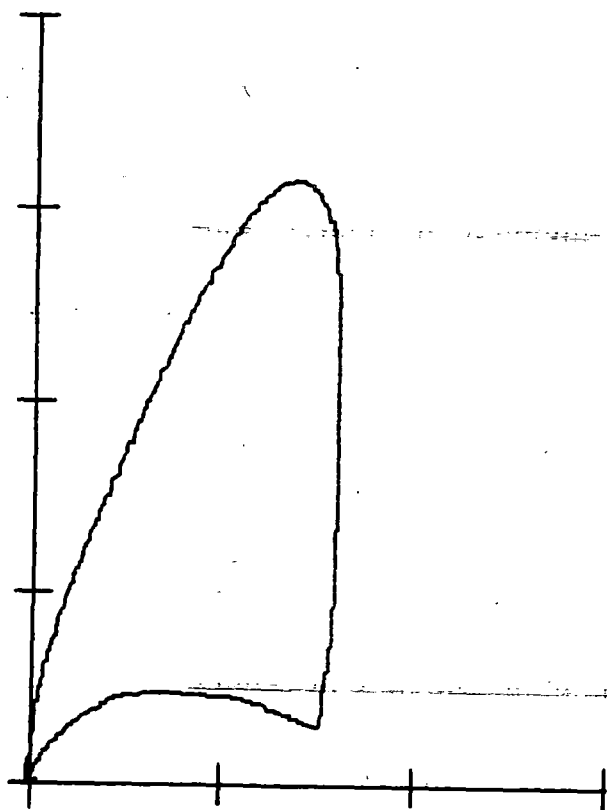
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ .5 MSEC.

3.86 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 14 T.T. # 331F

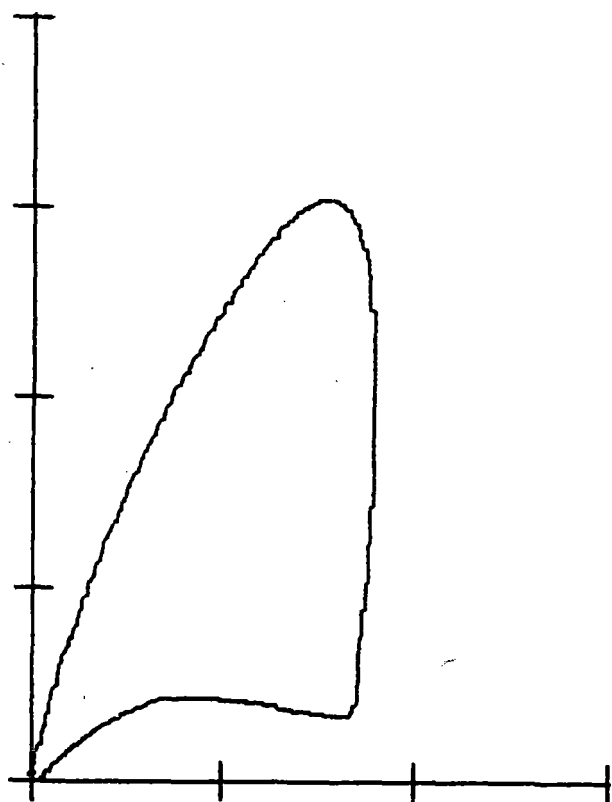
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ .5 MSEC.

3.91 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 15 T.T.# 331F

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

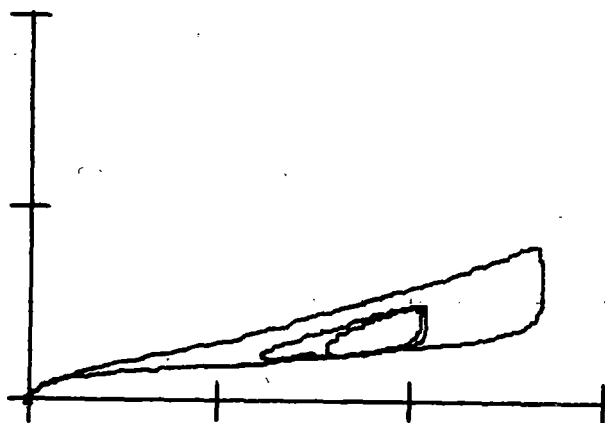
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

3.91 MPH

0.5 MSEC



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 1 T.T.# 3319

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

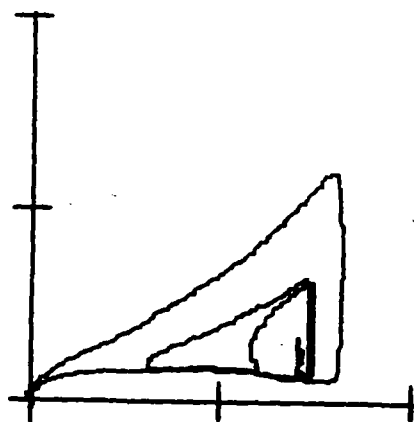
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.27 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 6H RUN 2 T.T.# 331G

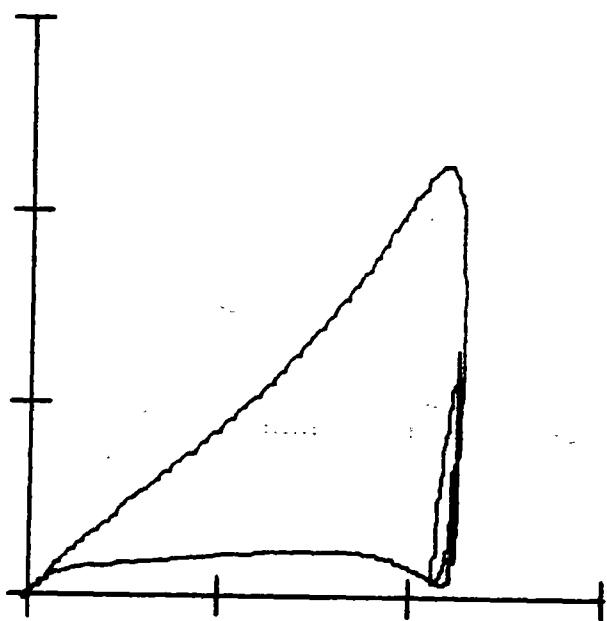
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ
@ 2 MSEC.

1.26 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 3 T.T. # 331G

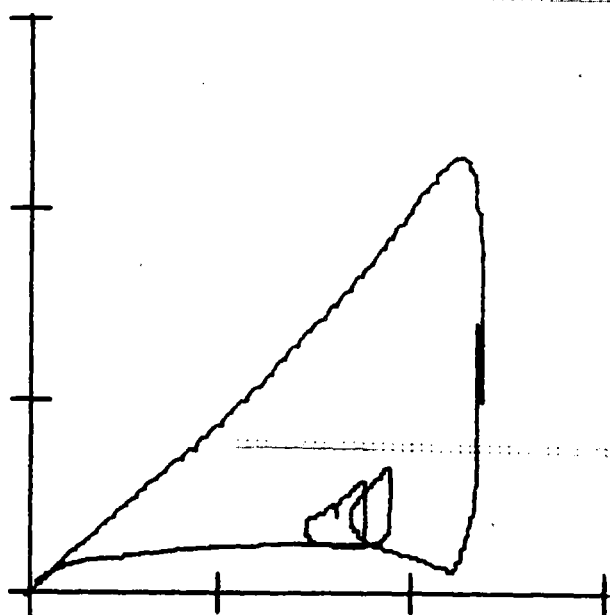
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ
@ 2 MSEC.

1.96 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 4 T.T. # 331G

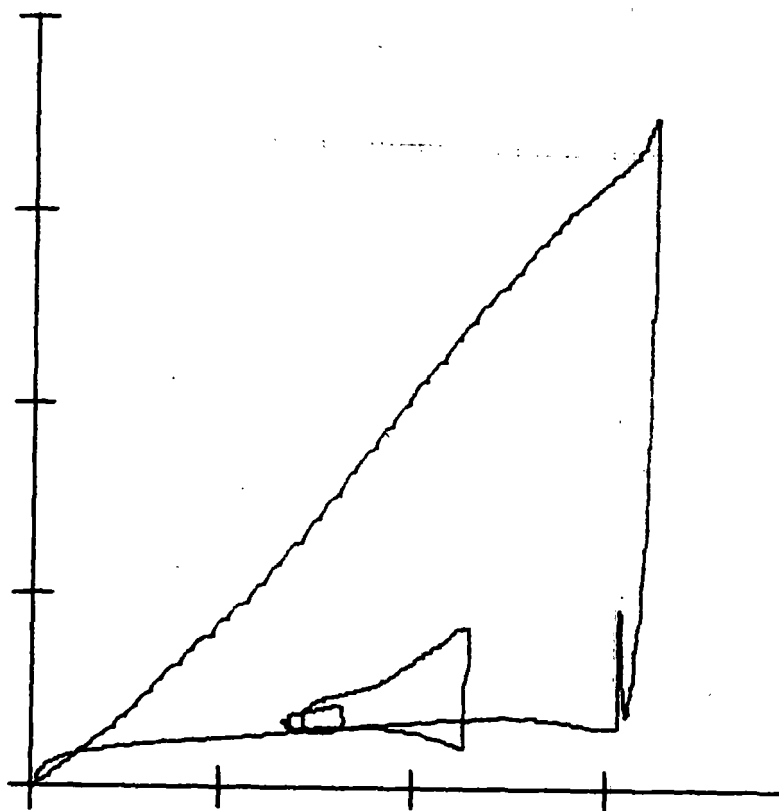
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2 MSEC.

2.66 MPH



OPERATOR KAJ DATE 10-12-78

RD # 6.11 RUN 5 T.T. # 331G

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

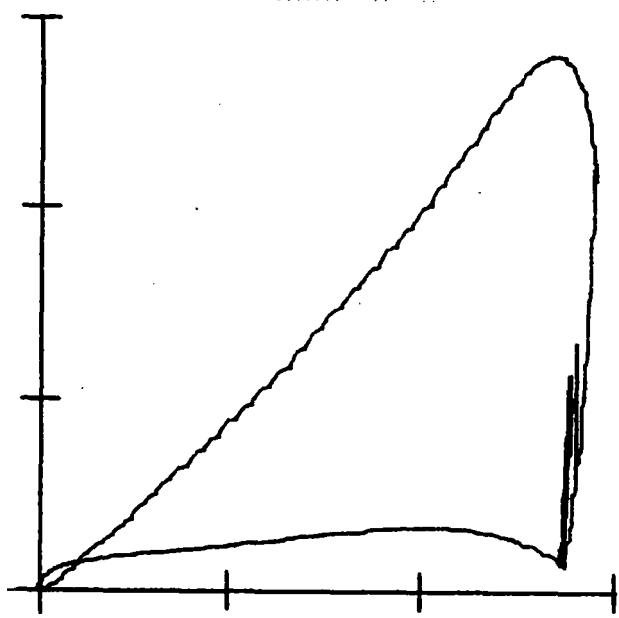
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

2.95 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

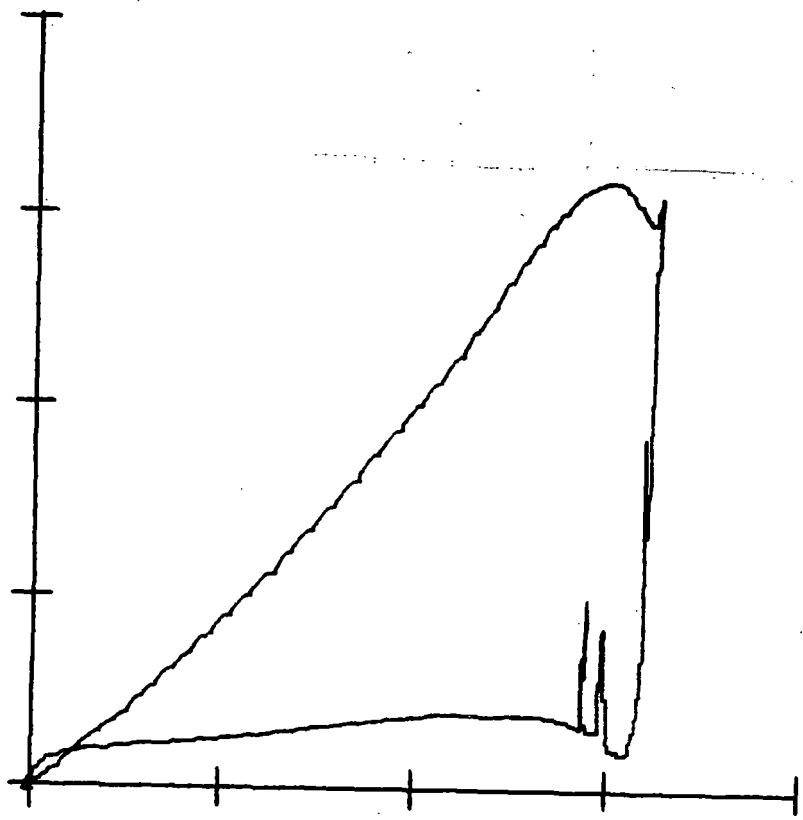
RD # 611 RUN 6 T.T. # 3316

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
2.86 MPH @ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 7 T.T.# 3316

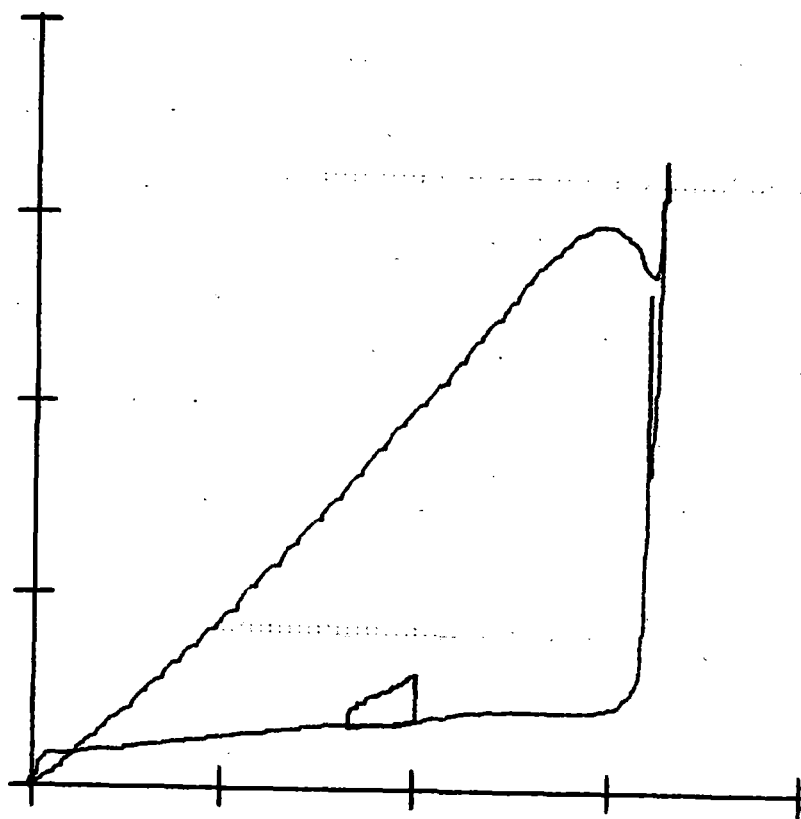
BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.39 MPH @ 2MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 8 T.T. # 3316

TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

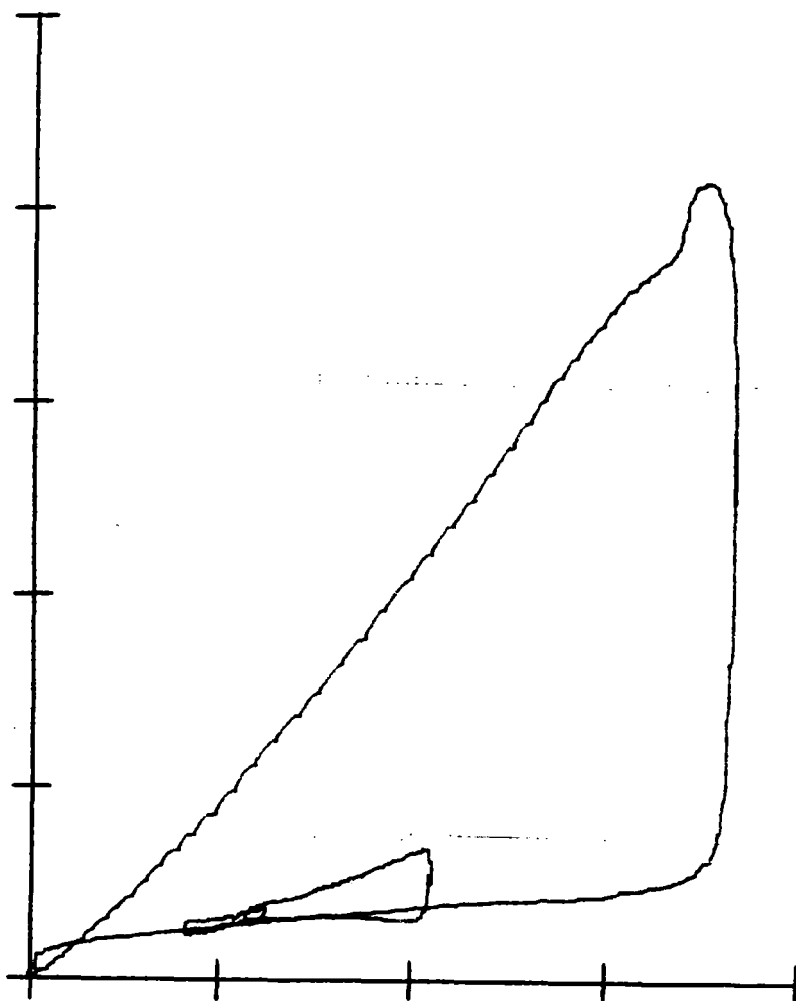
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.41 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 9 T.T. # 3316

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

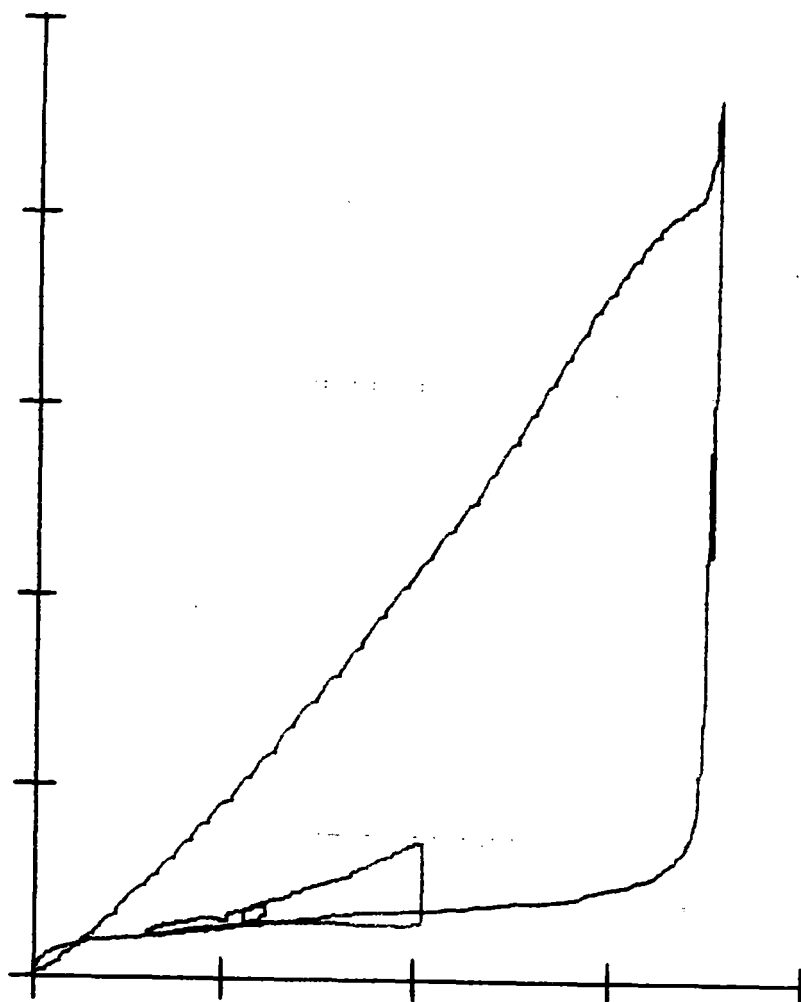
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

@ 2 MSEC.

3.91 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 10 T.T. # 331G

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

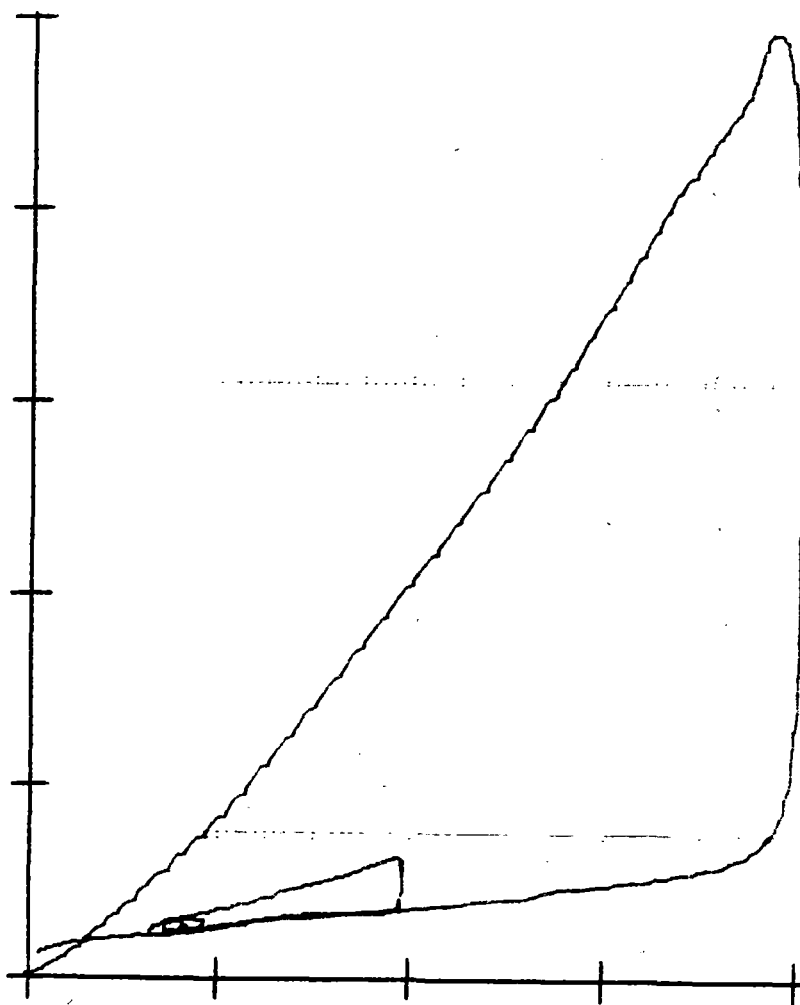
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

3.94 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 11 T.T. # 331G

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

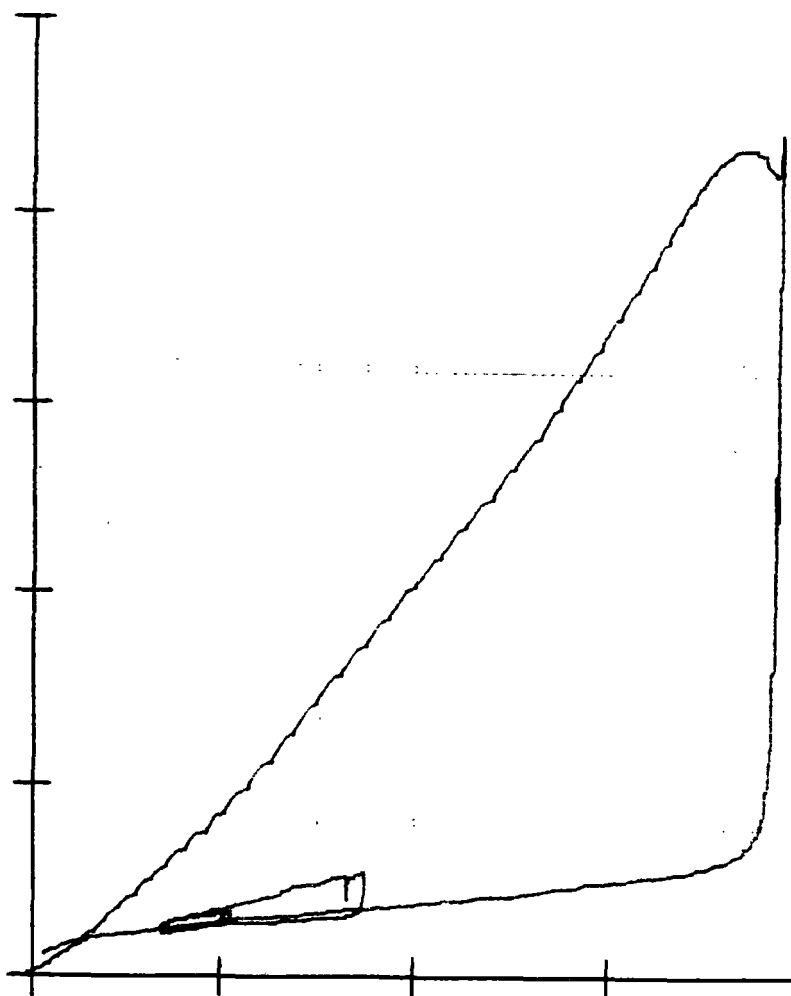
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUND PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

