

NATIONAL CENTER FOR EARTHQUAKE  
ENGINEERING RESEARCH

State University of New York at Buffalo



PB94-181757

NCEER-Taisei Corporation Research Program on  
Sliding Seismic Isolation Systems for Bridges:  
Experimental and Analytical Study of Systems  
Consisting of Sliding Bearings, Rubber Restoring  
Force Devices and Fluid Dampers

Volume II

by

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Technical Report NCEER-94-0002

February 4, 1994

This research was conducted at the State University of New York at Buffalo and Taisei Corporation and was partially supported by the National Science Foundation under Grant No. BCS 90-25010 and the New York State Science and Technology Foundation under Grant No. NEC-91029.

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Seismic Isolation Systems for Bridges:**

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Bearings, Rubber Restoring Force Devices and Fluid Dampers**

**Volume II**

by

P. Tsopelas<sup>1</sup>, S. Okamoto<sup>2</sup>, M.C. Constantinou<sup>3</sup>, D. Ozaki<sup>2</sup> and S. Fujii<sup>4</sup>

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NCEER Project Numbers 90-2101 and 91-5411B  
and  
Taisei Corporation Grant 150-6889A

NSF Master Contract Number BCS 90-25010  
and  
NYSSTF Grant Number NEC-91029

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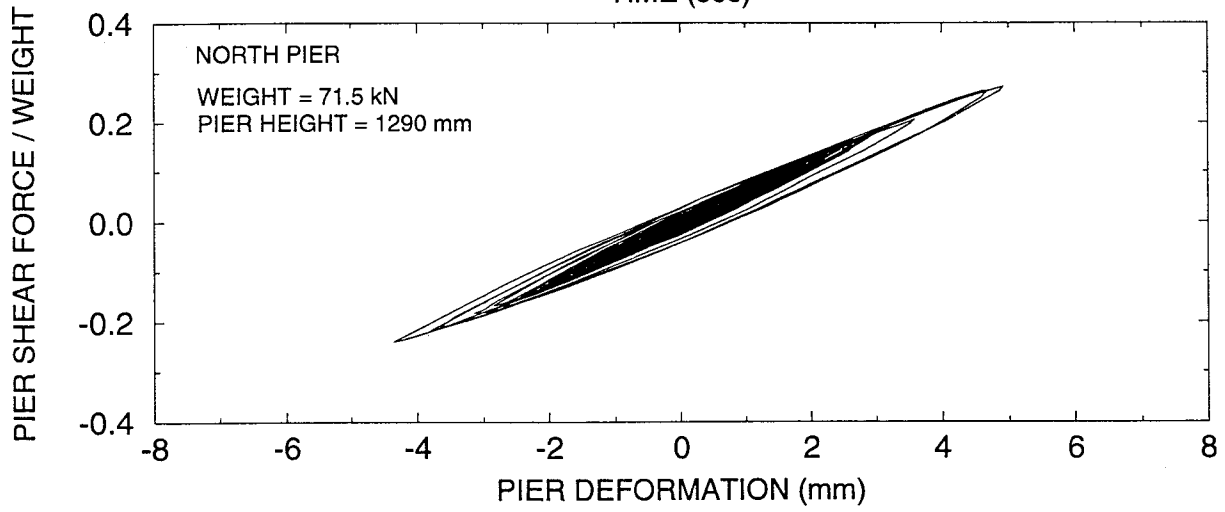
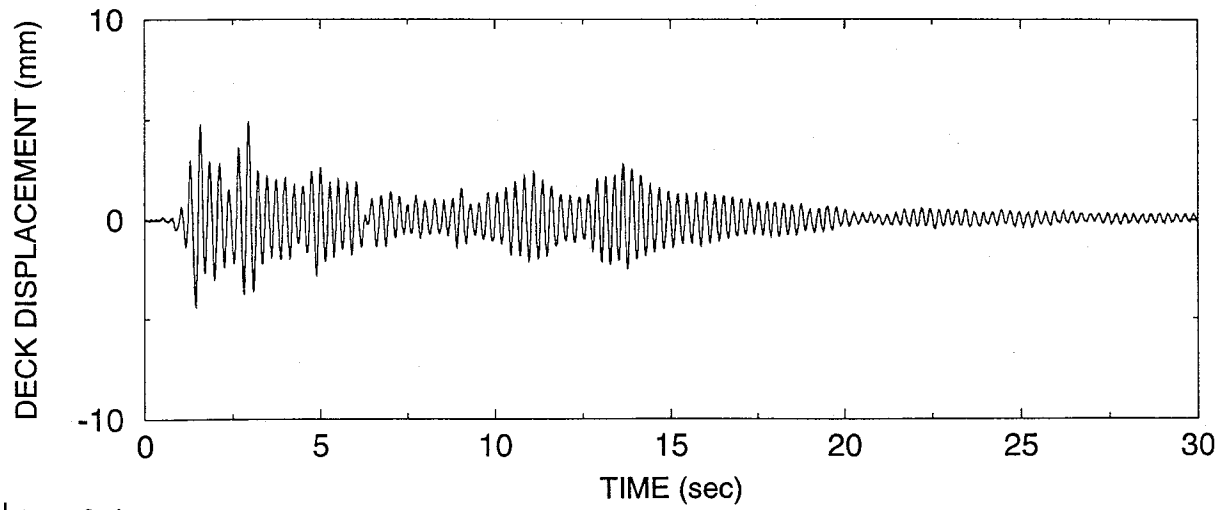