4.28 MPH

@ 2msec.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 12 T.T. # 3316

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

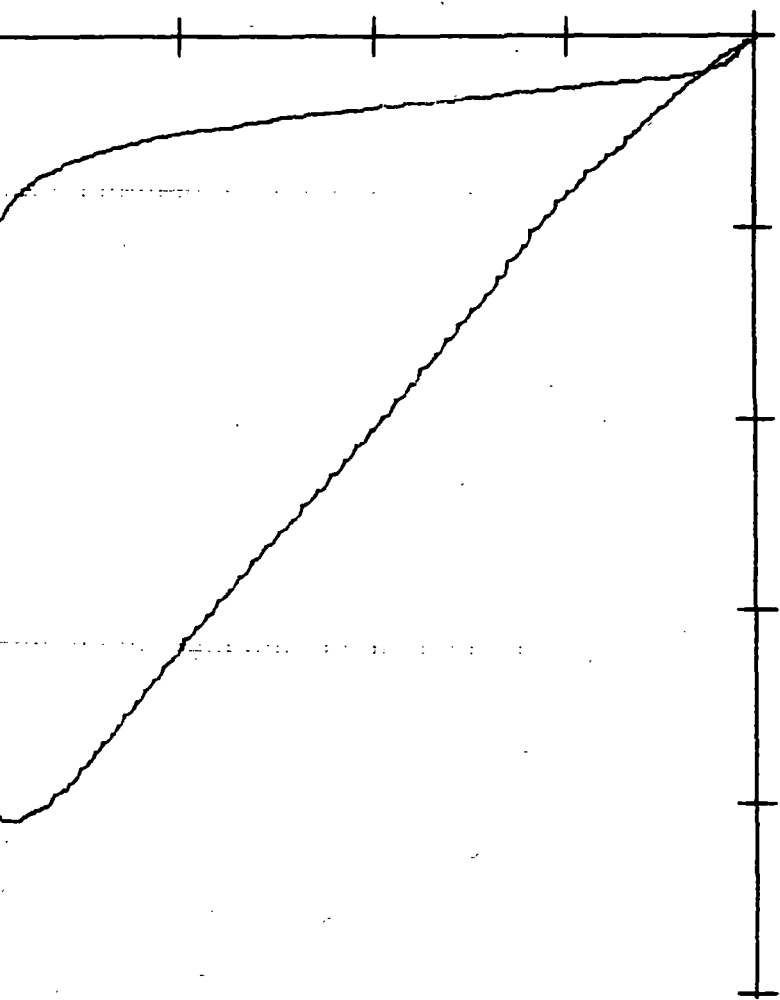
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

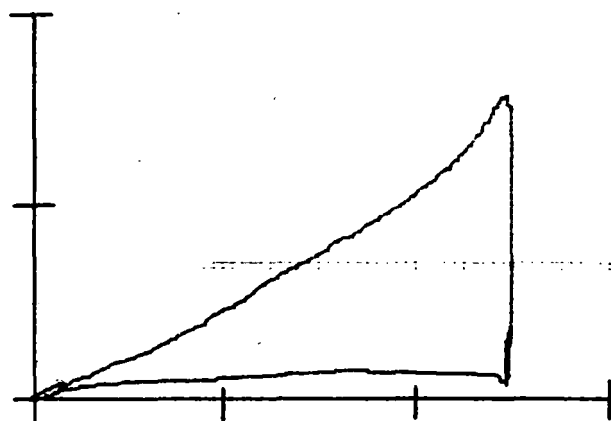
FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 2 MSEC

4.28 MPH

OPERATOR KAJ DATE 10-12-78
RD # 611 RUN 13 T.T. # 3316
TITLE BUFFER VS. TRAVEL S.C.
X-AXIS 1/2 INCH PER MAJOR DIV.
Y-AXIS 100,000 POUNDS PER MAJOR DIV.
FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ
@ 1 MSEC. 4.54 MPH





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 1 T.T. # 331 H

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

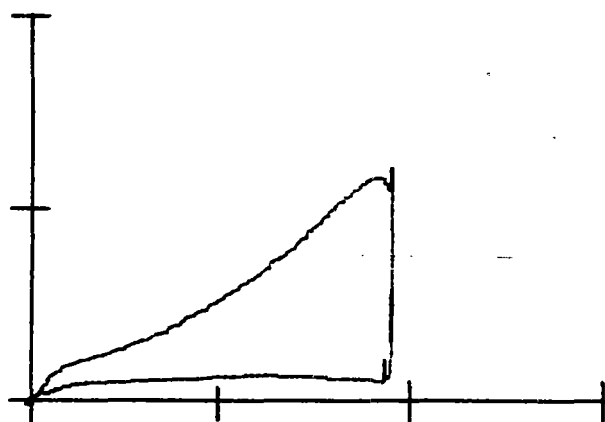
X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.36 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 2 T.T. # 331H

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

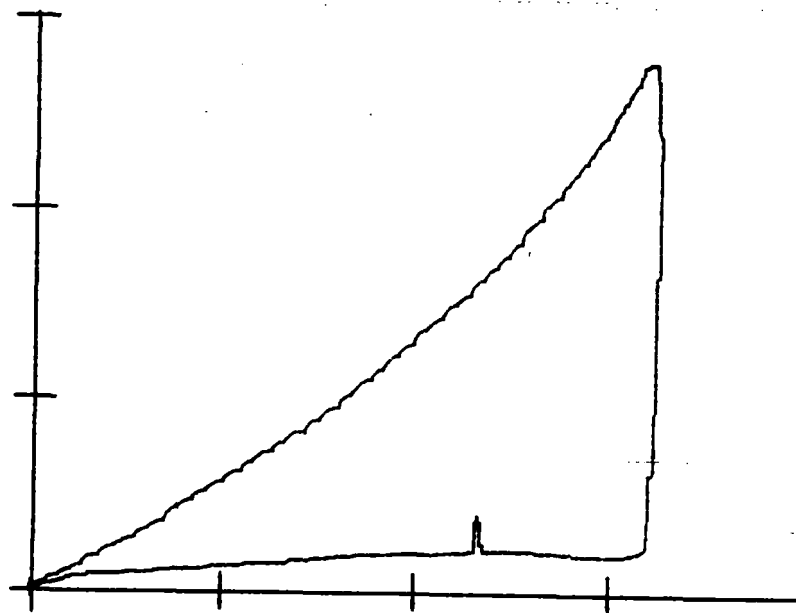
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.18 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 3 T.T.# 331 H

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

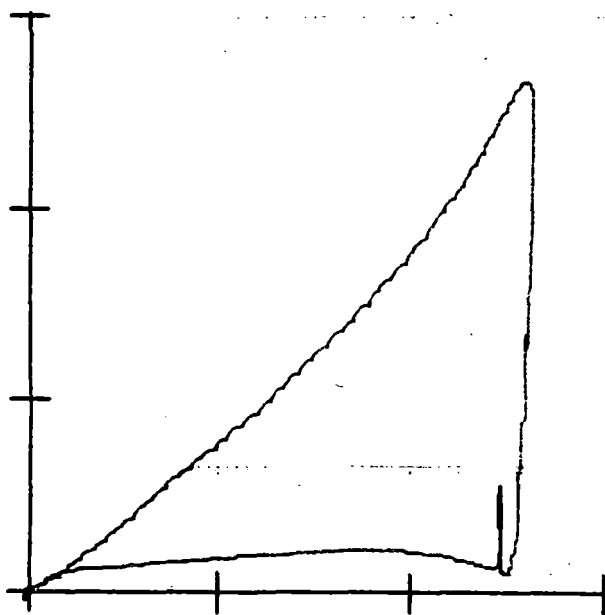
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.09 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 4 T.T. # 331H

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

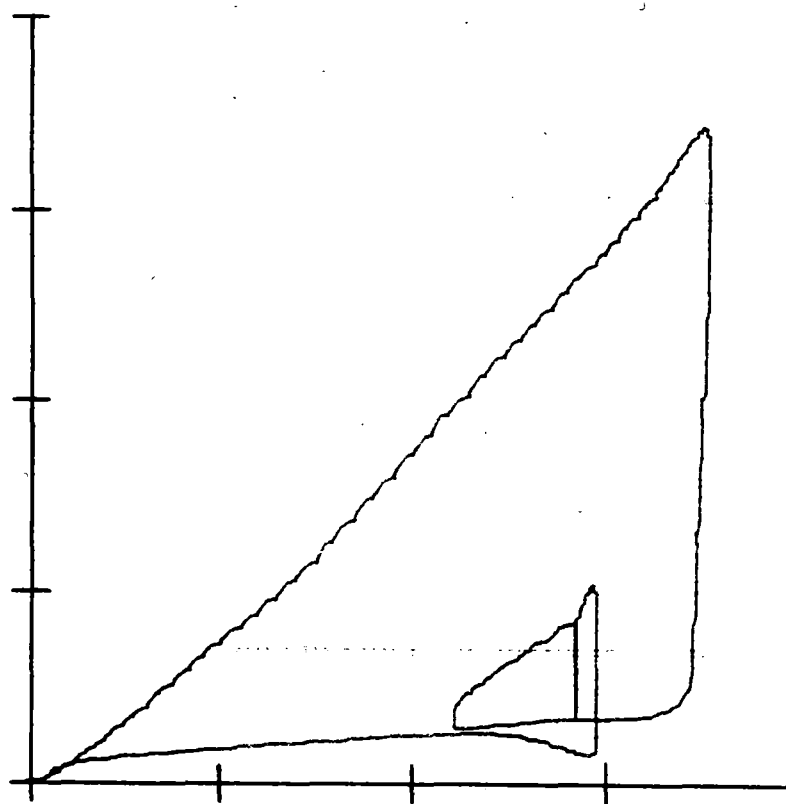
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.11 MPH

@2msec.



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 5 T.T. # 331H

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

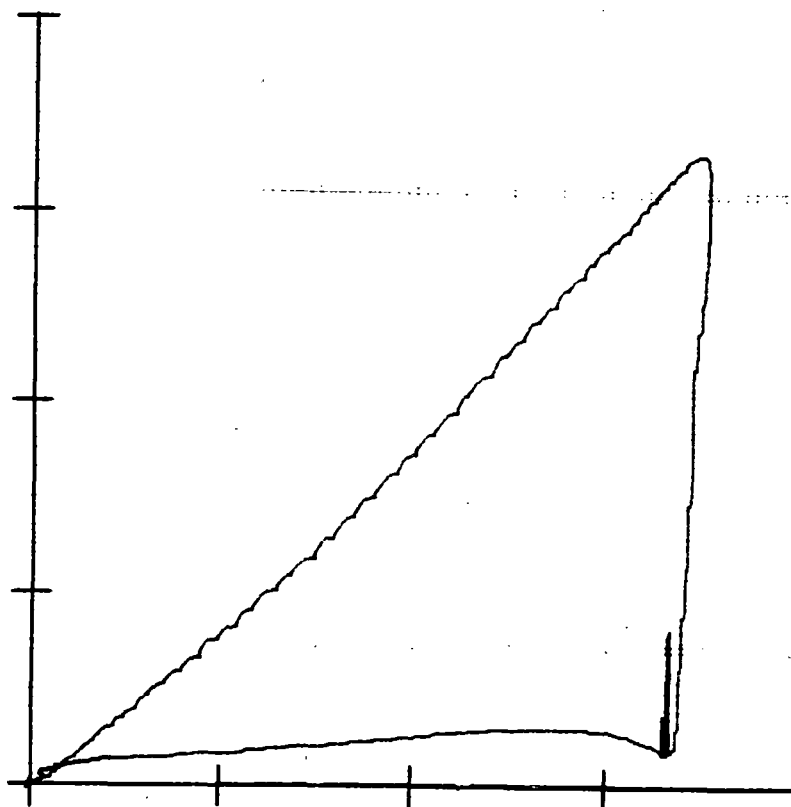
X-AXIS 1/2 INCH. PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 2 MSEC.

3:00 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 6 IT# 331H

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

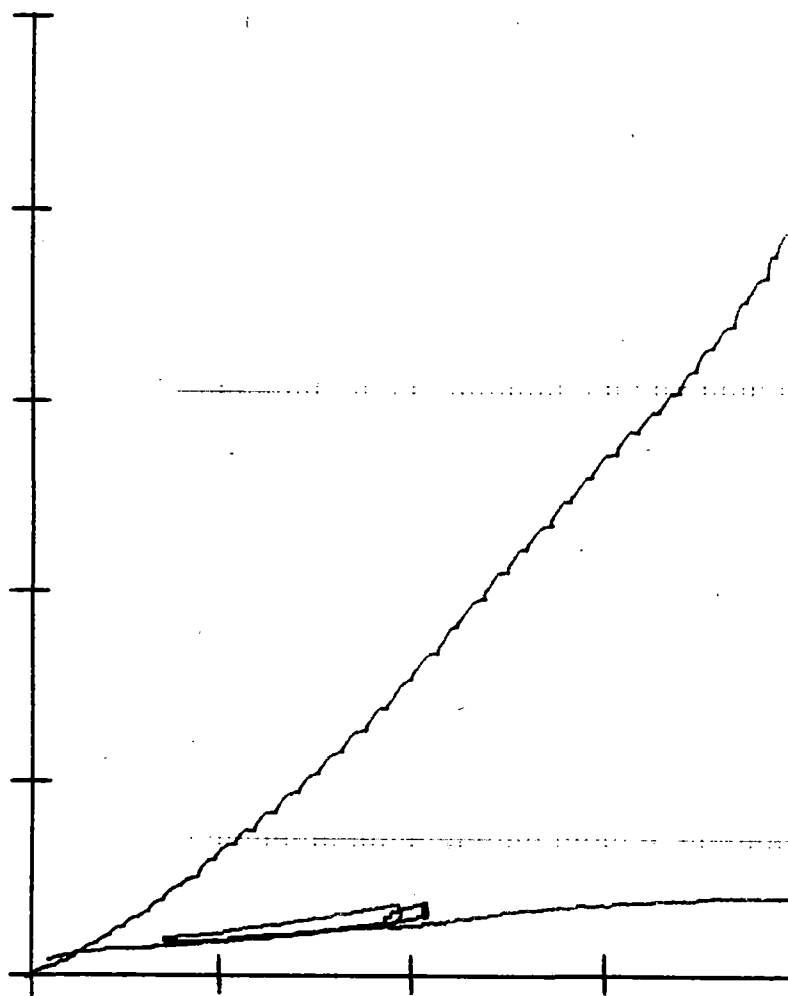
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@2MSEC.

2.97 MPH



OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 7 T.T.# 331H

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

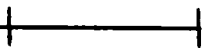
X-AXIS 1/2 INCH PER MAJOR DIV.

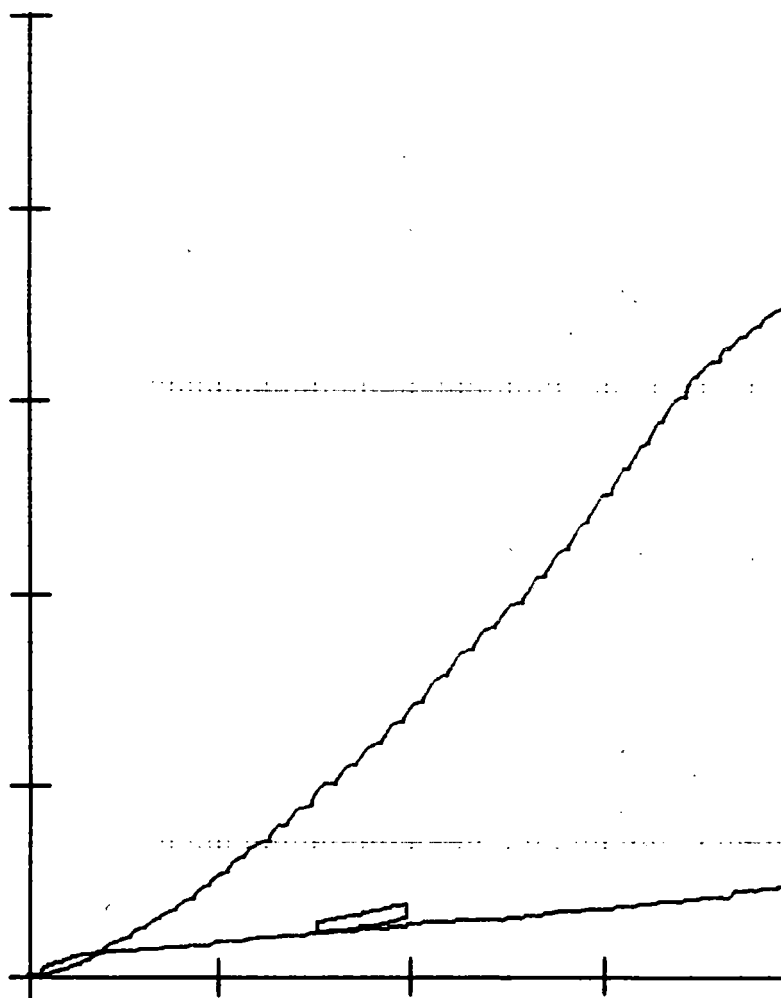
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

@ 2 msec.

3.44 MPH





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 8 T.T. # 3314

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

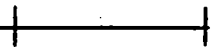
X-AXIS 1/2 INCH PER MAJOR DIV.

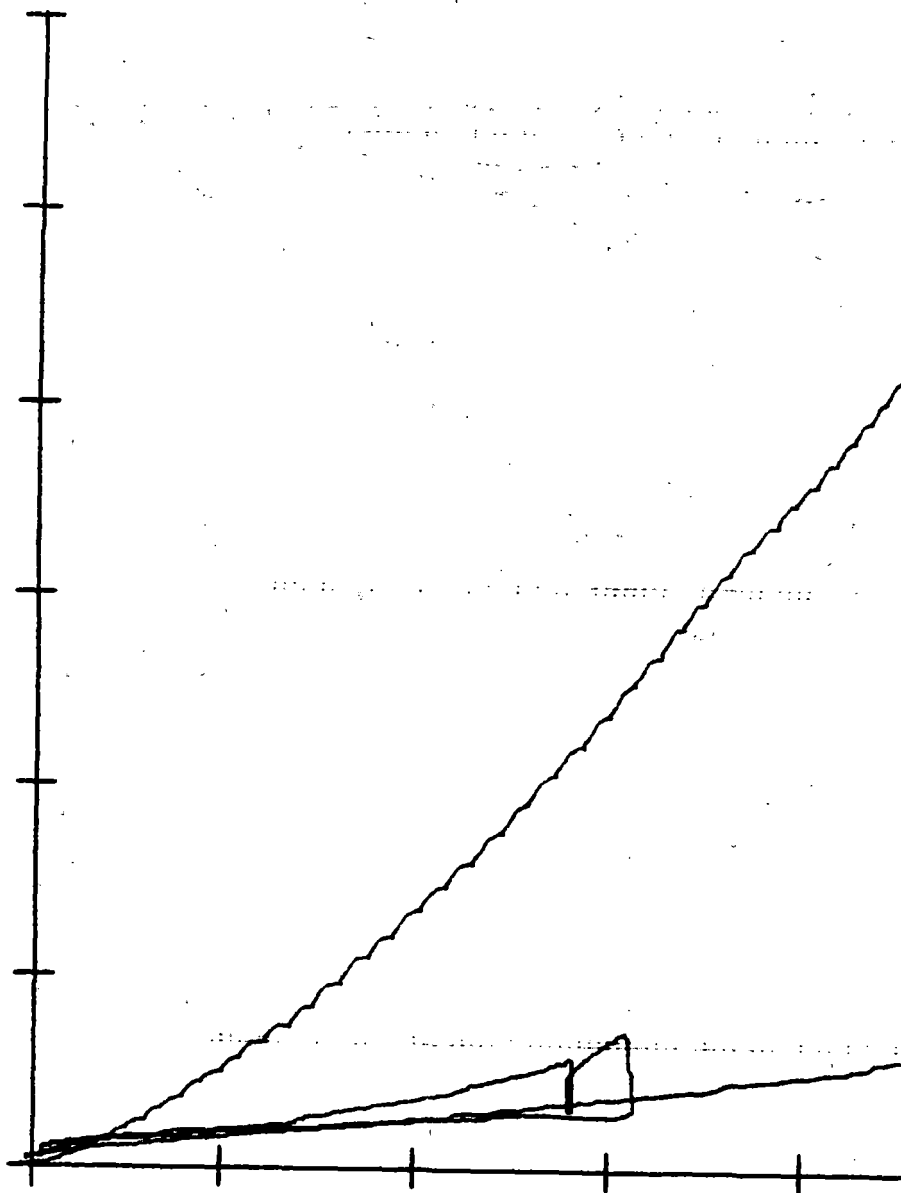
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
OUT-OFF FREQUENCY 10 HZ

0.2 MSEC

3.44 MPH





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 9 T.T. # 331H

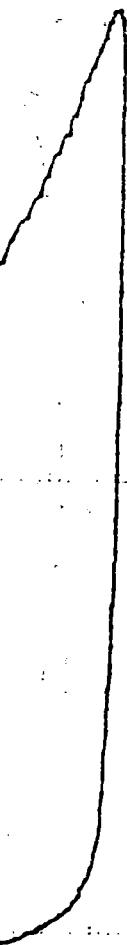
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

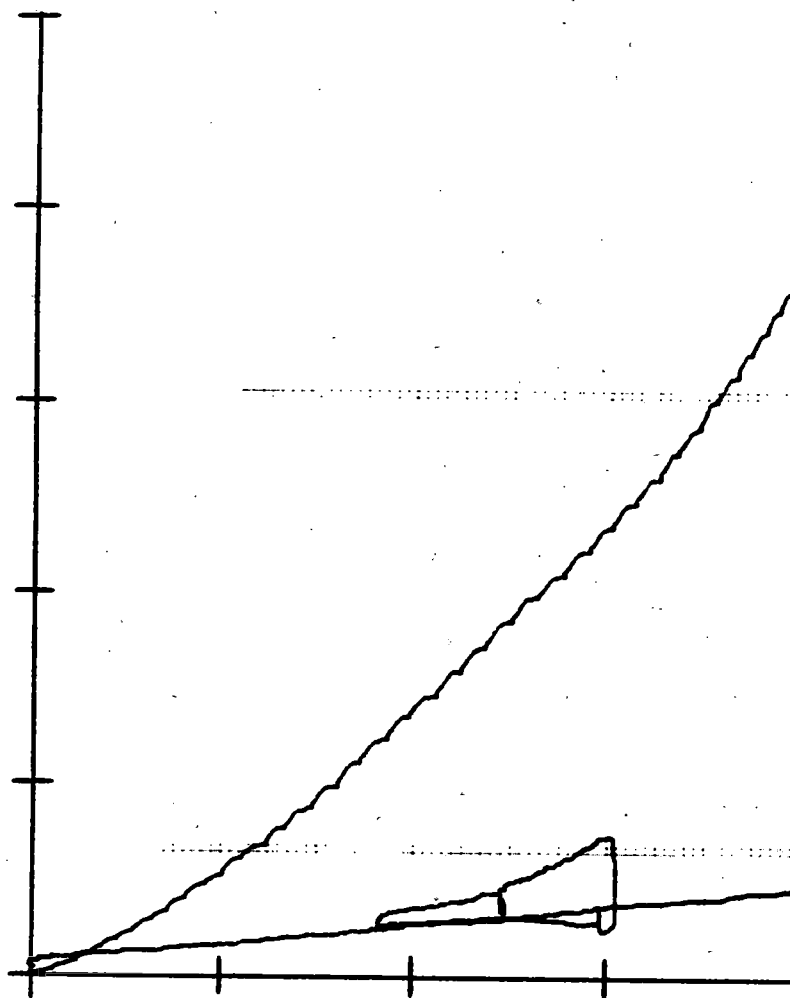
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ
@ 21MSEC.

3.90 MPH





OPERATOR KAJ DATE 10-12-78

RD # 611 RUN 10 T.T. # 3314

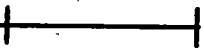
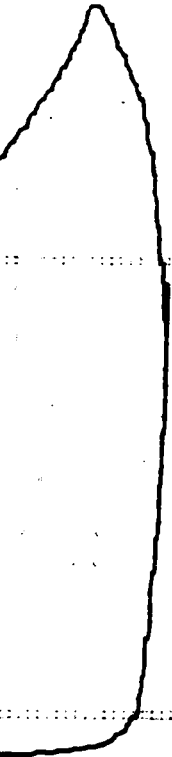
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2 msec

3.87 MPH



10.4 Appendix 4

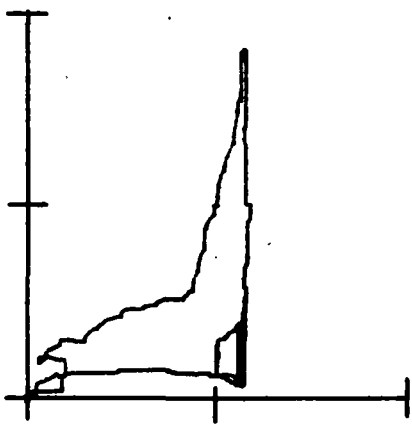
Force vs. Displacement Curves
For a Friction Draft Gear

1. The first part of the paper is devoted to the study of the

2.

3.

4. The second part of the paper is devoted to the study of the



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 2 T.T.# 332A

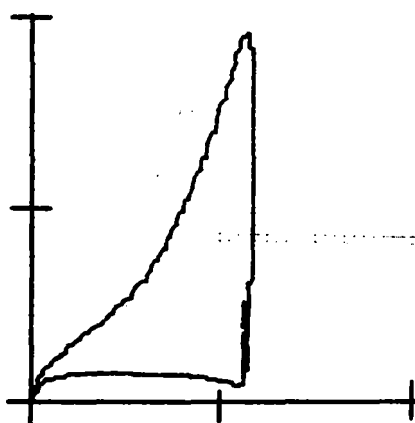
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS. PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ.
@ 2 MSEC.

1.29 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 3 T.T. # 332A

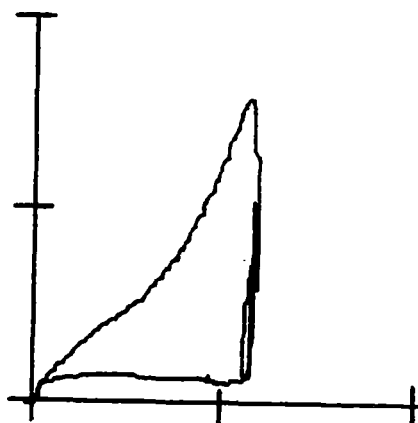
TITLE FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE ^{SHARP}
OUT-OFF FREQUENCY 10 HZ
@2 MSEC.

1.31 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 4 T.T.# 332A

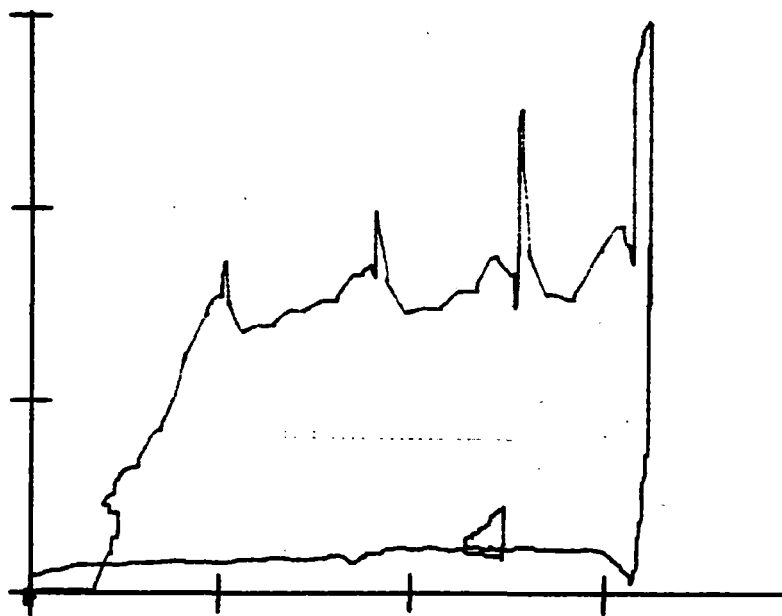
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH - - - PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2 MSEC.

1.26 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 5 T.T.# 332 A

TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

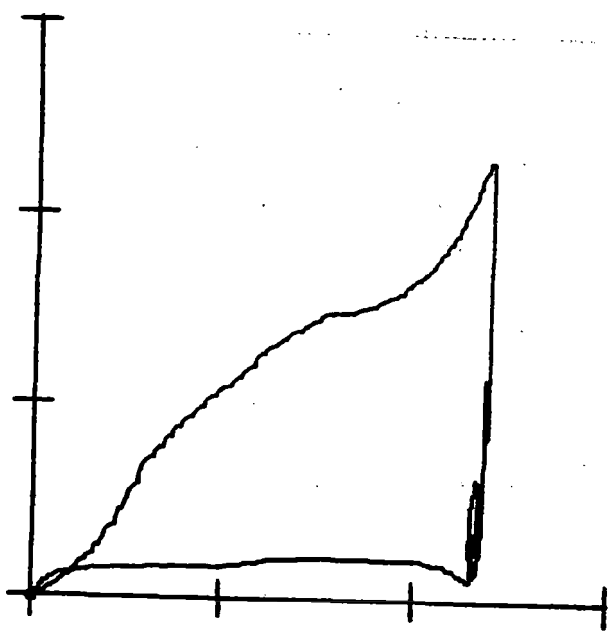
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2 MSEC.

2.11 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 6 T.T.# 332A

TITLE BUFFER UNIT
FORCE Vs. TRAVEL S.C.

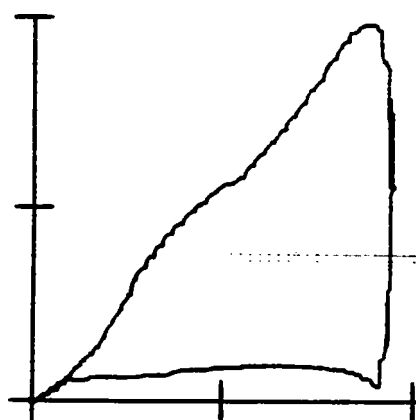
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 2 MSEC.

2.06 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 7 T.T. # 332A

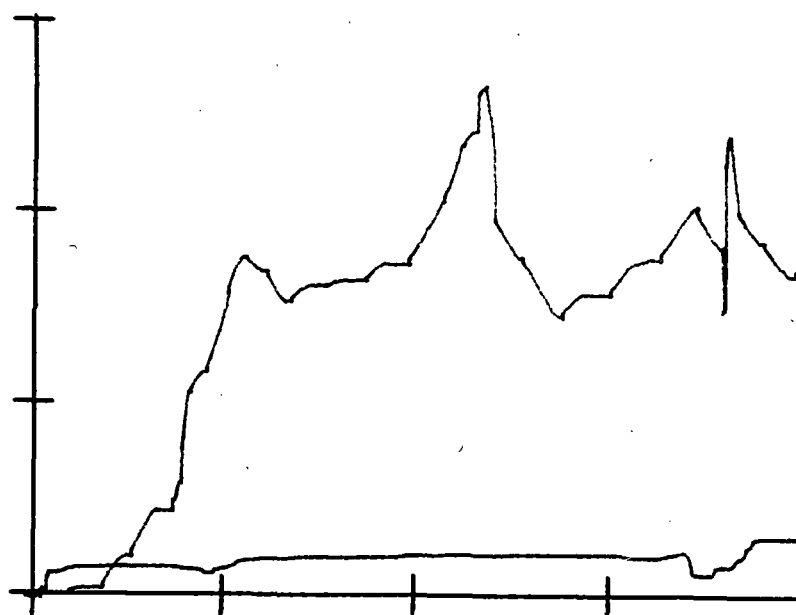
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ
@2MSEC.

2.05 MPH



OPERATOR KAJ DATE 10-18-78

RD # 611 RUN 8 T.T. # 332A

TITLE BUFFER UNIT VS TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

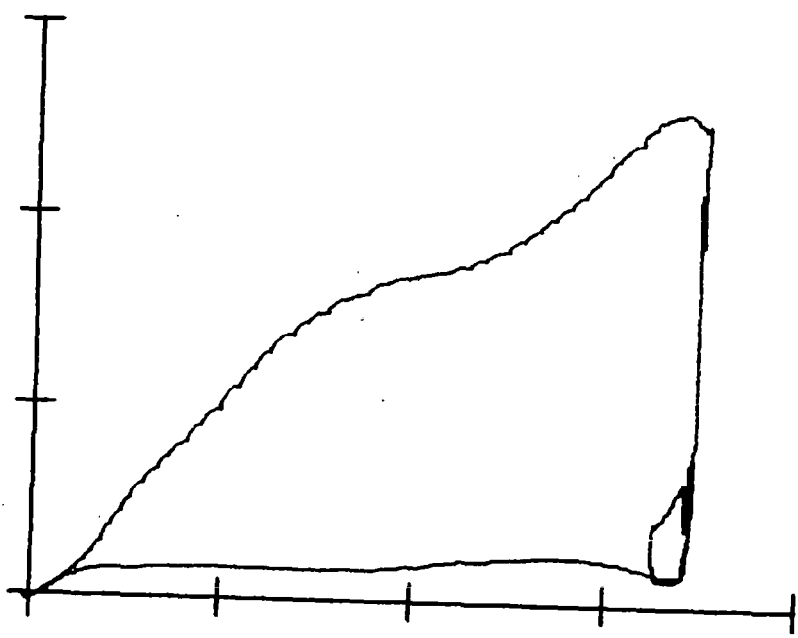
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2 MSEC.

2.95 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 9 T.T. # 332A

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

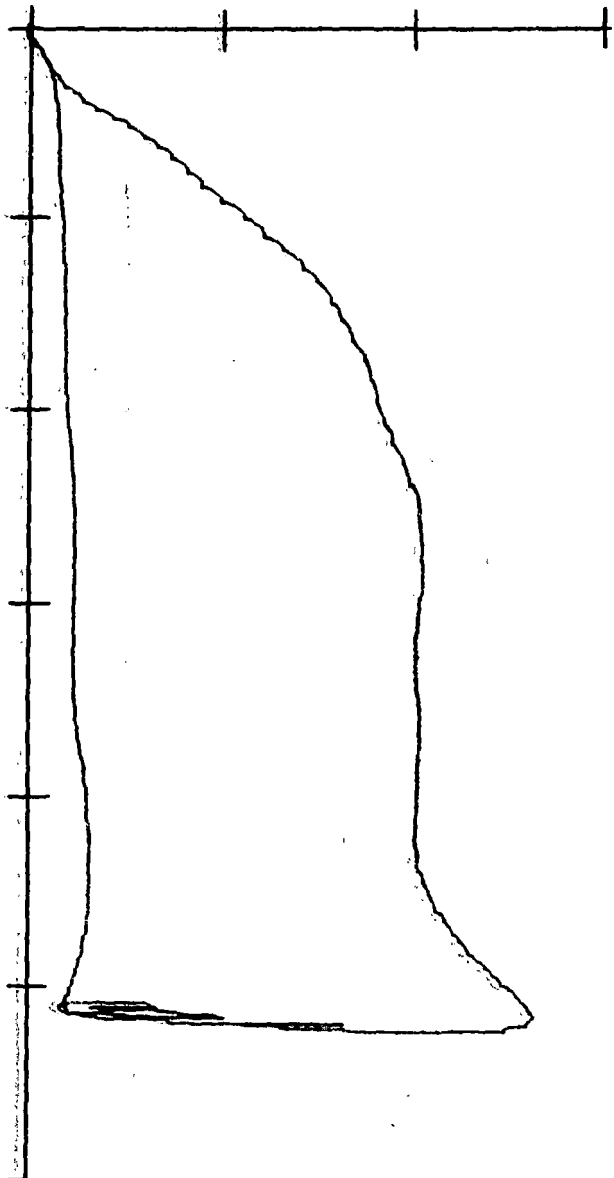
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

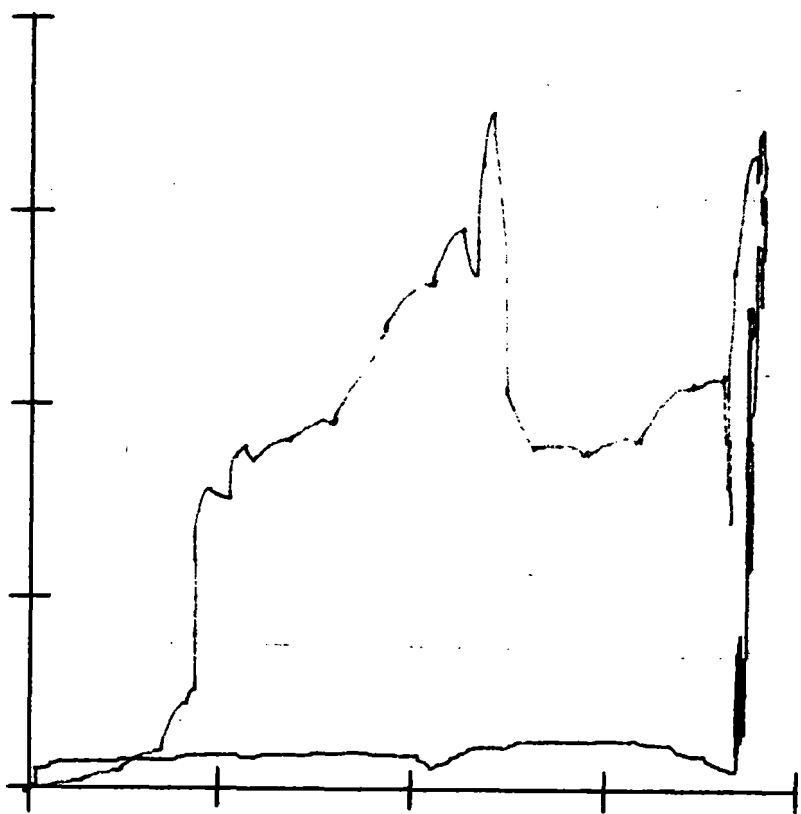
FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@2MSEC

2.97 MPH

OPERATOR KAJ DATE 10-16-78
 RD # 611 RUN 10 TT # 3324
 TITLE BUFFER UNIT
 FORCE VS. TRAVEL S.C.
 X-Axis 1/2 INCH PER MAJOR DIV.
 Y-Axis 100,000 POUNDS PER MAJOR DIV.
 FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ
2.89 MPH @ 2M SEC





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 11 T.T. # 332A

TITLE FORCE VS. TRAVEL S.C.

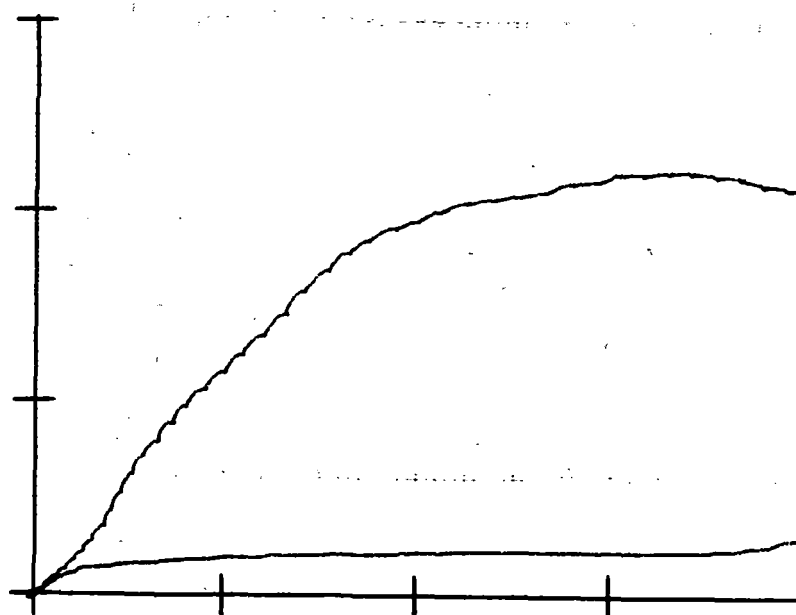
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2 msec.

3.36 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 12 T.T. # 332A

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

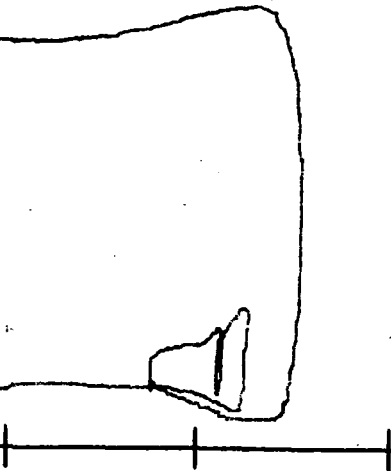
X-AXIS 1/2 INCH PER MAJOR DIV.

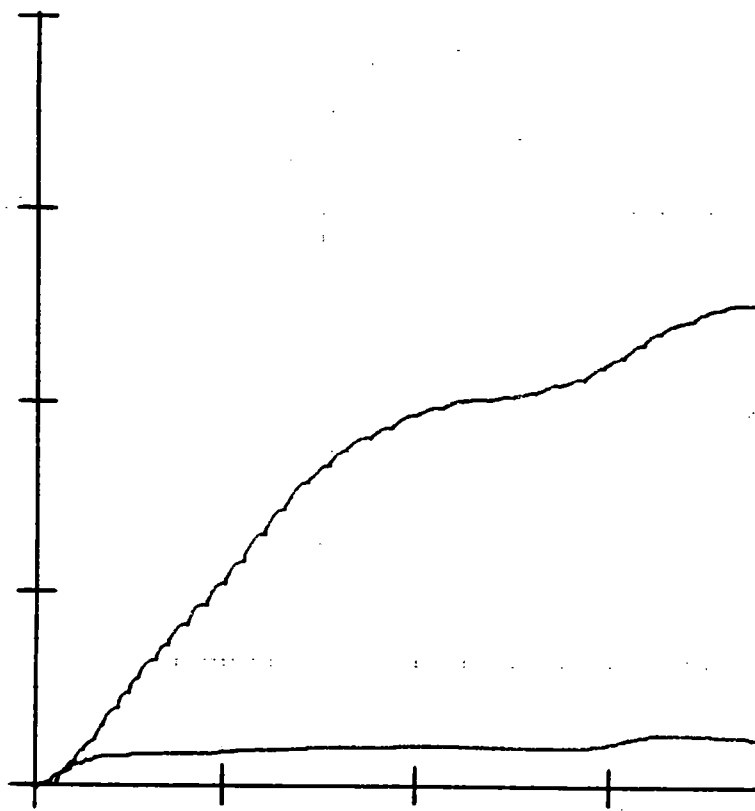
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@2MSEC.

3.41 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 13 T.T.# 332A

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

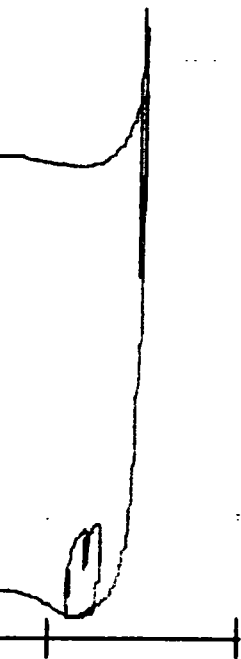
X-AXIS 1/2 INCH PER MAJOR DIV.

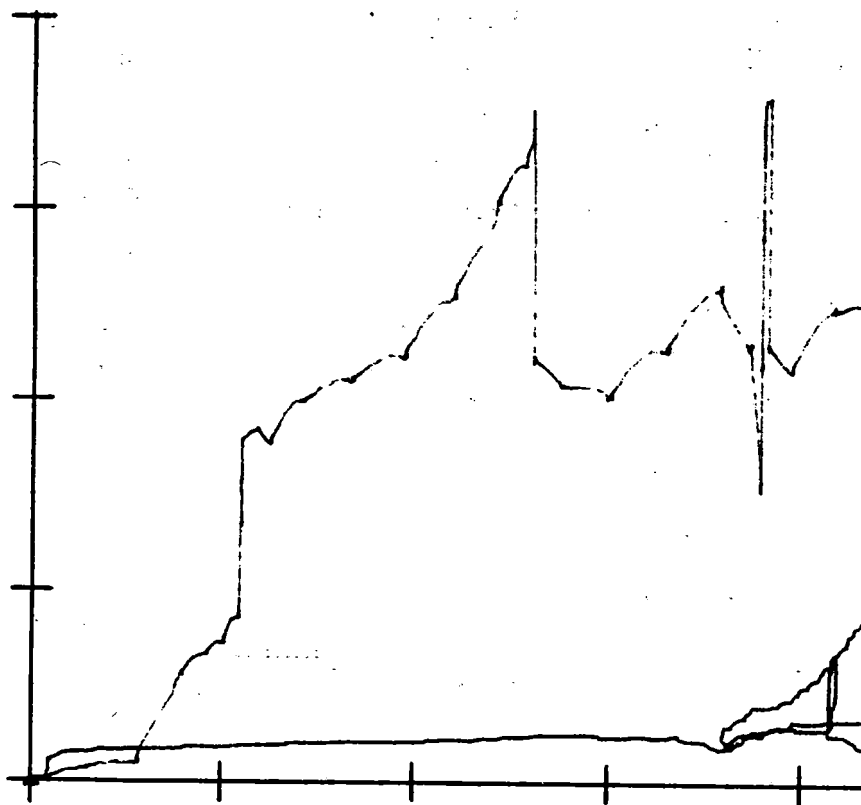
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

@ 2 MSEC.

3.45 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 14 T.T.#332A

TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

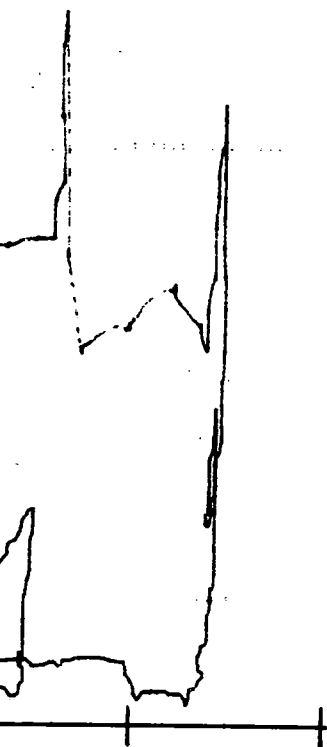
X-AXIS 1/2 INCH PER MAJOR DIV.

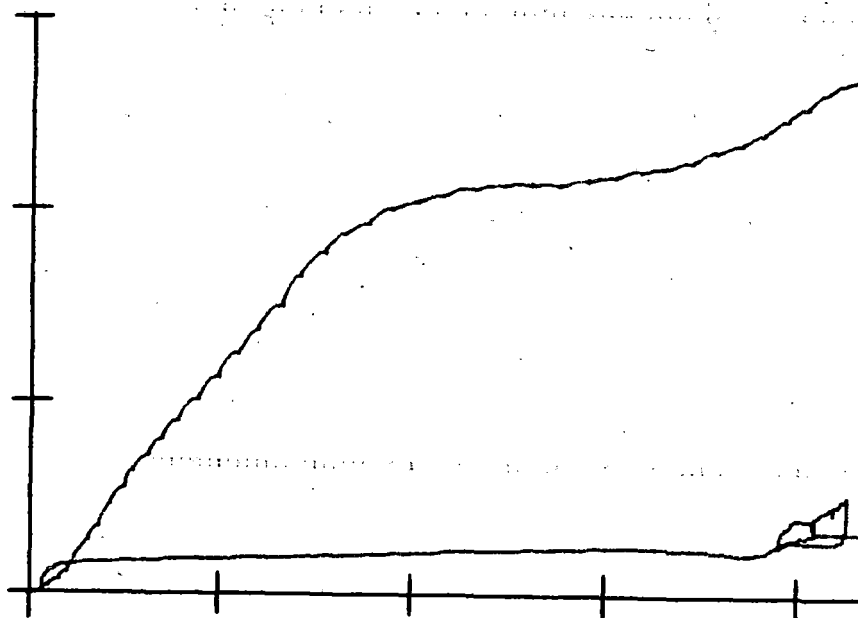
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@2mSEC.

3.80 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 15 T.T.# 332A

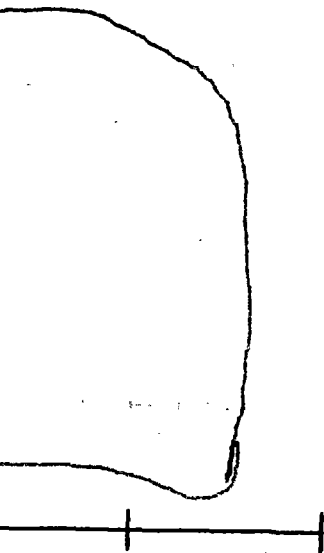
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C

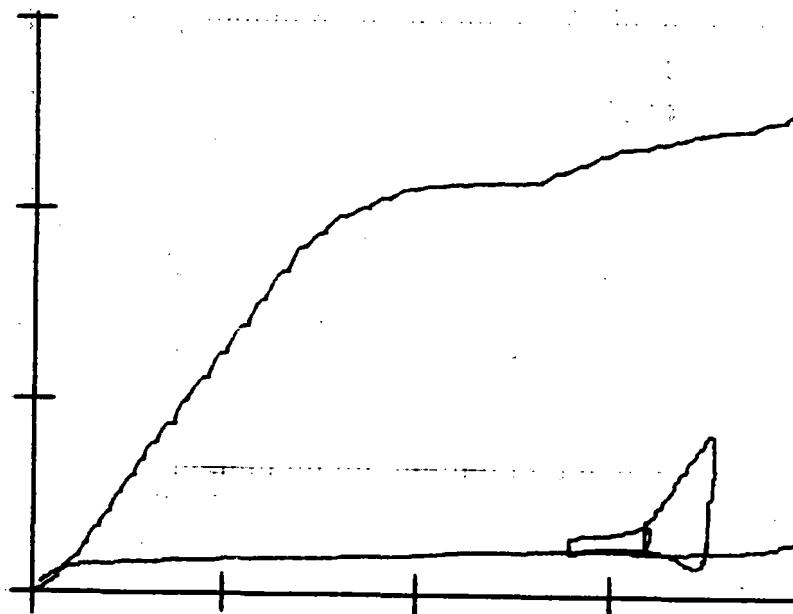
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2 MSEC.

3.90 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 16 T.T. # 332A

BUFFER UNIT
TITLE FORCE VS TRAVEL S.C.

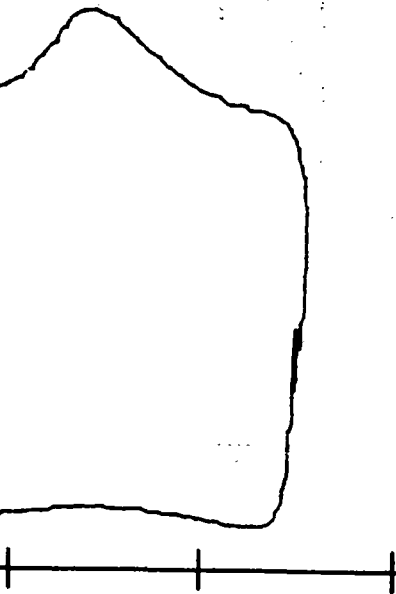
X-AXIS 1/2 INCH

Y-AXIS 100,000 POUNDS MAJOR DIV.

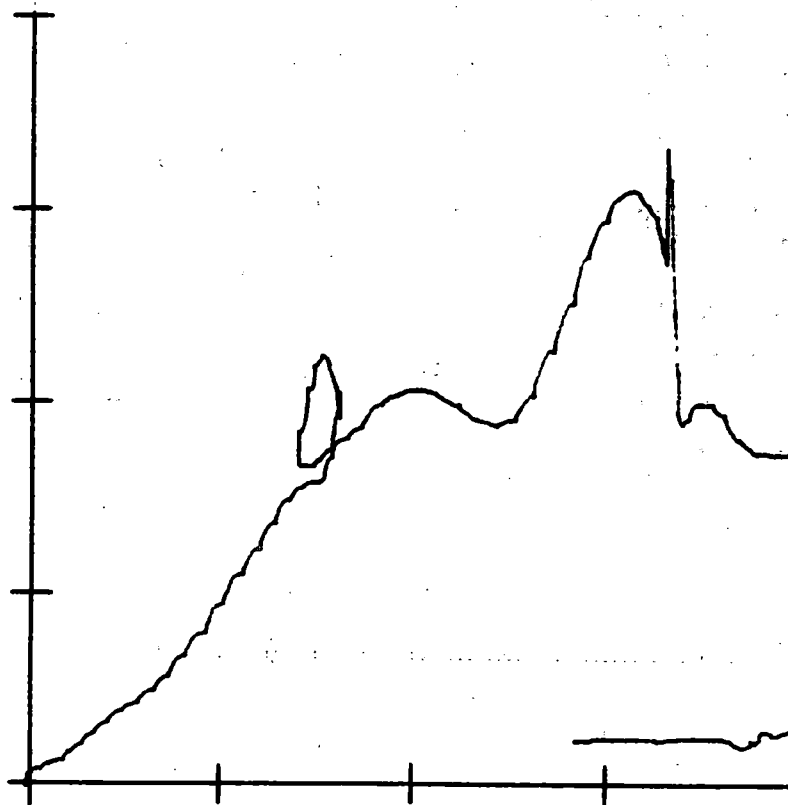
FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

3.85 MPH

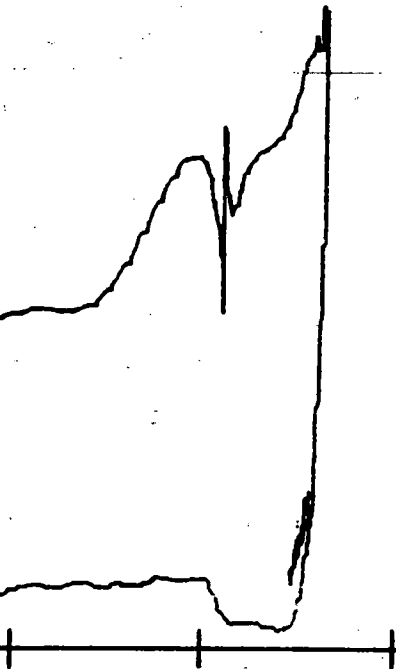
@ 2 MSEC

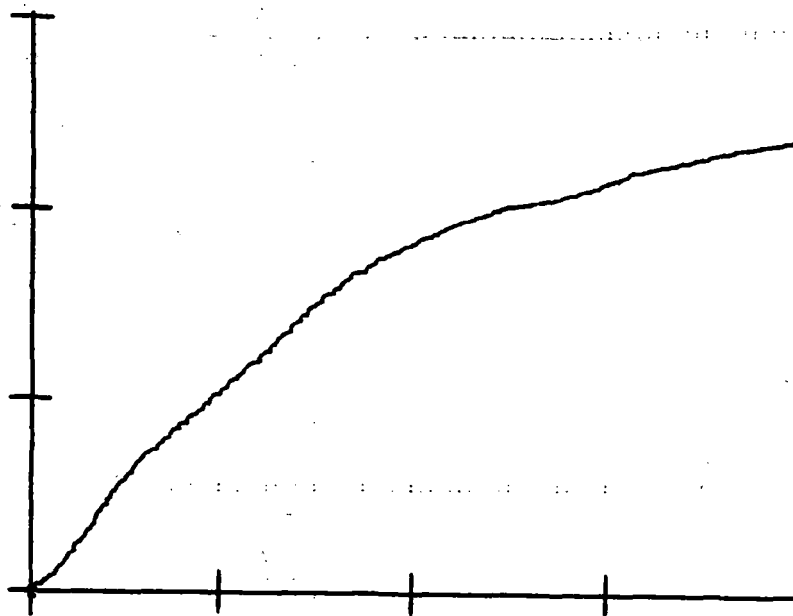


340



OPERATOR KAJ DATE 10-16-78
RD # 611 RUN 17 T.T.# 332A
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.
X-AXIS 1/2 INCH PER MAJOR DIV.
Y-AXIS 100,000 POUNDS PER MAJOR DIV.
FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
0.5MSEC
4.21 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 18 T.T.# 332A

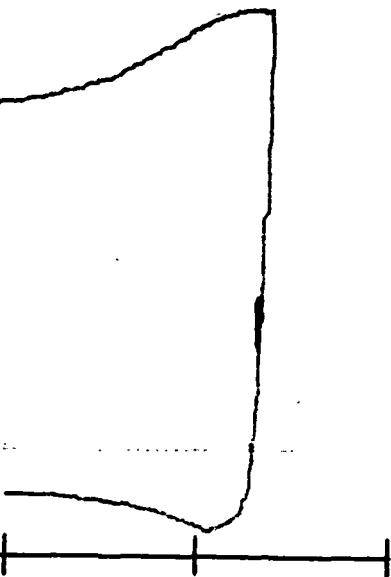
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

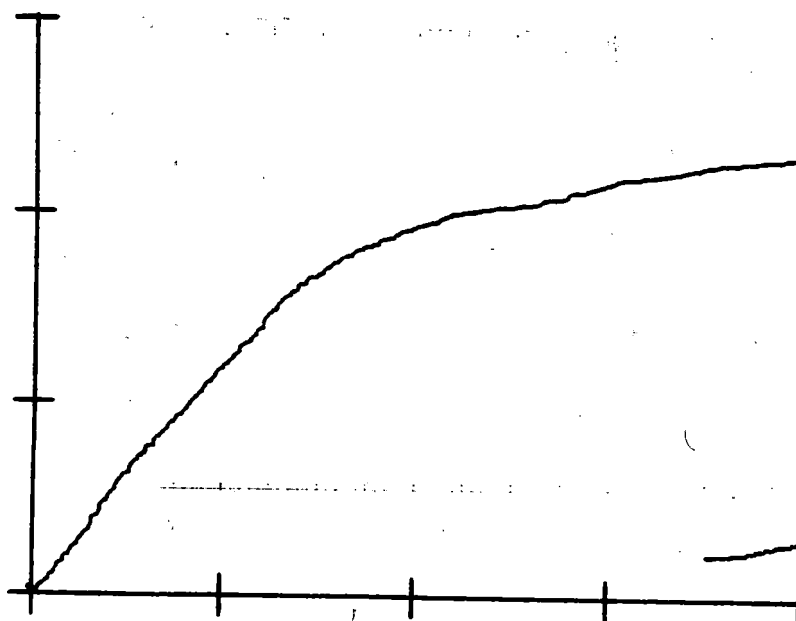
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
0.5 MSEC

4.23 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 19 T.T. # 332A

TITLE BUFFER UNIT FORCE VS TRAVEL S.C. S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

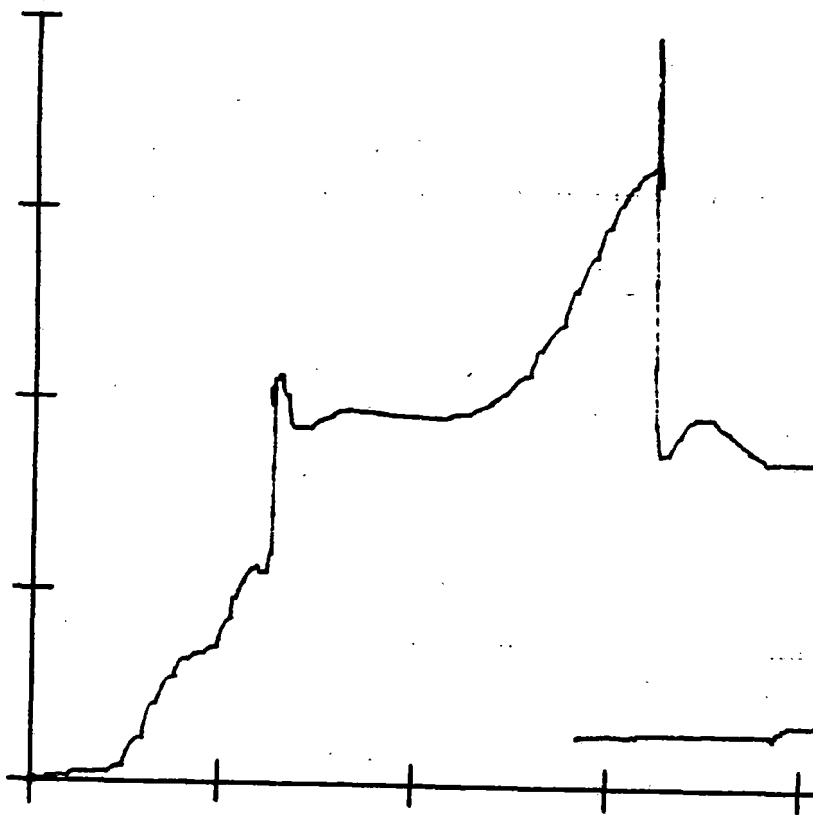
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ

@.5MSEC

4.23 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 20 T.T. # 332A

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

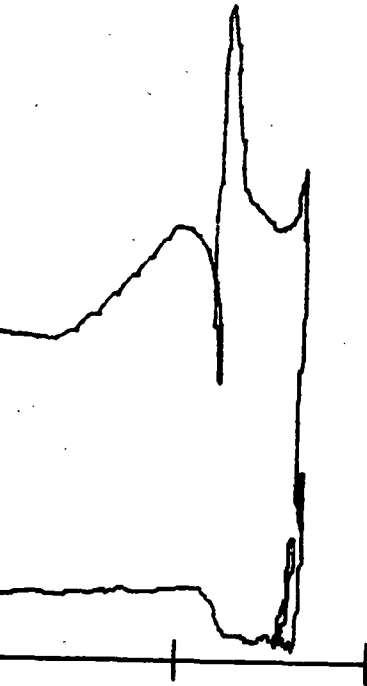
X-AXIS 1/2 INCH PER MAJOR DIV.

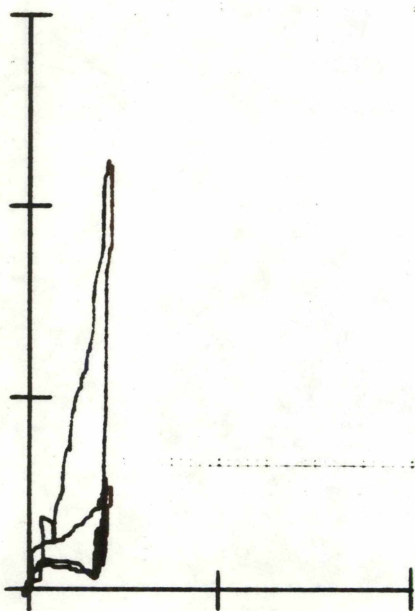
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 5 MSEC.

4.46 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 1 T.T. # 332B

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

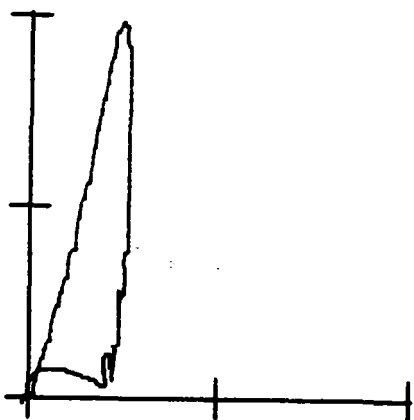
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2MSEC.

1.26 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 2 T.T. # 332B

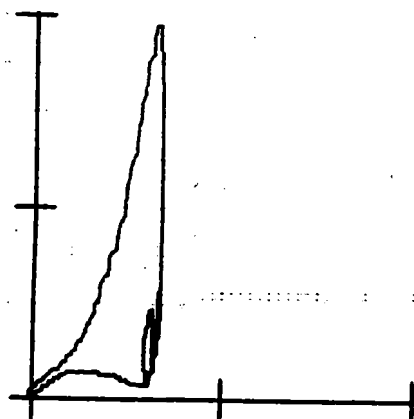
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ
@ 2 MSEC.

1.37 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 3 T.T. # 332B

TITLE BUFFER UNIT VS TRAVEL S.C.

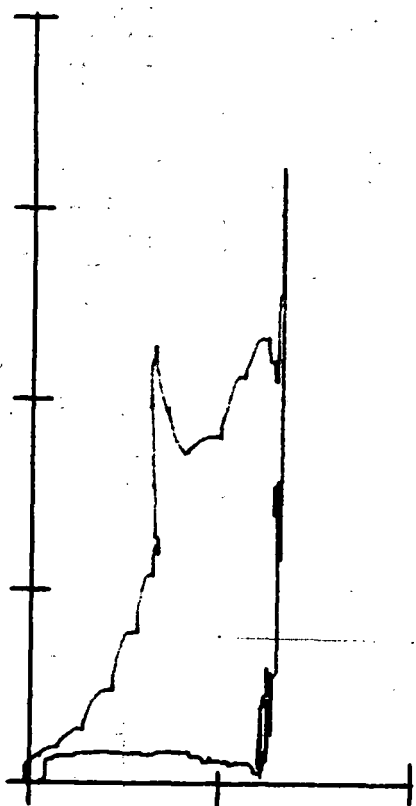
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.35 MPH

@ 1 MSEC.



OPERATOR KAJ DATE 10-16-78

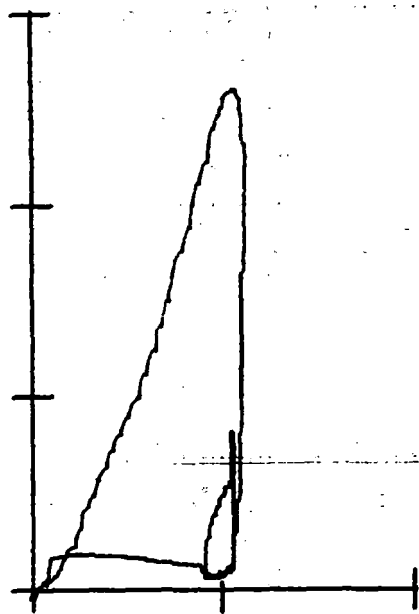
RD # 611 RUN 4 T.T.# 332B

TITLE TRAVEL UNIT
FORCE VS TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
2.06 MPH @ 2 MSEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 5 T.T. # 3328

TITLE BUFFER UNIT VS
FORCE TRAVEL S.C.

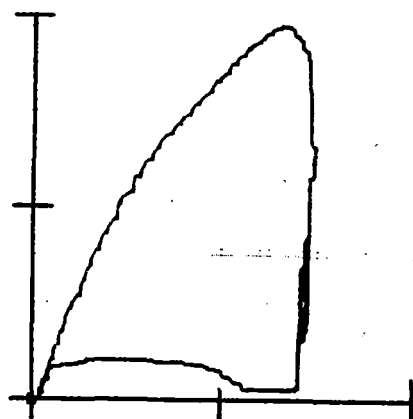
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

© 2MSEC.

2.10 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 6 T.T. # 3328

..... BUFFER UNIT
TITLE FORCE VS TRAVEL S.C.

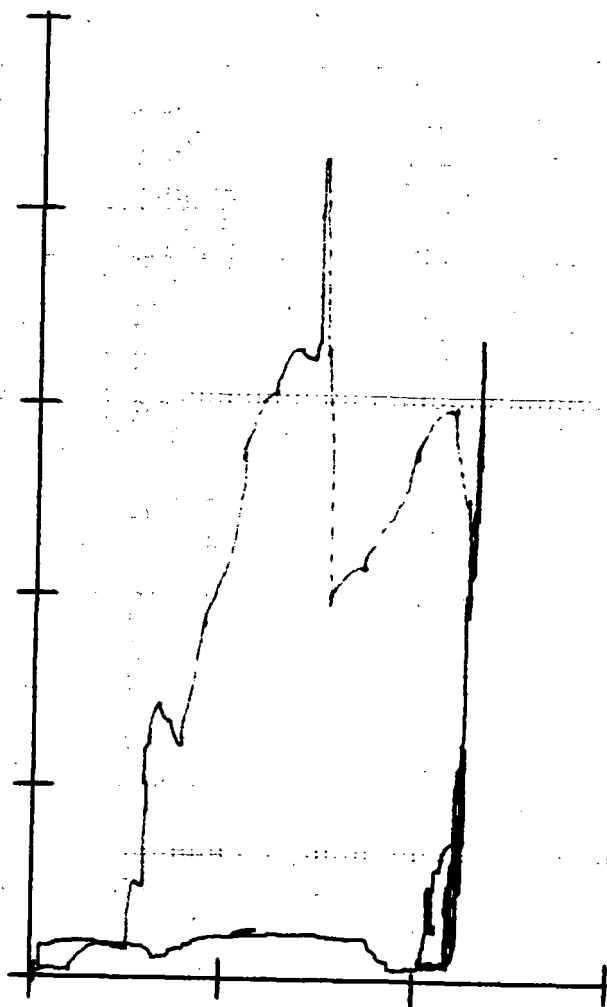
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

2.02 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 7 T.T.# 332B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

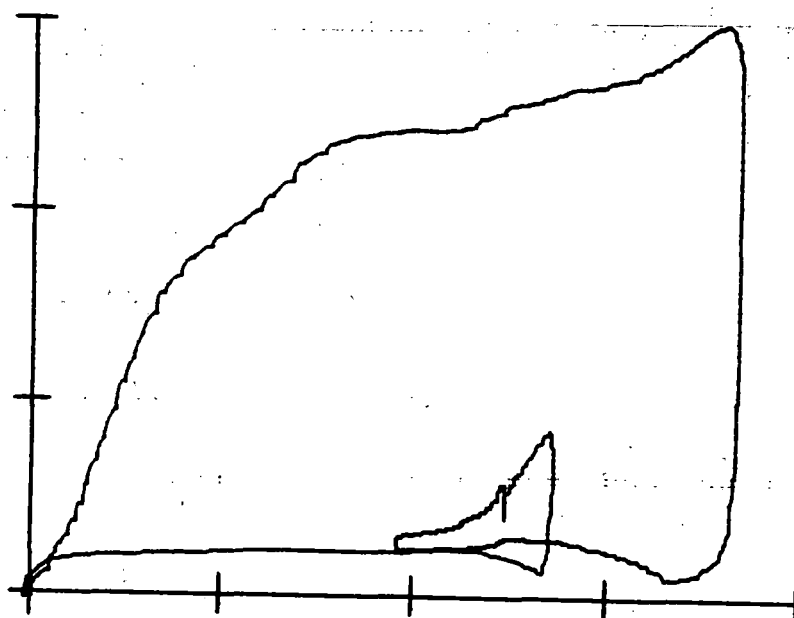
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

2.98 MPH

@ 2MSEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 8 T.T. # 332B

TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

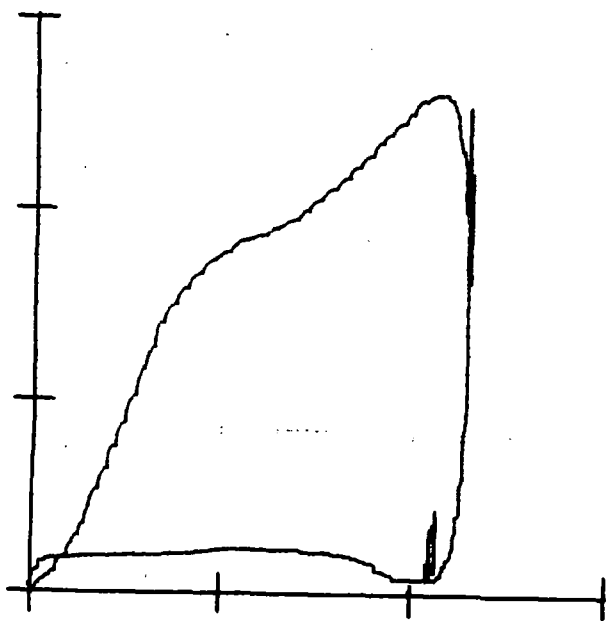
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 2mSEC.

2.90 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 9 T.T.# 332B

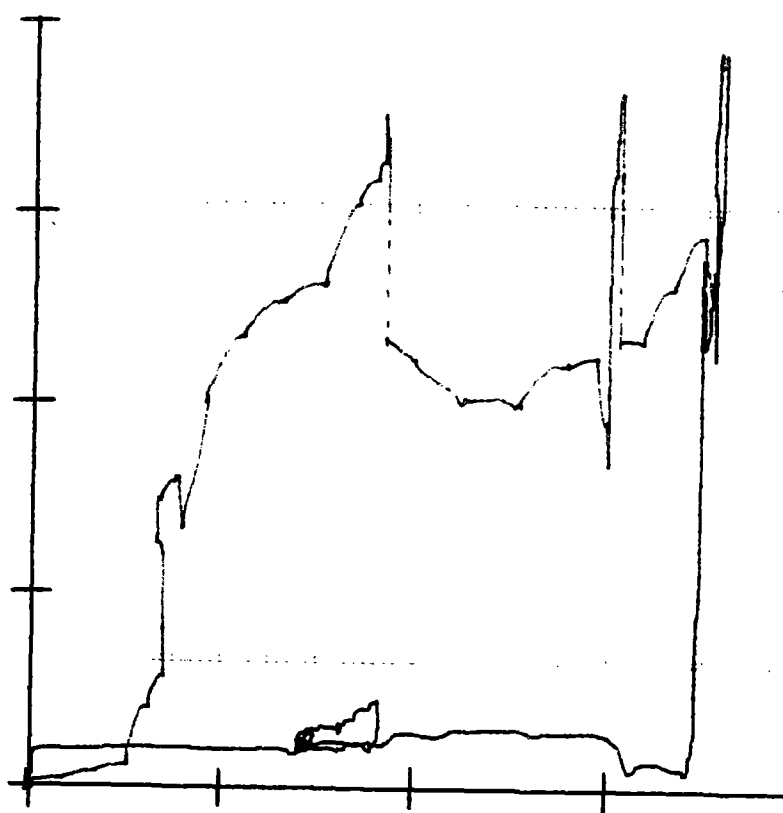
TITLE BUFFER UNIT UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.85 MPH @ 2 msec.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 10 T.T.# 332B

TITLE BUFFER UNIT
FORCE vs. TRAVEL S.C.

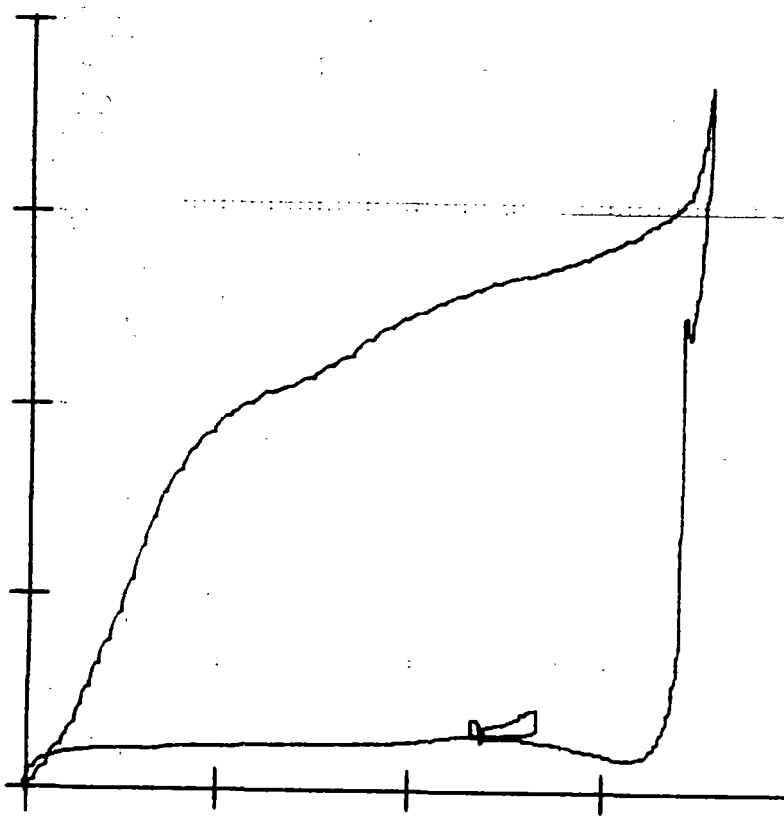
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.
SHARP

FILTER TYPE CUT-OFF FREQUENCY 100 HZ

3.40 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 11 T.T. # 332B

TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

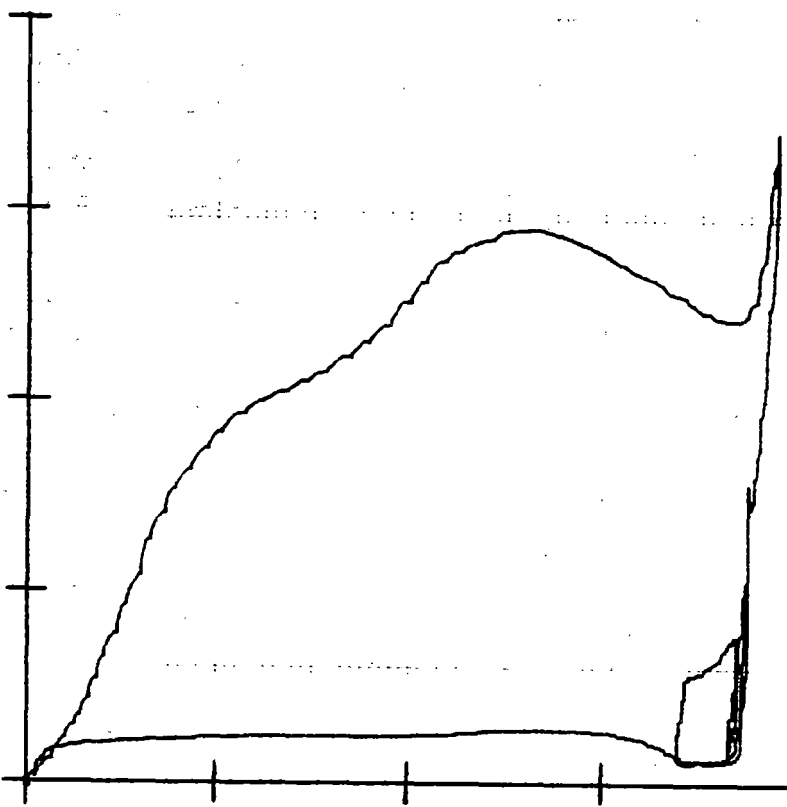
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.38 MPH

2 msec.



OPERATOR KAJ DATE 10-16-78

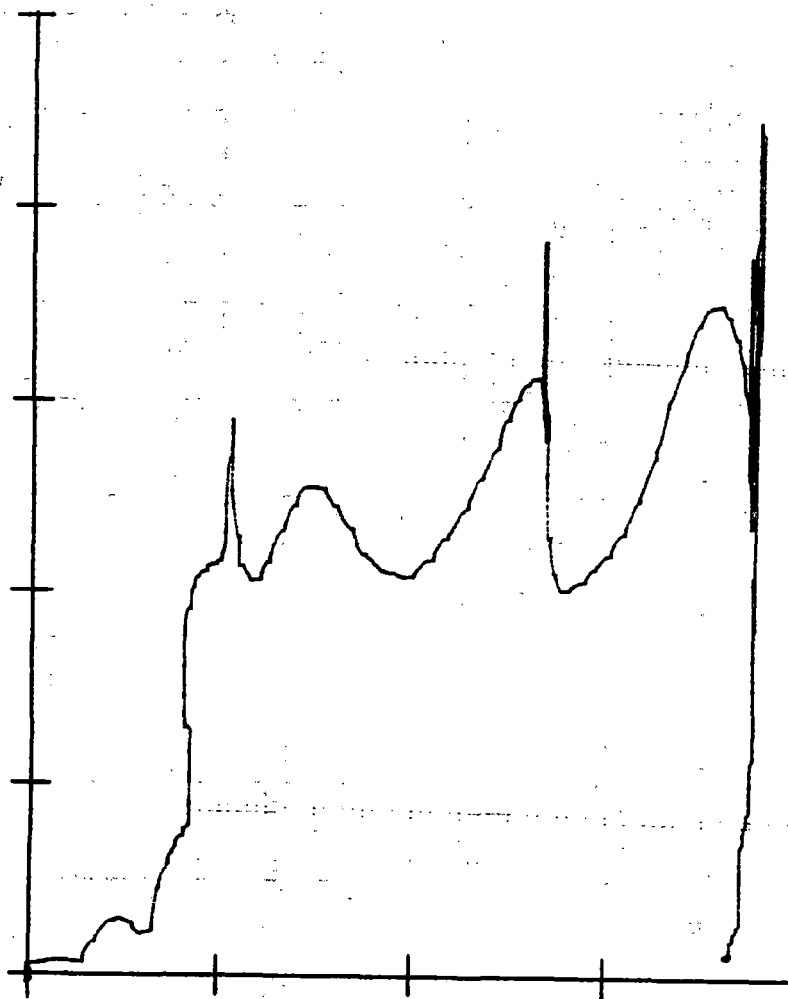
RD # 611 RUN 12 T.T. # 332B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
3.41 MPH @ 275 SEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 13 TT # 3328

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

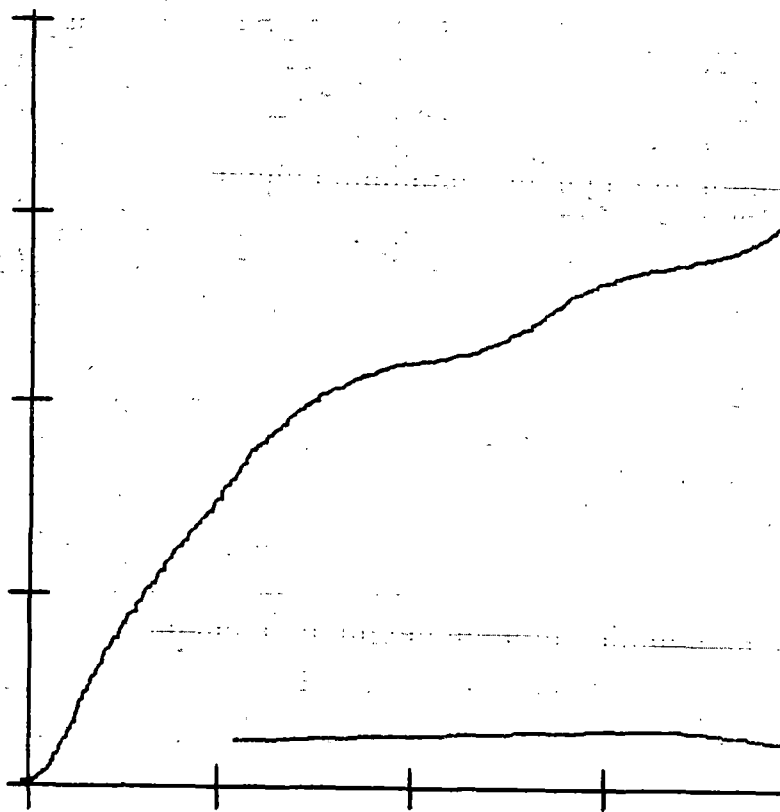
Y-AXIS 100.000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 100 HZ

@.5msec.

3-90 MPH

357



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 14 T.T. # 3328

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

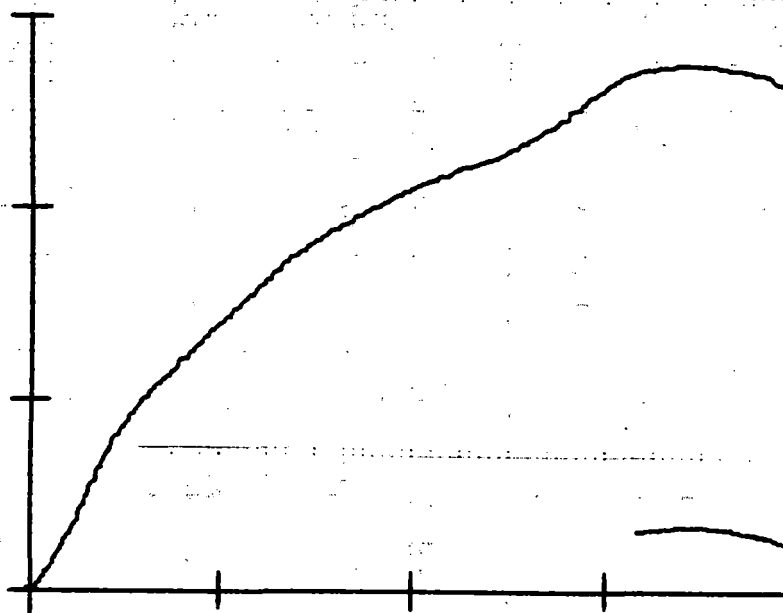
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.97 MPH

0.5MSEC





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 15 T.T. # 332B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

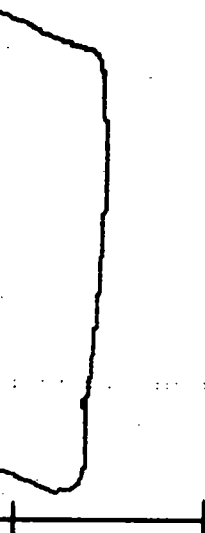
X-AXIS 1/2 INCH PER MAJOR DIV.

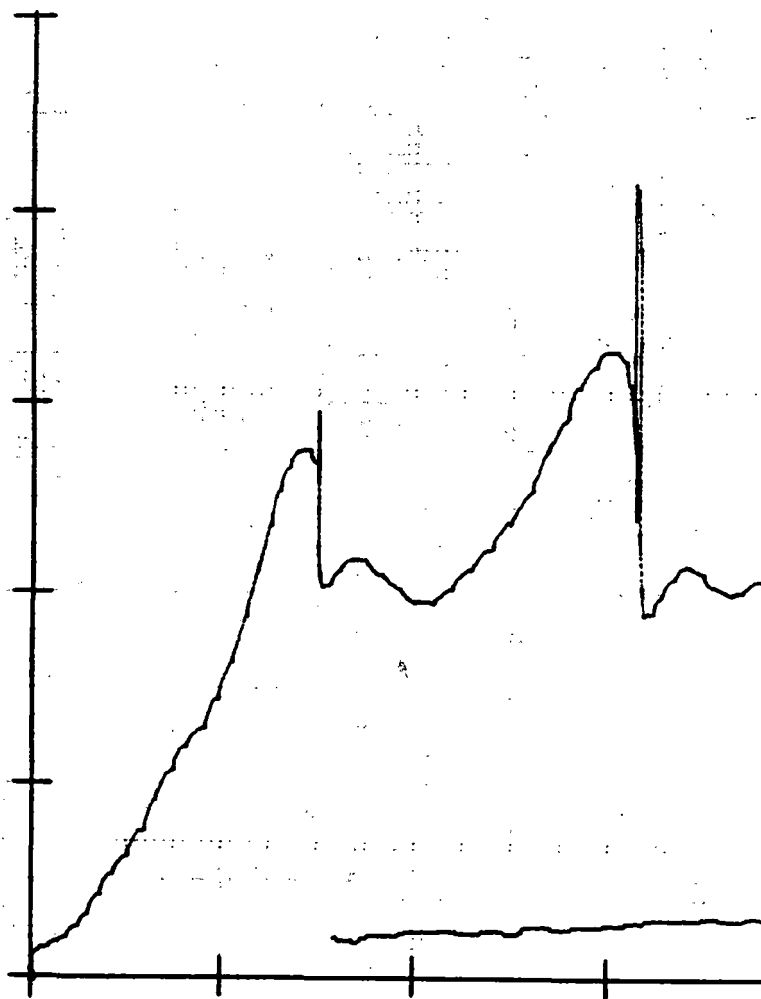
Y-AXIS 200,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@.5 msec.

3.97 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 16 T.T. # 332B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

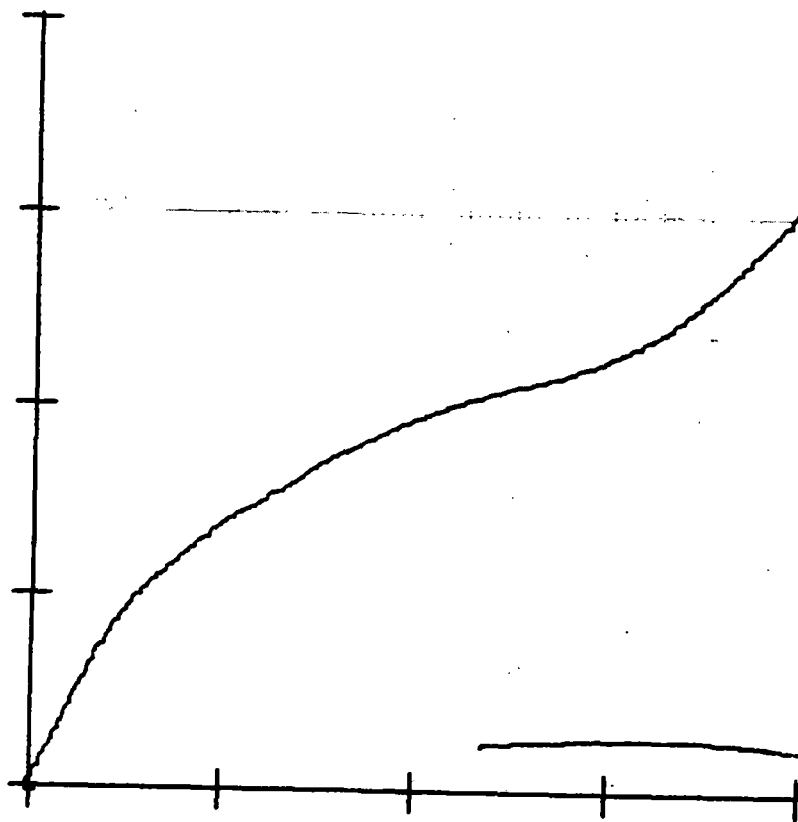
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ .5MSEC.

4.12 MPH



360



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 17 T.T. # 332B

TITLE BUFFER UNIT
FORCE VS. TRAVEL SC.

X-AXIS 1/2 INCH. PER MAJOR DIV.

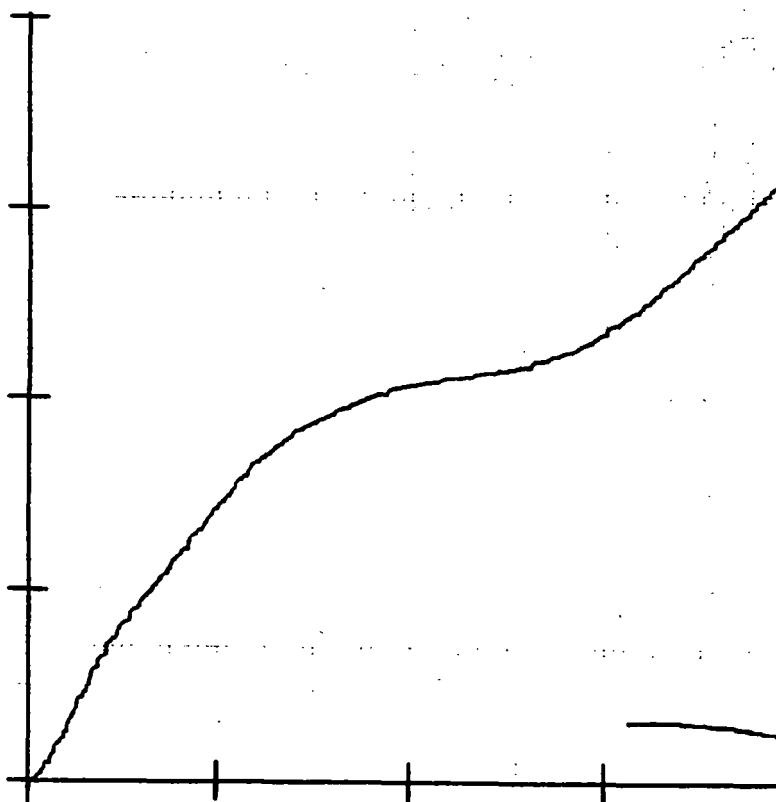
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

4.26 MPH

@ .5 MSEC.





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 18 T.T. # 332B

TITLE FORCE VS. TRAVEL S.C.
BUFFER UNIT

X-AXIS 1/2 INCH PER MAJOR DIV.

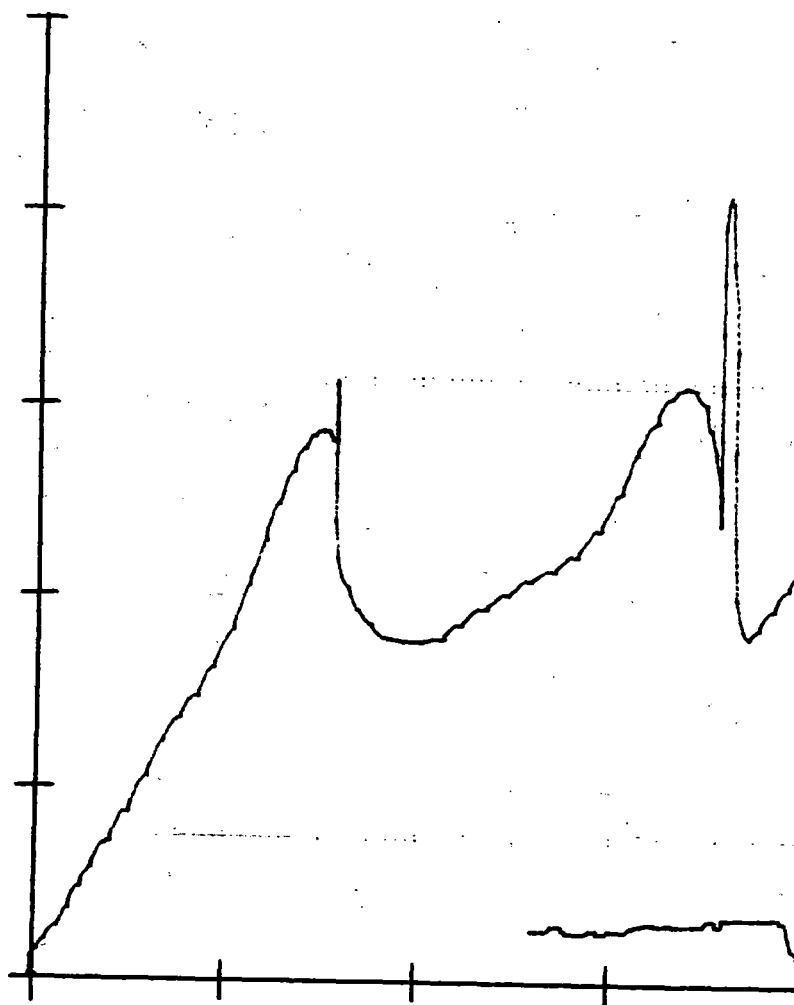
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

0.5 MSEC.

4.21 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 19 T.T. # 332B

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

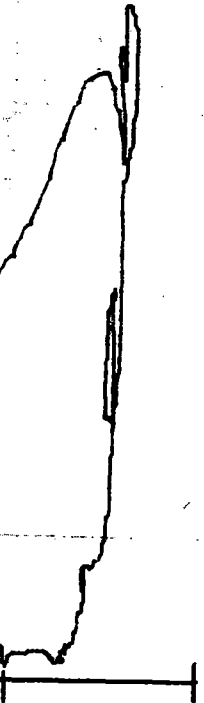
X-AXIS 1/2 INCH PER MAJOR DIV.

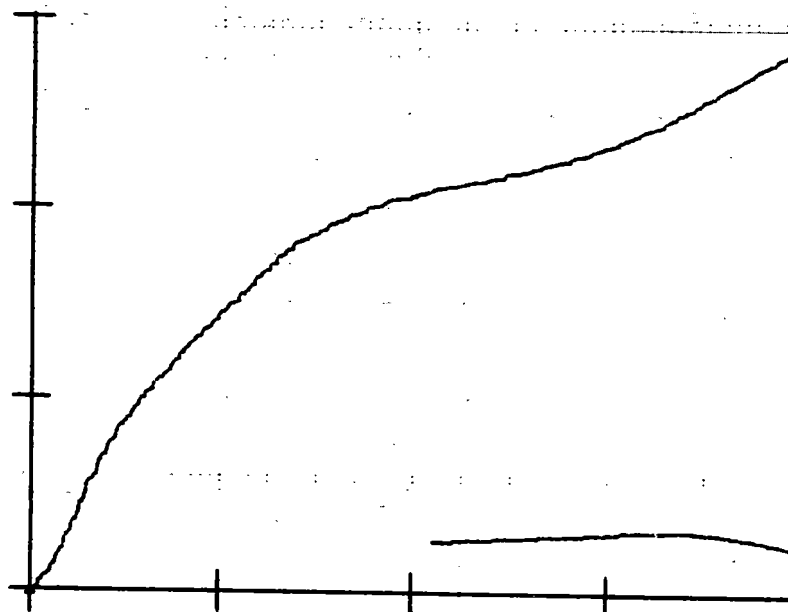
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 5 MSEC.

4.47 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 20 T.T.# 3328

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

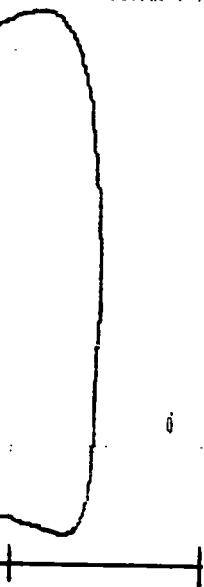
X-AXIS 1/2 INCH PER MAJOR DIV.

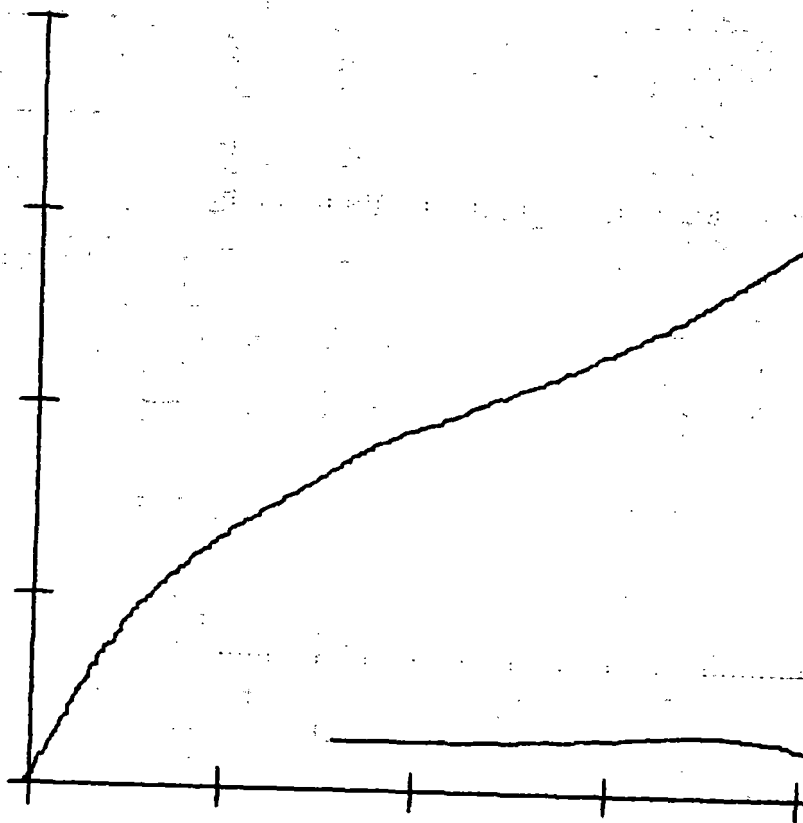
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

@ .5MSEC.

4.49 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 21 T.T. # 332B

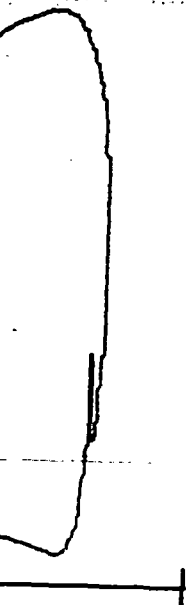
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

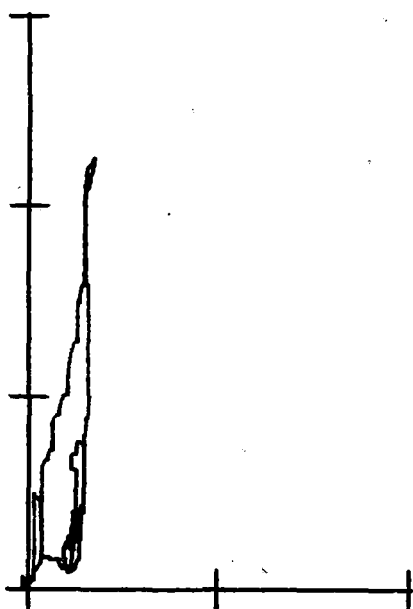
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 30 HZ
@ .5msec.

4.50 MPH





OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 1 T.T. # 3320

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

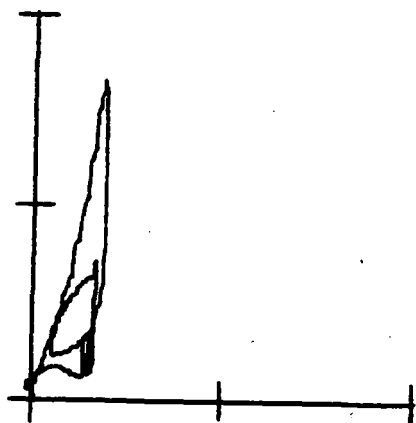
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

1.26 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 2 T.T. # 3320

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

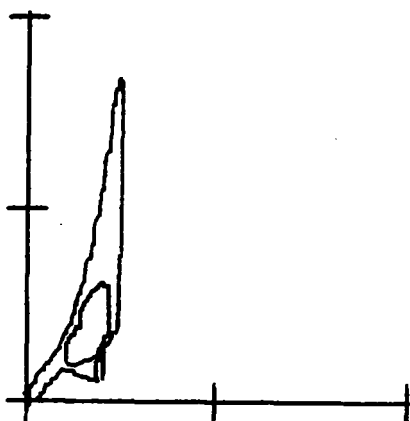
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
OUT-OFF FREQUENCY 10 HZ

1.16 MPH

@2MSEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 3 T.T. # 332C

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

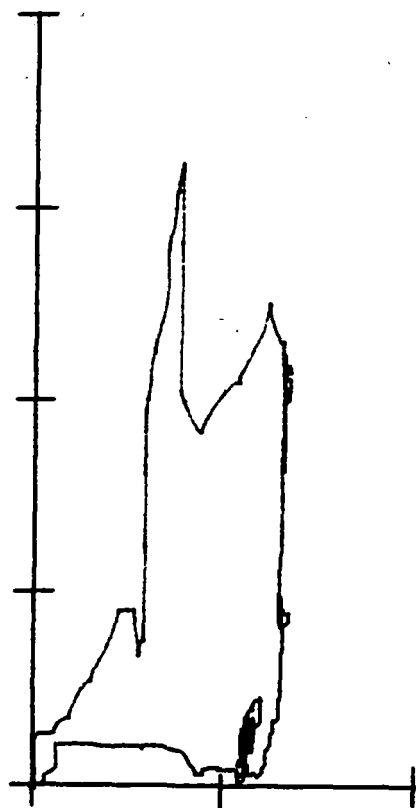
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 2 MSEC

1.20 MPH



OPERATOR KAJ DATE 10-16-78

RD # G11 RUN 4 T.T. # 3320

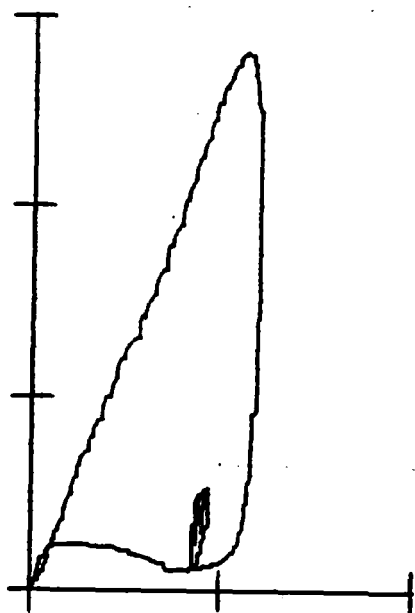
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

SHARP
FILTER TYPE CUT-OFF FREQUENCY 100 HZ
@ 2MSEC

2.01 MPH



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 5 T.T. # 3320

BUFFER UNIT
TITLE FORCE VS. TRAVEL S.C.

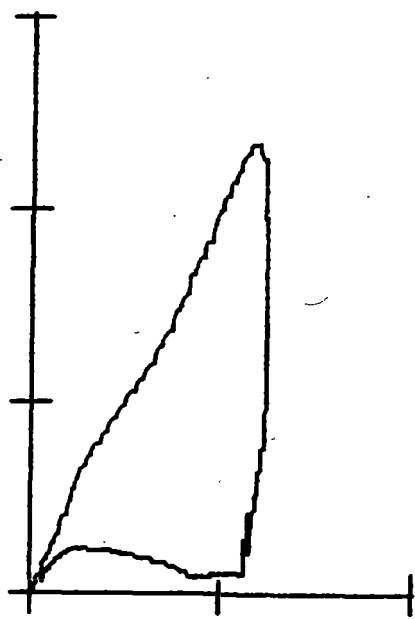
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 10 HZ

2.06 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-16-78

RD # 611 RUN 6 T.T.# 3320

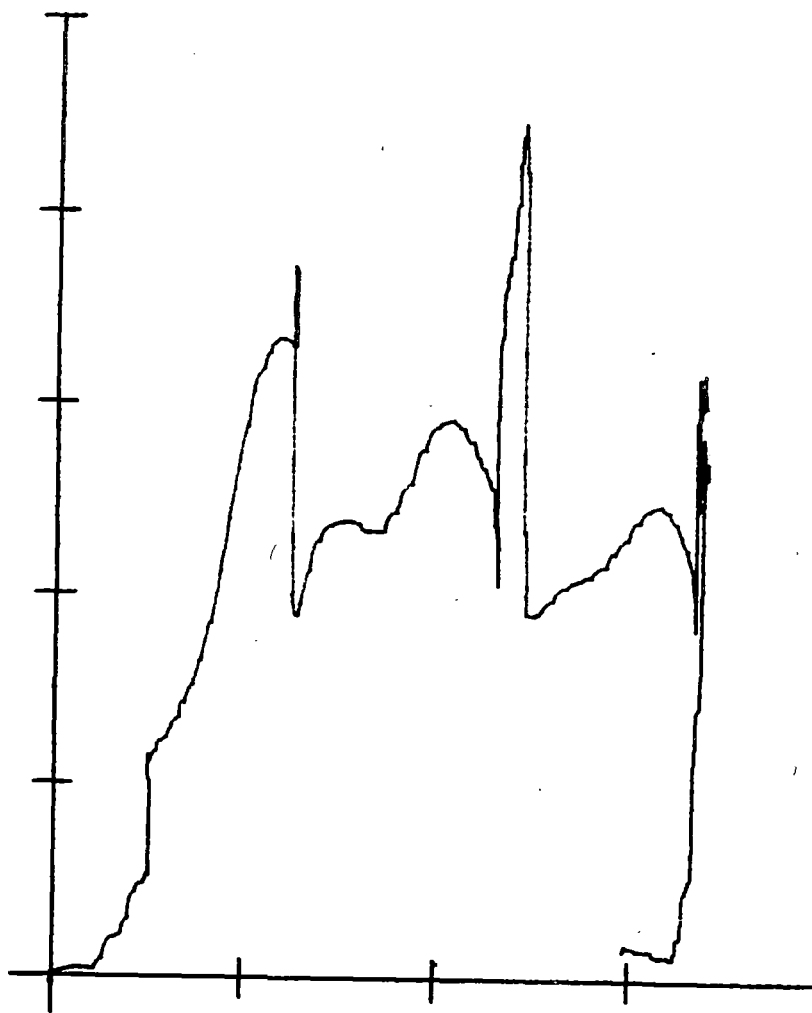
TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2 MSEC.

2.06 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 7 T.T. # 332C

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

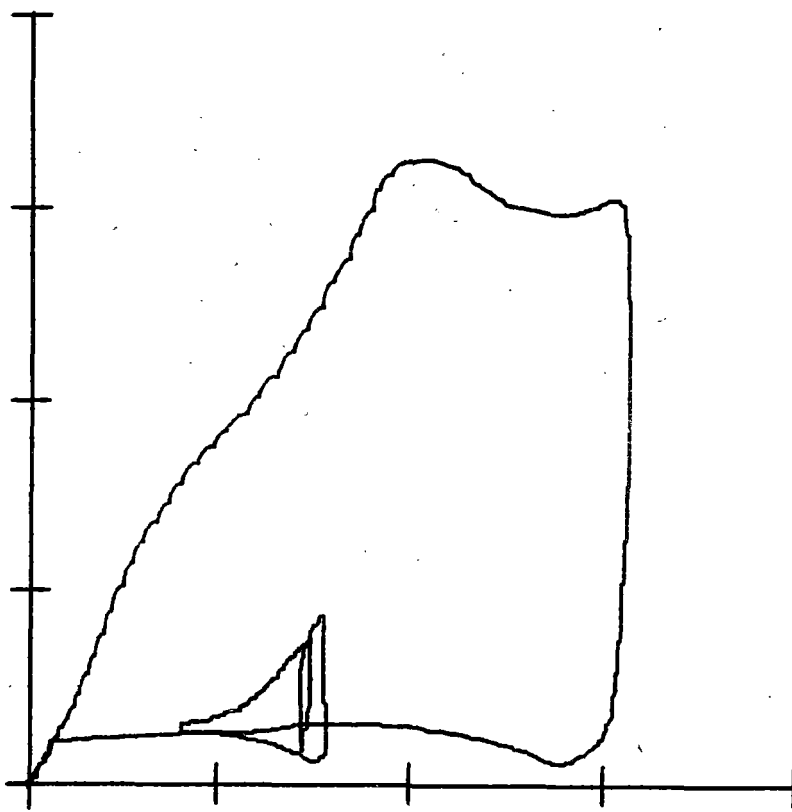
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

2.94 MPH

@.5 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 8 T.T. # 332C

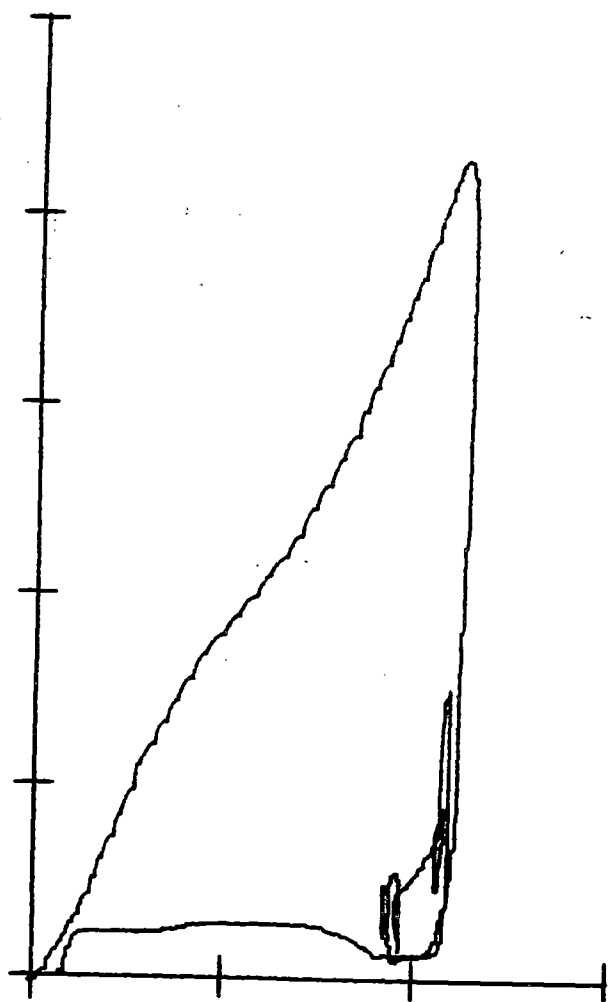
TITLE BUFFER UNIT
FORCEVS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ
@ 2 msec.

2.89 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 9 T.T. # 332C

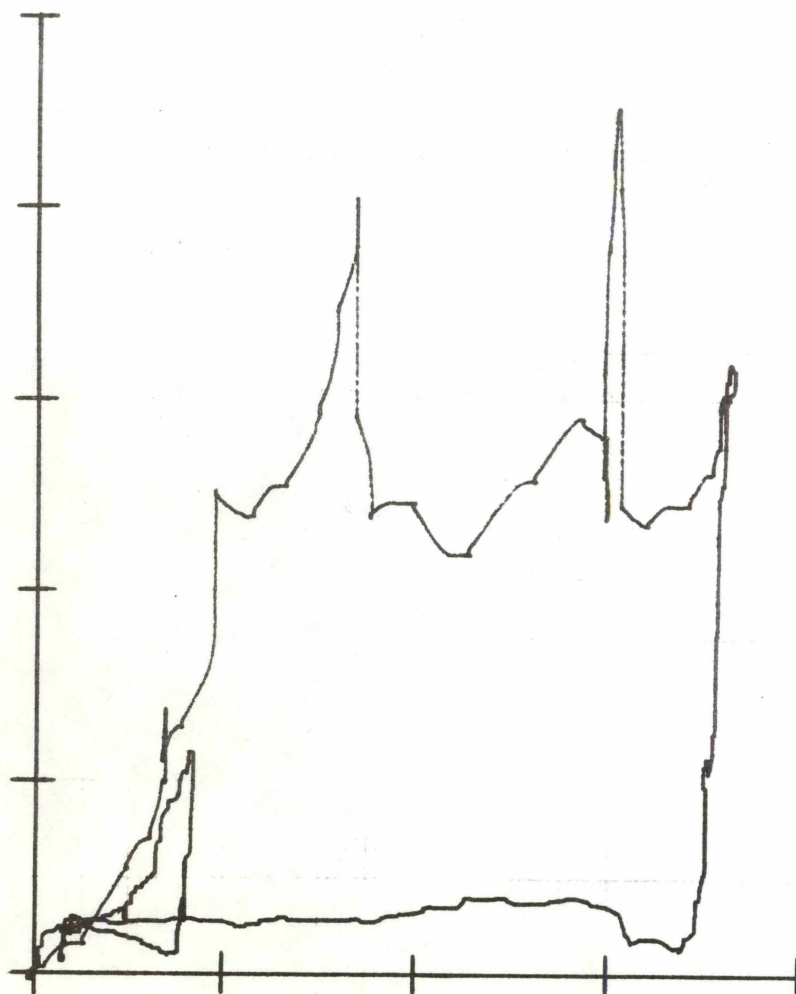
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2MSEC.

2.90 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 10 T.T.# 332C

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

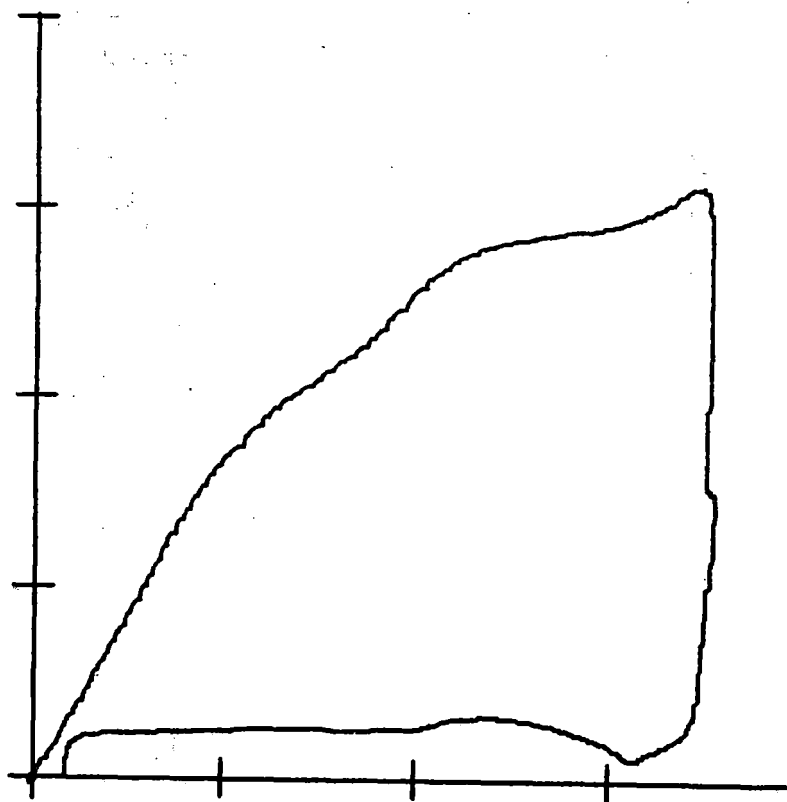
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2 MSEC.

3.39 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 11 T.T. # 3320

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

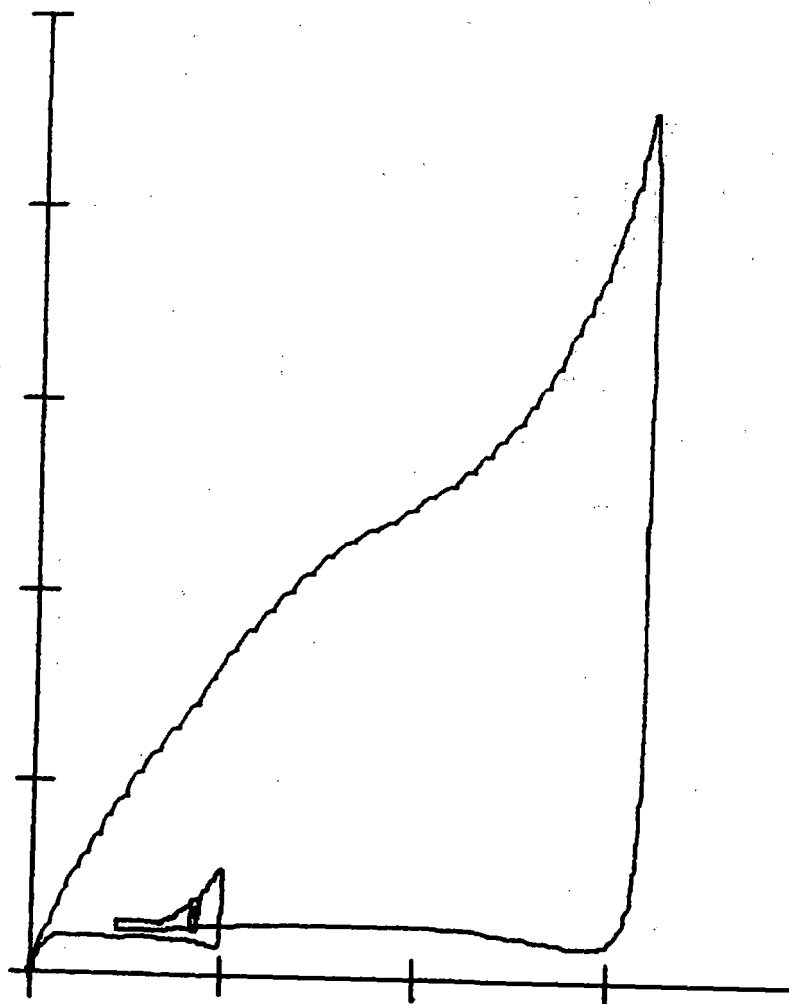
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.39 MPH

© 1 MSEC



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 12 T.T. # 332C

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

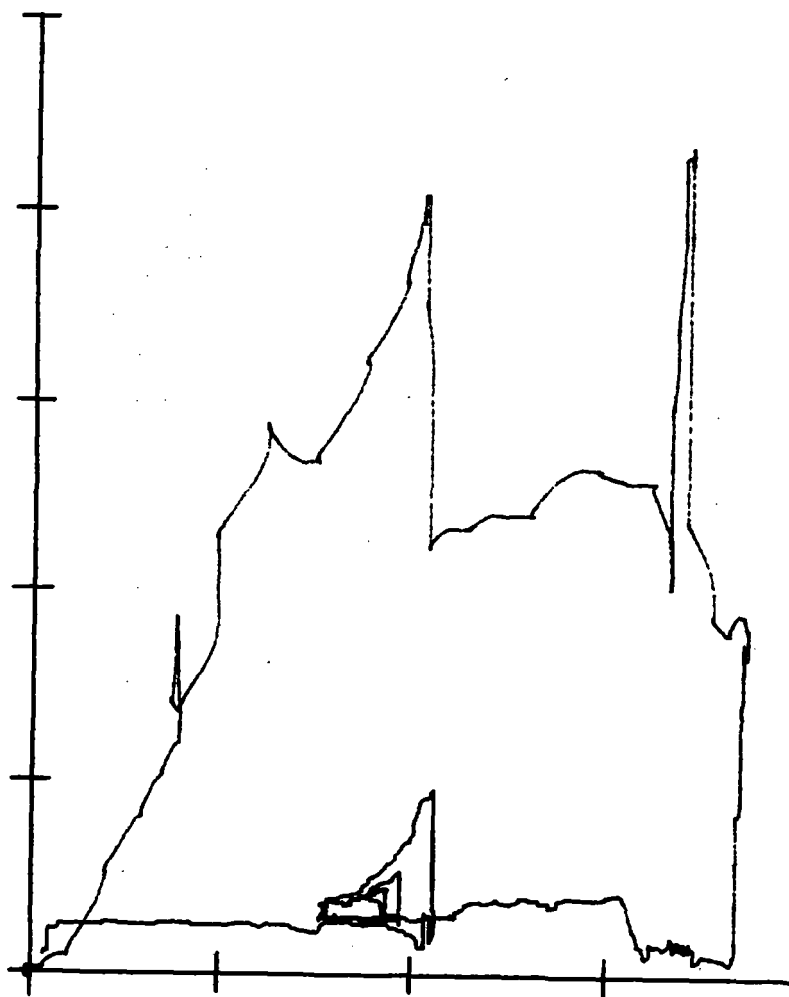
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.48 MPH

© 2MSEC.



OPERATOR KAJ DATE 10-27-78

RD # 011 RUN 13 T.T.# 3320

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

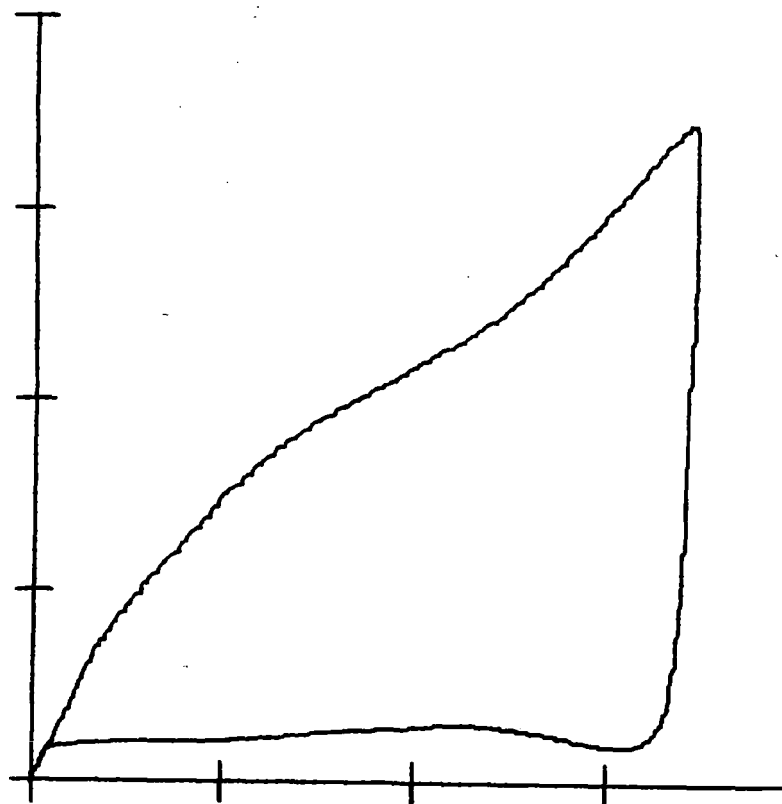
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

3.83 MPH

@2MSEC.



OPERATOR KAJ DATE 10-17-79

RD # 611 RUN 14 T.T. # 332C

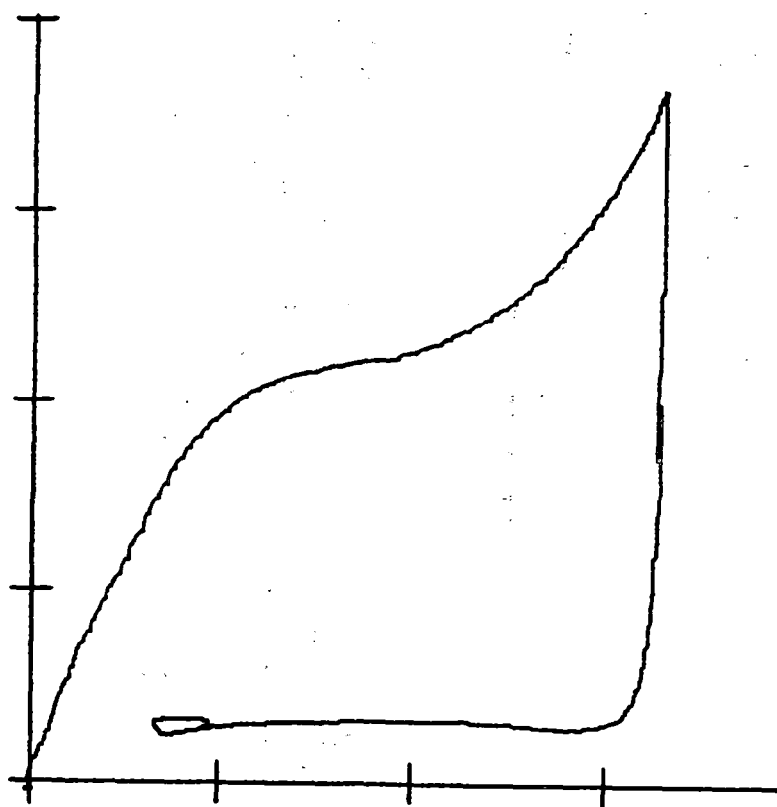
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 1 MSEC.

3.87 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 15 T.T. # 3320

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

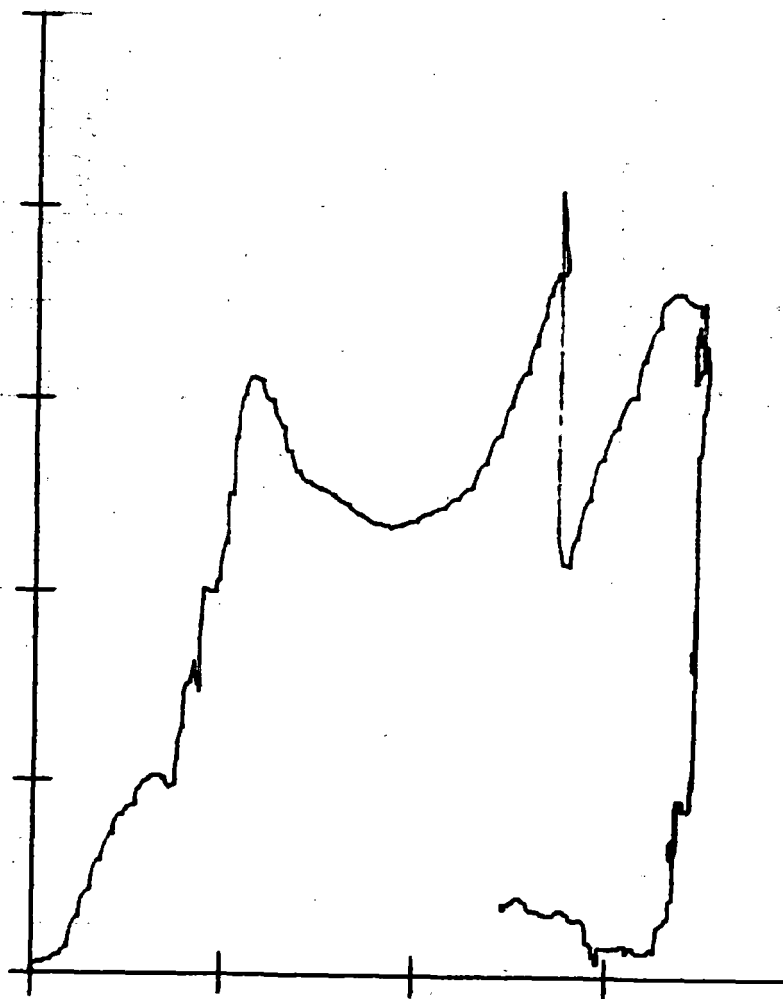
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 1 MSEC

3.89 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 17 T.T. # 3320

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

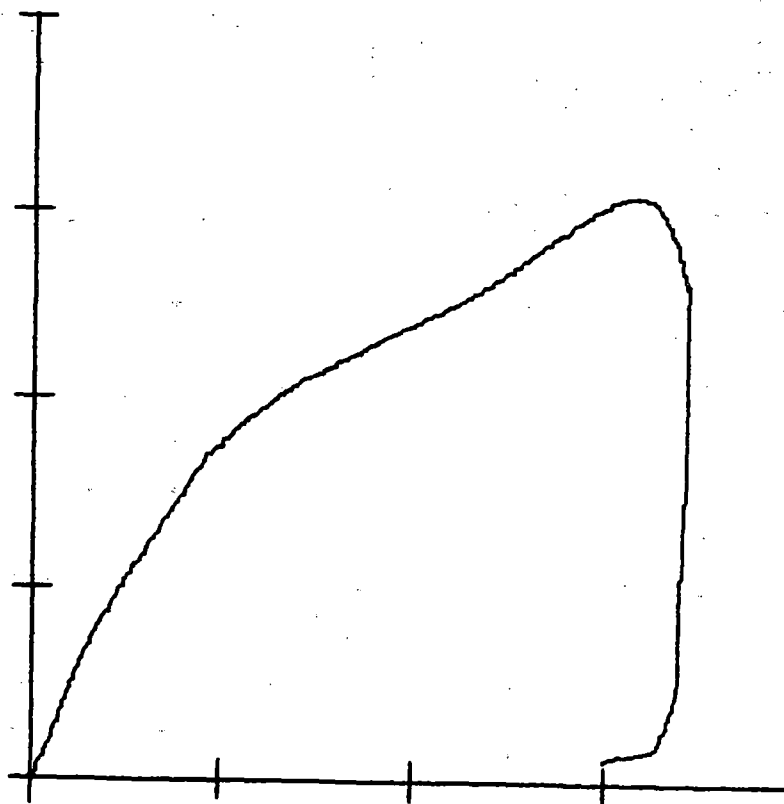
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

4.22 MPH

@ .5 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 18 T.T. # 3320

TITLE BUFFER UNT
FORCE VS TRAVEL SC.

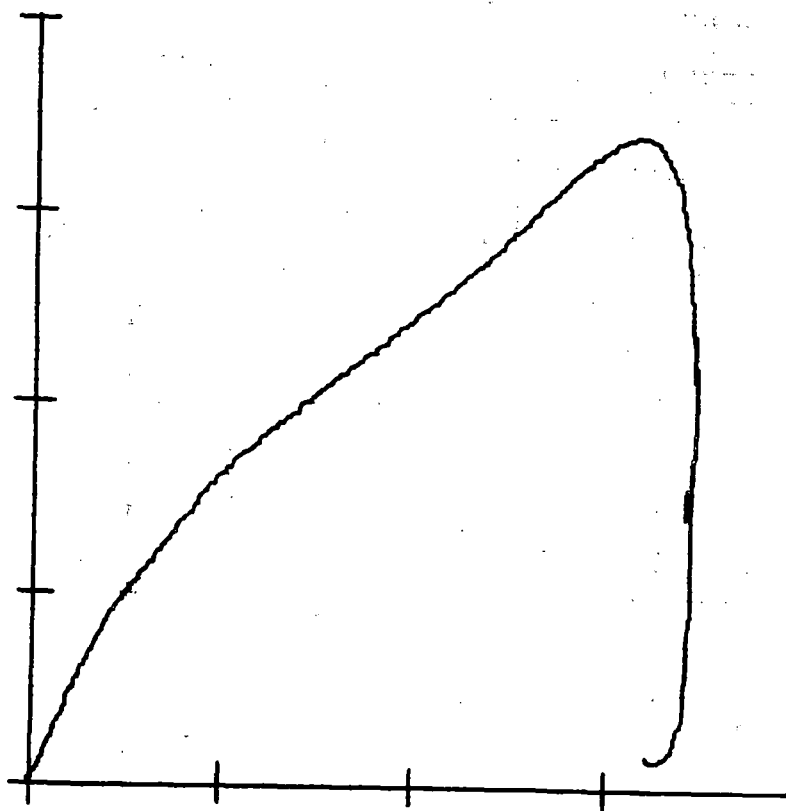
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

0.5 MSEC.

4.26 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 19 T.T.# 332C

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

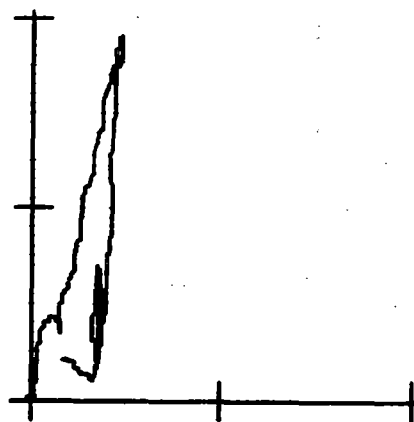
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

4.25 MPH

@ .5MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 1 T.T. # 332 D

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

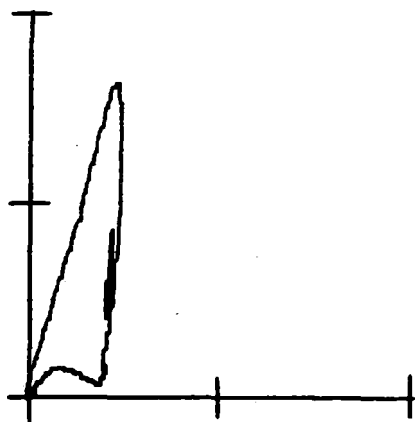
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100HZ

1.09 MPH

@.5MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 2 T.T. # 332D

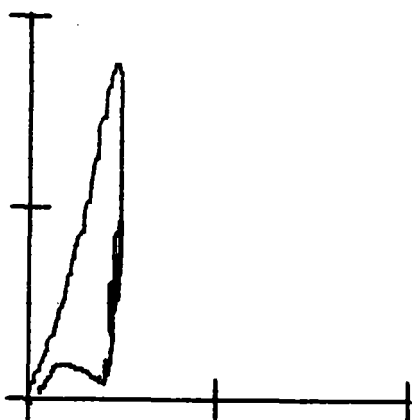
TITLE BUFFER UNIT
FORCE VS. TRAVEL SR.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ.
@ 2 MSEC.

1.12 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 3 T.T.# 332 D

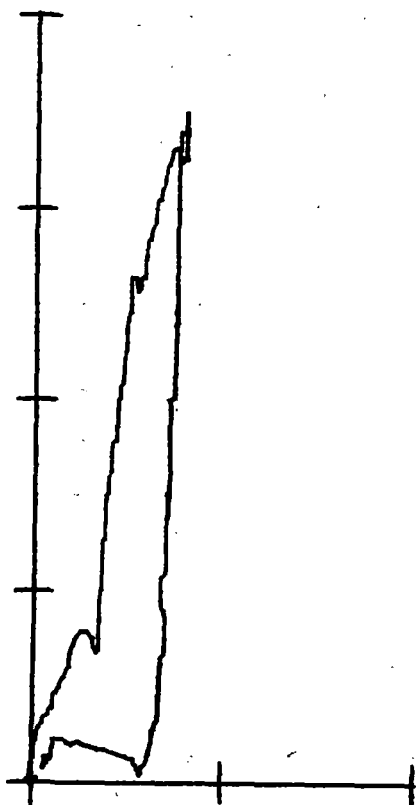
TITLE BUFFER UNIT
FORCE VS TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.20 MPH @ 2msec.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 4 T.T. # 3320

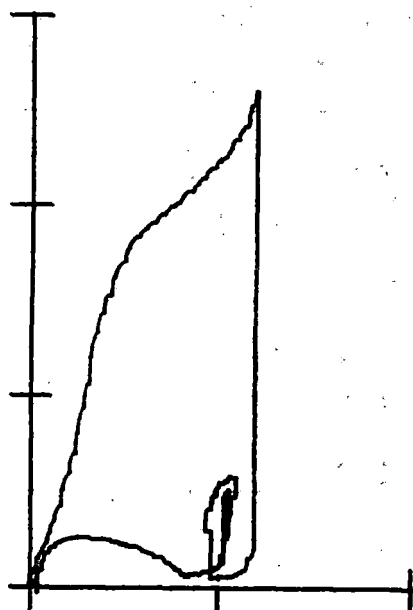
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ .5 MSEC.

2.05 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 5 T.T. # 332A

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

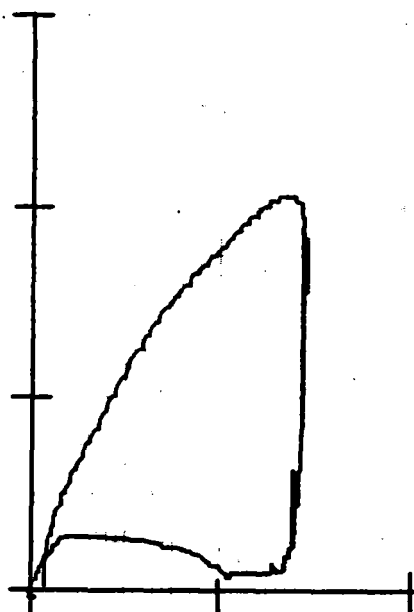
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.09 MPH

Ⓢ 2 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 6 T.T. # 3320

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

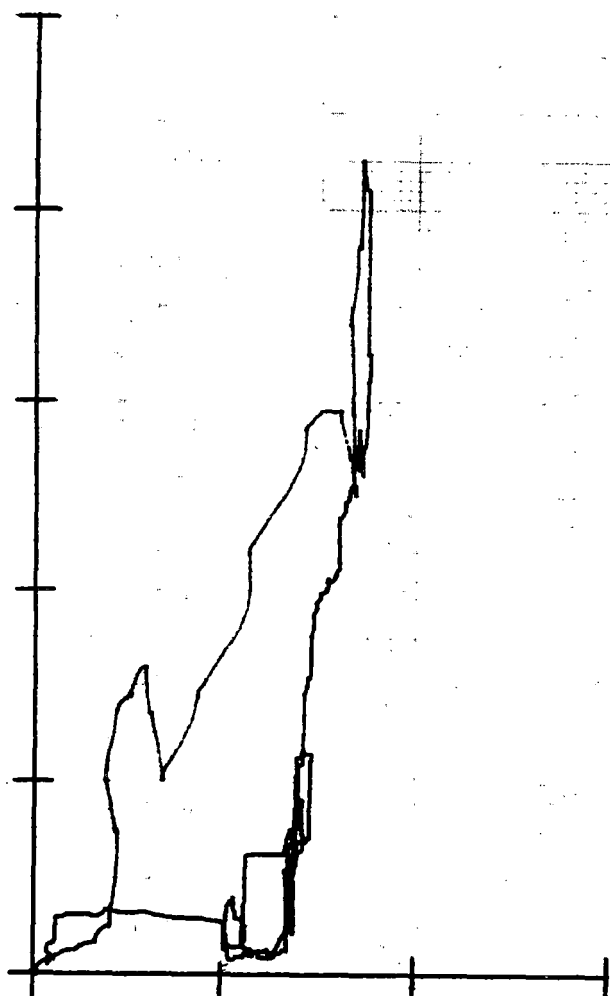
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.09 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 7 T.T. # 3320

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

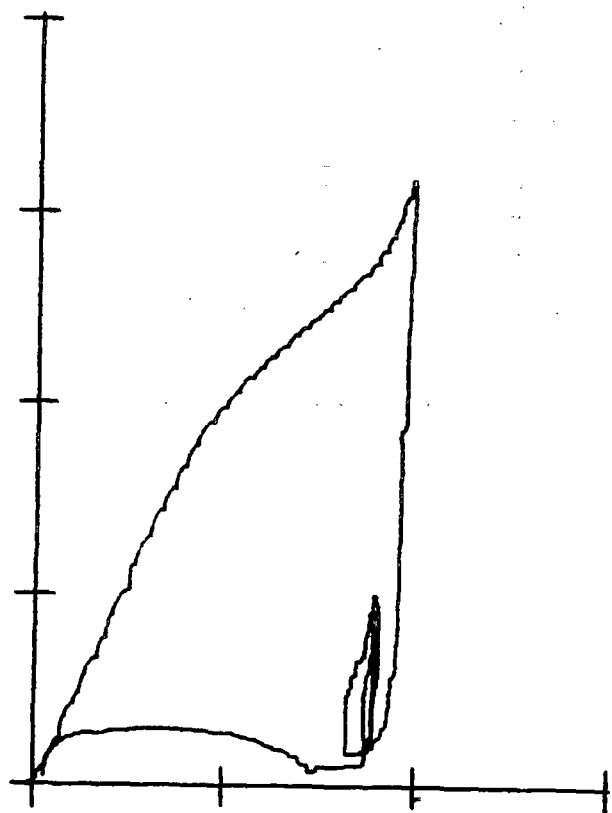
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2 mSEC.

2.94 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 8 T.T. # 332 D

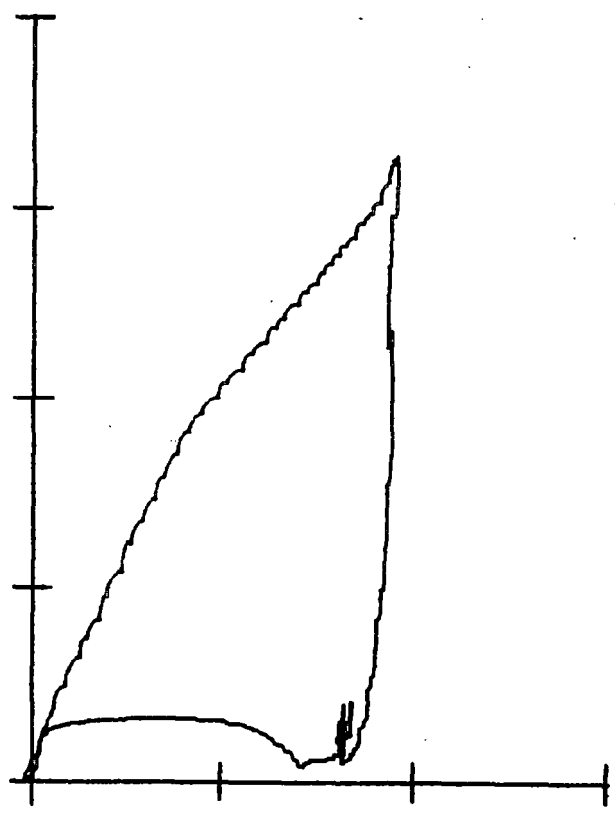
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ 2 MSEC.

2.92 MPH



OPERATOR RAJ DATE 10-17-78

RD # 611 RUN 9 T.T.# 332 D

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

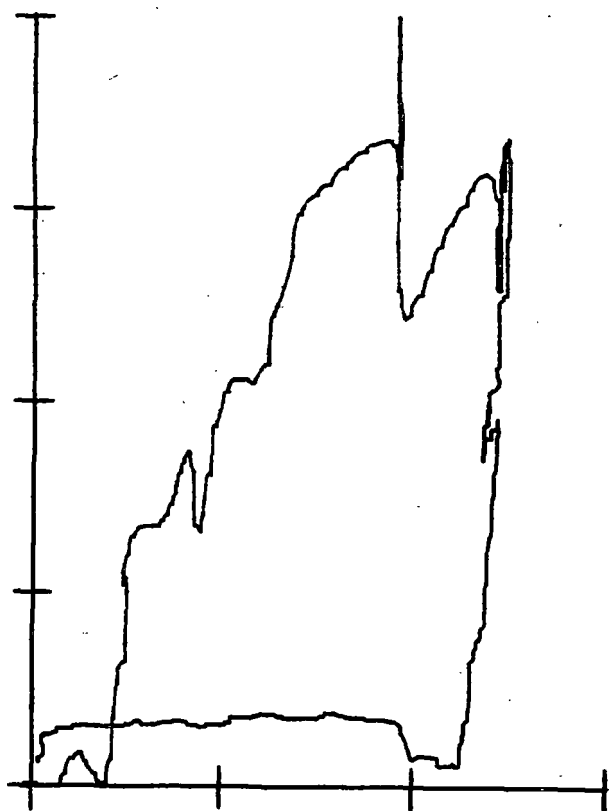
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ 2 MSEC.

2.86 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 10 T.T. # 332D

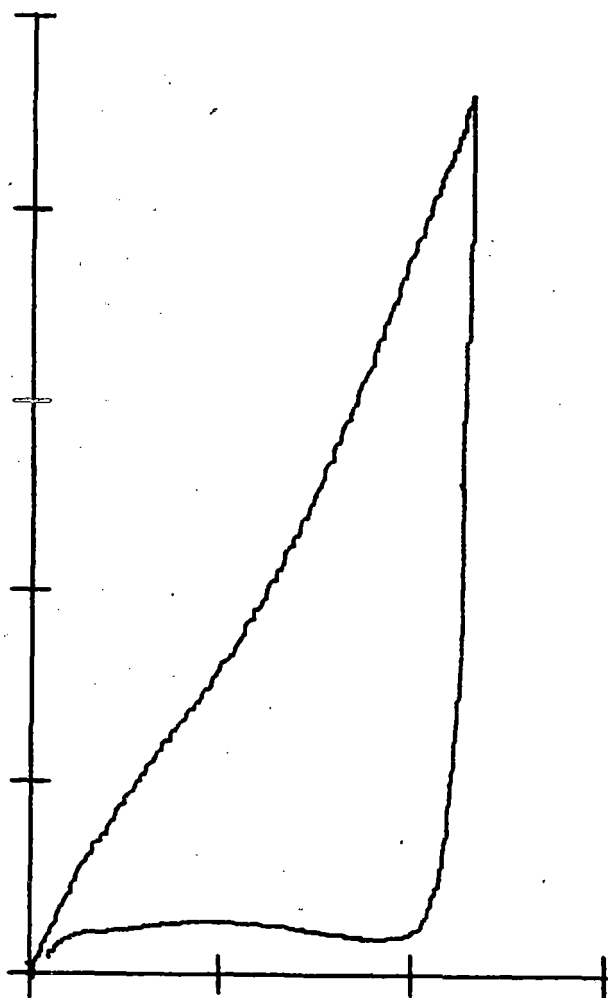
TITLE ^{BUFFER}FORCE VS. ^{UNIT}TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE ^{SHARP}CUT-OFF FREQUENCY 100 HZ
@ .5 msec.

3.39 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 11 T.T. # 332D

TITLE BUFFER UNIT
FORCE vs. TRAVEL S.C

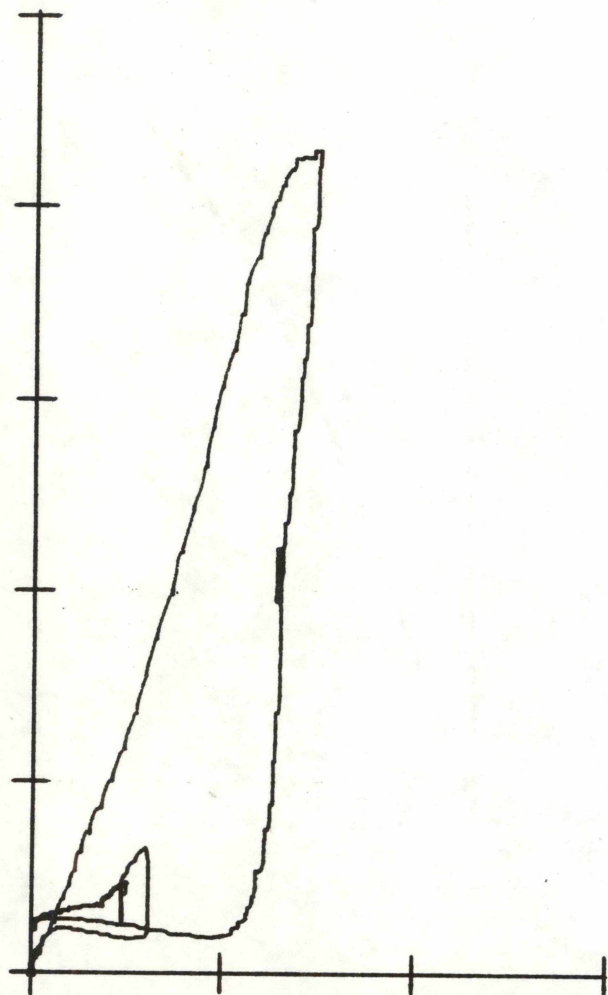
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.34 MPH

@.5MSEC.



OPERATOR KAJ DATE 10-17-98

RD # 611 RUN 12 T.T.# 332D

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

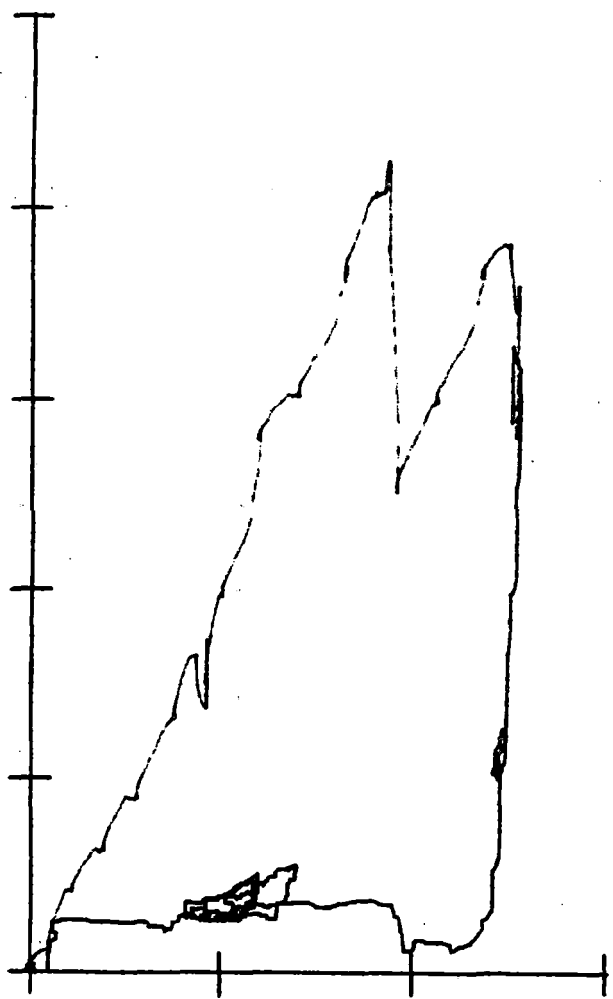
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.37 MPH

@2MSEC



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 13 T.T. # 332D

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

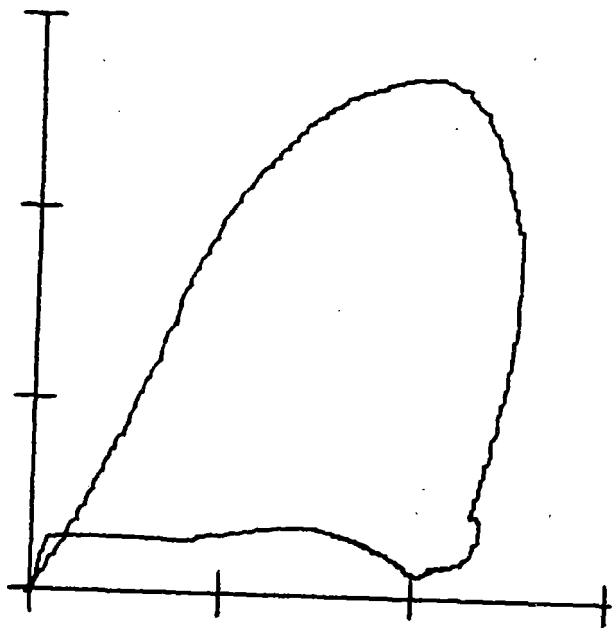
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

@ 2 MSEC.

3.90 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 14 T.T.# 3320

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

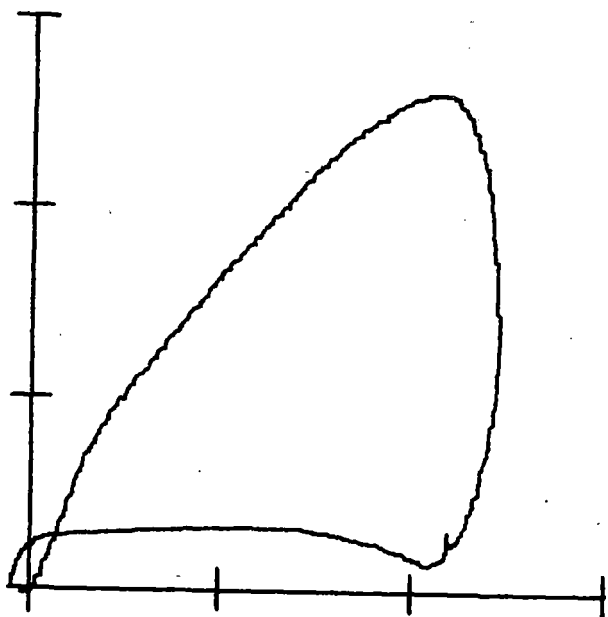
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.89 MPH

@ 1 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 15 T.T. # 332D

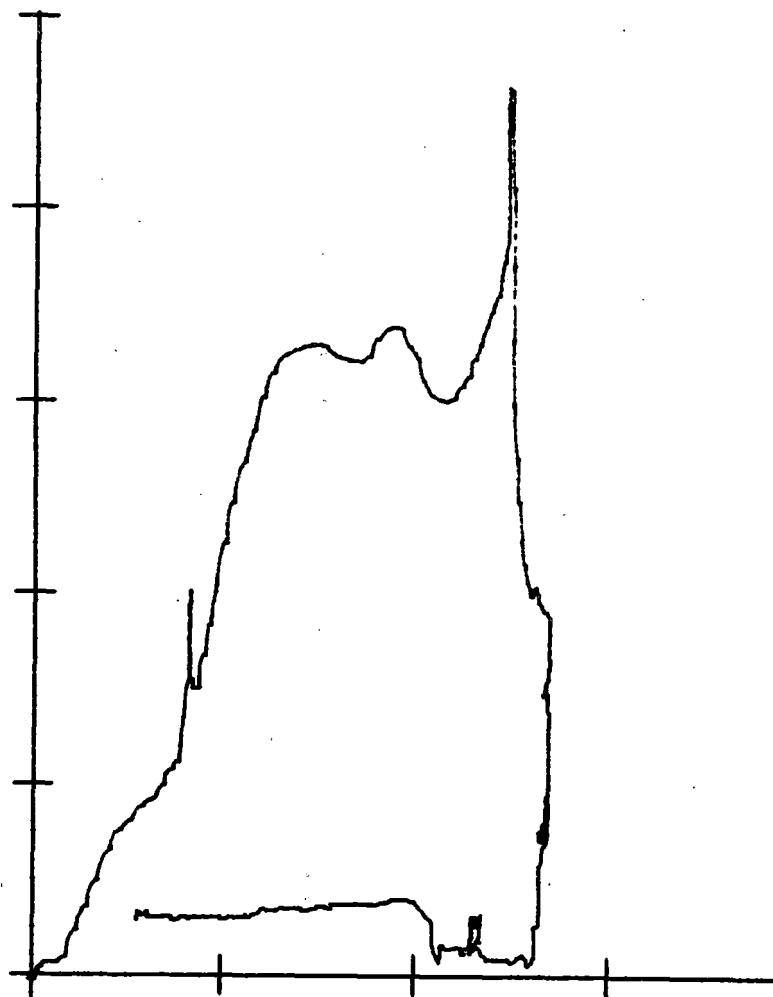
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

3.87 MPH @.5 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 16 T.T. # 332D

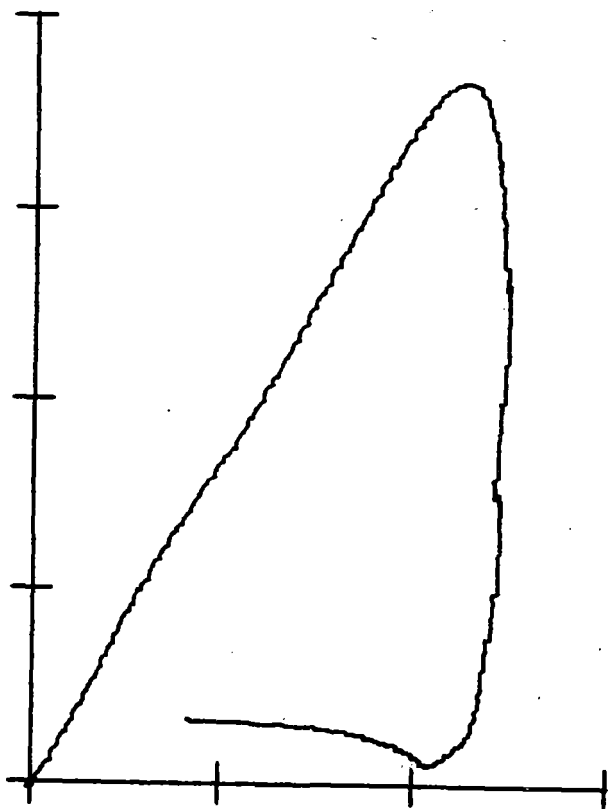
TITLE BUFFER UNIT. VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@ .5 MSEC.

4.27 MPH



OPERATOR KAI DATE 10-17-78

RD # 611 RUN 17 T.T. # 332D

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

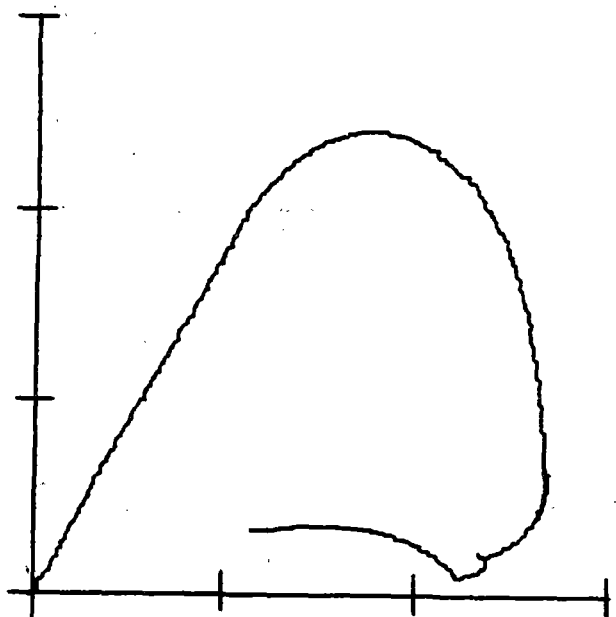
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

@ .5MSEC.

4.21 MPH

400



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 18 T.T. # 332D

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

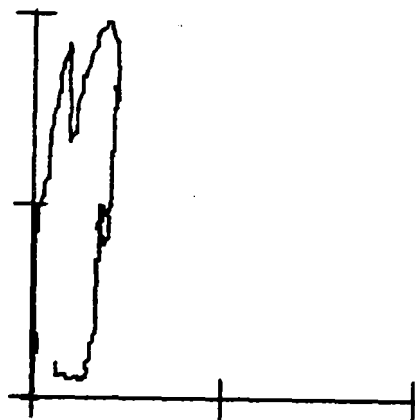
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 KHZ

@ .5MSEC.

4.28 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 1 T.T. # 332E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

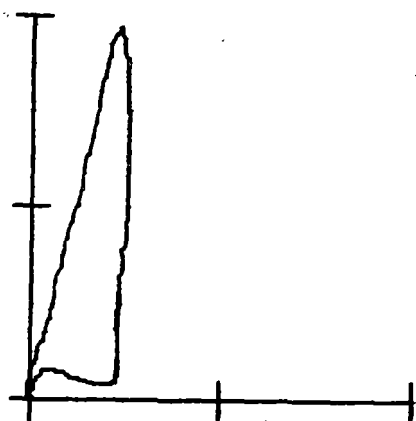
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

1.21 MPH

@ .5MSEC.



OPERATOR KAJ DATE 10-17-78

RD # G11 RUN 2 T.T. # 332E

TITLE BUFFER UNIT
FORCE vs. TRAVEL S.C.

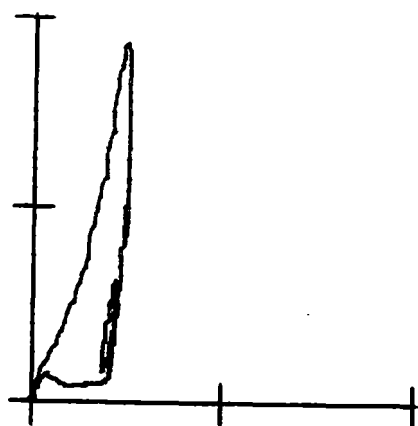
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.30 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 3 T.T.# 332E

TITLE BUFFER UNIT
FORCE vs. TRAVEL S.C.

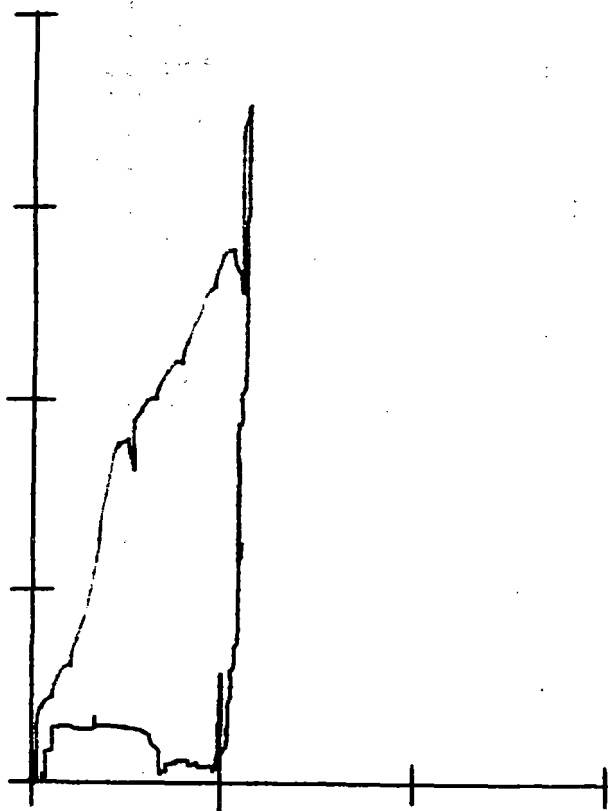
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

1.26 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 4 TT # 332E

TITLE BUFFER VS. UNIT
FORCE TRAVEL S.C.

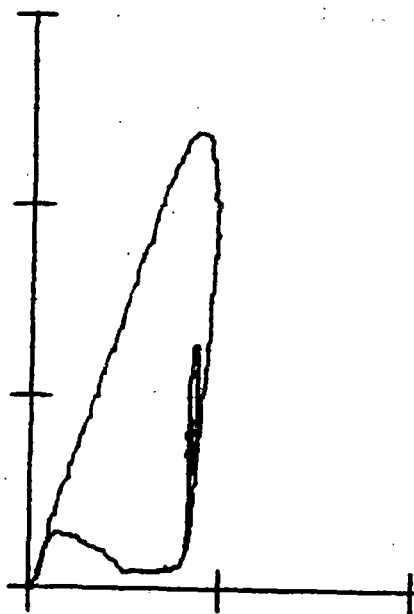
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ

2.14 MPH

@ 2 MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 5 T.T. # 332E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

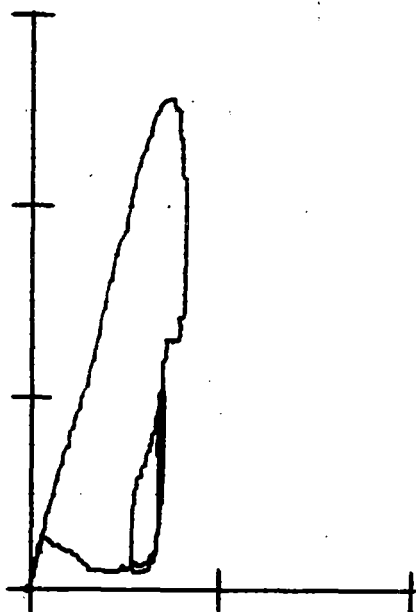
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.07 MPH

@ 2 MSEC.



OPERATOR KAL DATE 10-17-78

RD # 611 RUN 6 T.T.* 332E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.E.

X-AXIS 1/2 INCH PER MAJOR DIV.

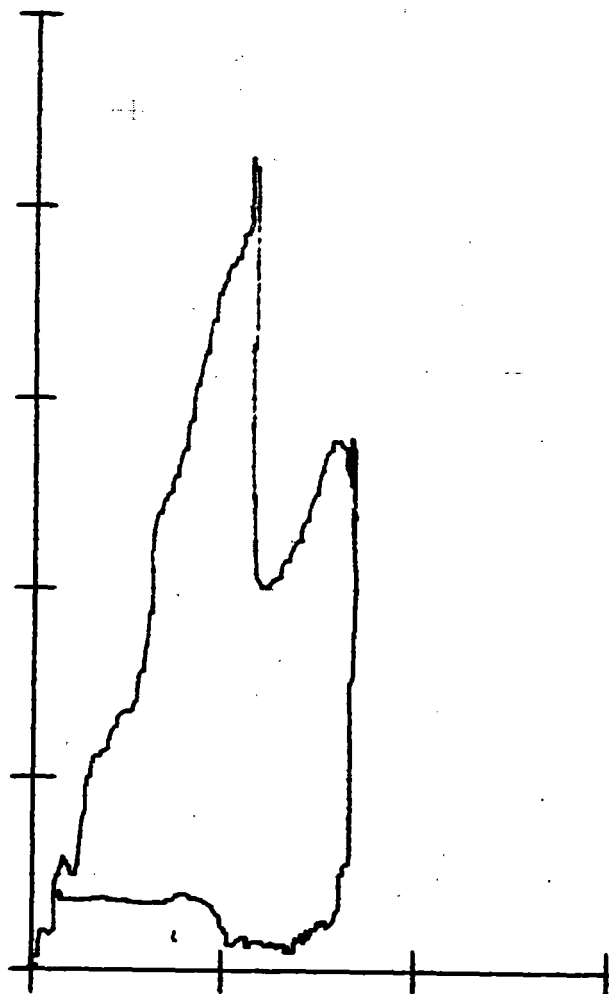
Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ

2.07 MPH

@ 2MSEC.

407



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 7 T.T. # 332E

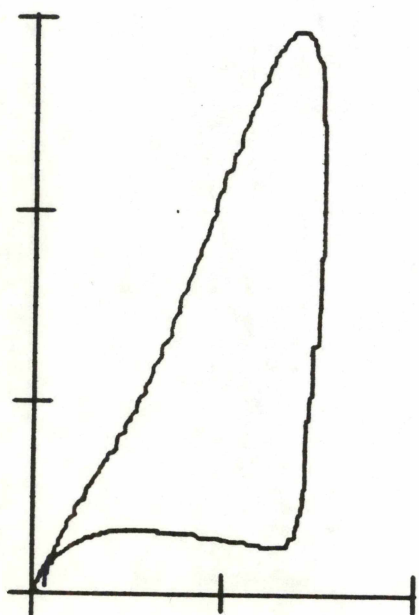
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 100 HZ
@.5 MSEC.

2.94 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 8 T.T. # 332E

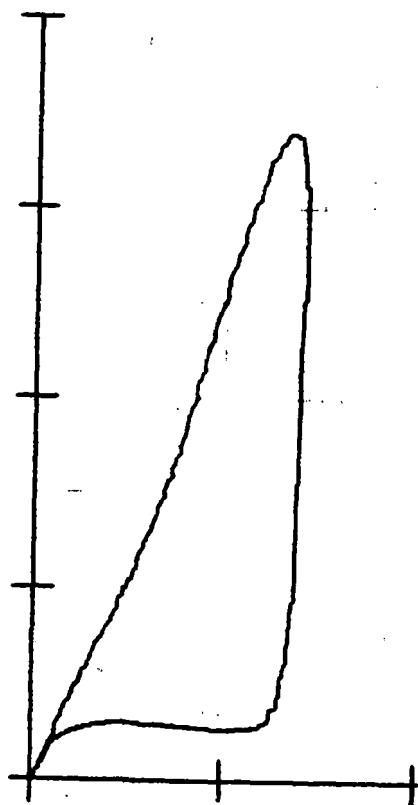
TITLE BUFFER UNIT
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
⑥ .5 MSEC.

3.01 MPH



OPERATOR KAJ DATE 10-17-78

RD # 611 RUN 9 T.T.# 332E

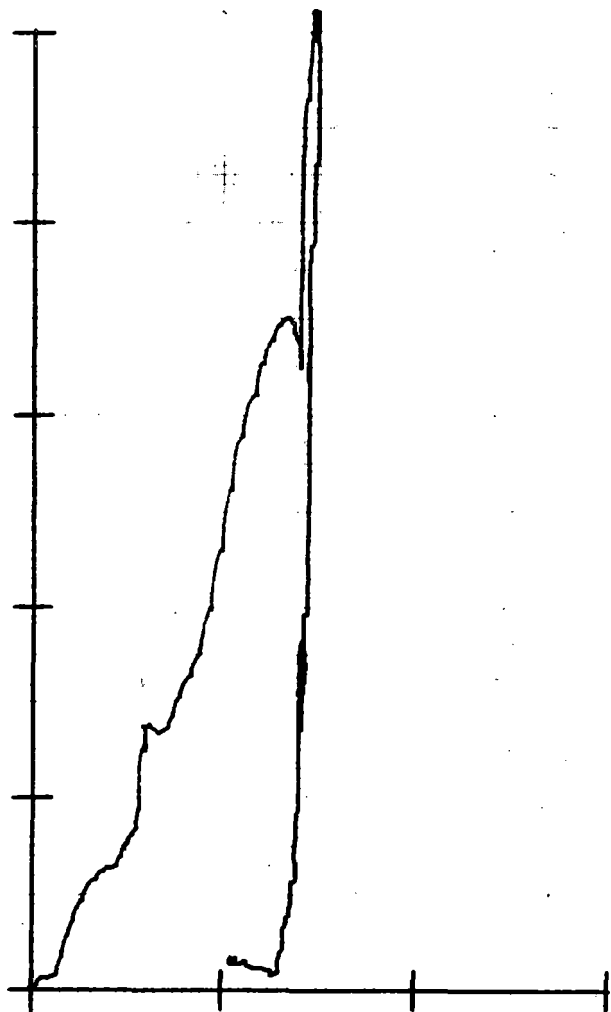
TITLE BUFFER UNIT.
FORCE VS. TRAVEL S.C.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 10 HZ
@ .5 MSEC.

2.98 MPH



OPERATOR RAJ DATE 10-17-78

RD # 611 RUN 10 T.T. # 332E

TITLE SUPFER UNIT
FORCE VS. TRAVEL S.C.

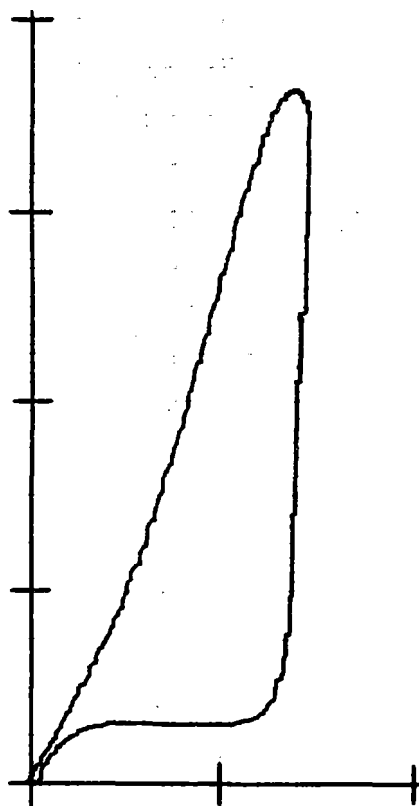
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-off FREQUENCY 100 HZ

3.32 MPH

@.5MSEC.



OPERATOR KAI DATE 10-17-78

RD # 611 RUN 11 T.T. # 332F

TITLE FORCE vs. TRAVEL S.C.

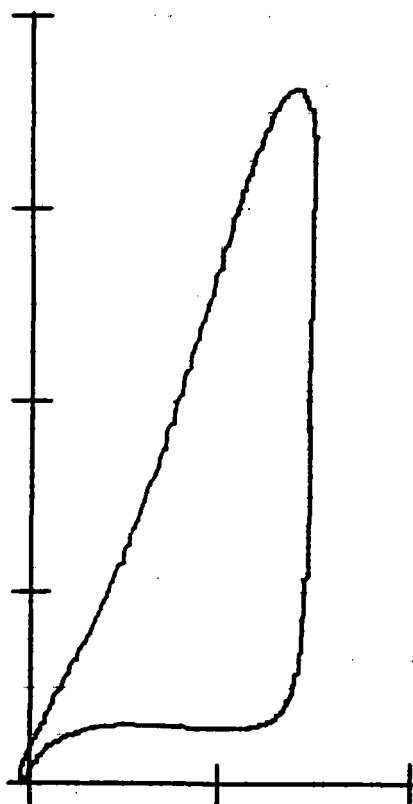
X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP CUT-OFF FREQUENCY 10 HZ

3.47 MPH

@ .5MSEC.



OPERATOR KAJ DATE 10-17-78

RD # 011 RUN 12 T.T. # 332E

TITLE BUFFER UNIT
FORCE VS. TRAVEL S.P.

X-AXIS 1/2 INCH PER MAJOR DIV.

Y-AXIS 100,000 POUNDS PER MAJOR DIV.

FILTER TYPE SHARP
CUT-OFF FREQUENCY 30 HZ
@ .5 MSEC.

3.42 MPH

Draft Gear/Cushioning Unit Optimization for
Train Action - Volume II (Final Report), 1980
SK Punwani

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