## **APPENDIX A**

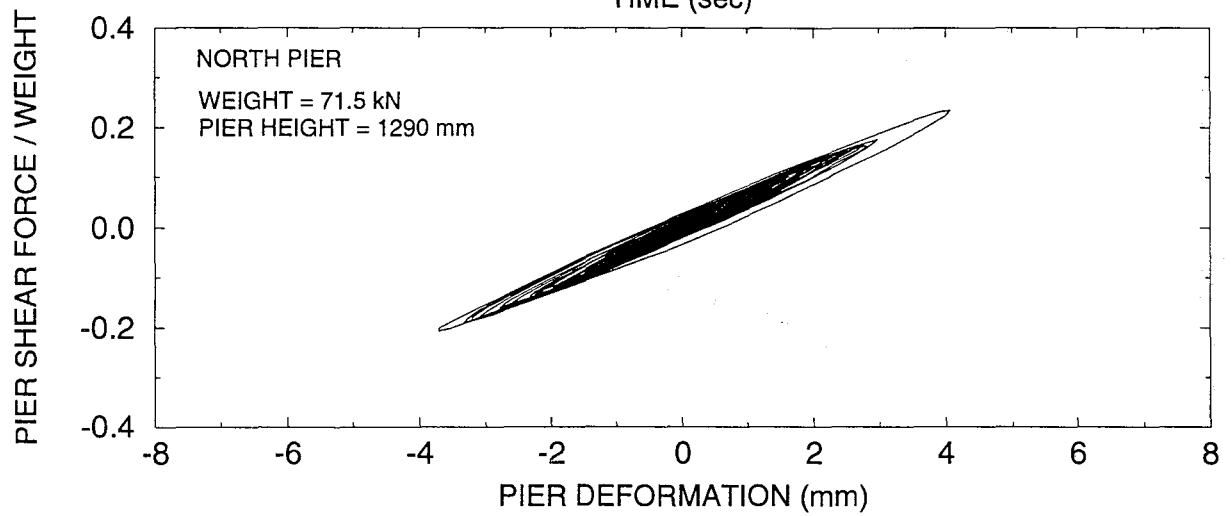
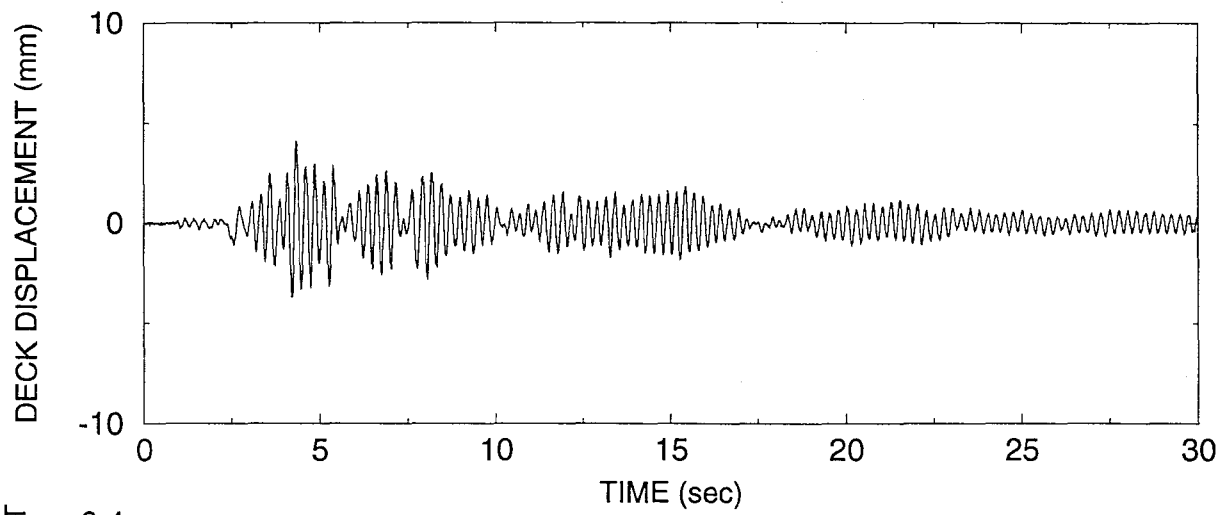
### **EXPERIMENTAL RESULTS**

This Appendix contains experimental results of the tested bridge model in the non-isolated configuration and the isolated configuration with two flexible piers. In the case of the non-isolated bridge, the recorded time history of the deck displacement with respect to the table and the loops of the shear force versus deformation of the north pier are presented. In the case of the isolated bridge, the recorded SW bearing displacement history, the loops of isolation system force versus SW bearing displacement and the loops of shear force versus deformation of the north pier are presented. Furthermore, in the case of isolation systems with different isolation system properties at the two piers, the recorded loops at both piers are presented. Each page of the appendix contains results of one test. The isolation system, test number and excitation are identified at the top of each page.

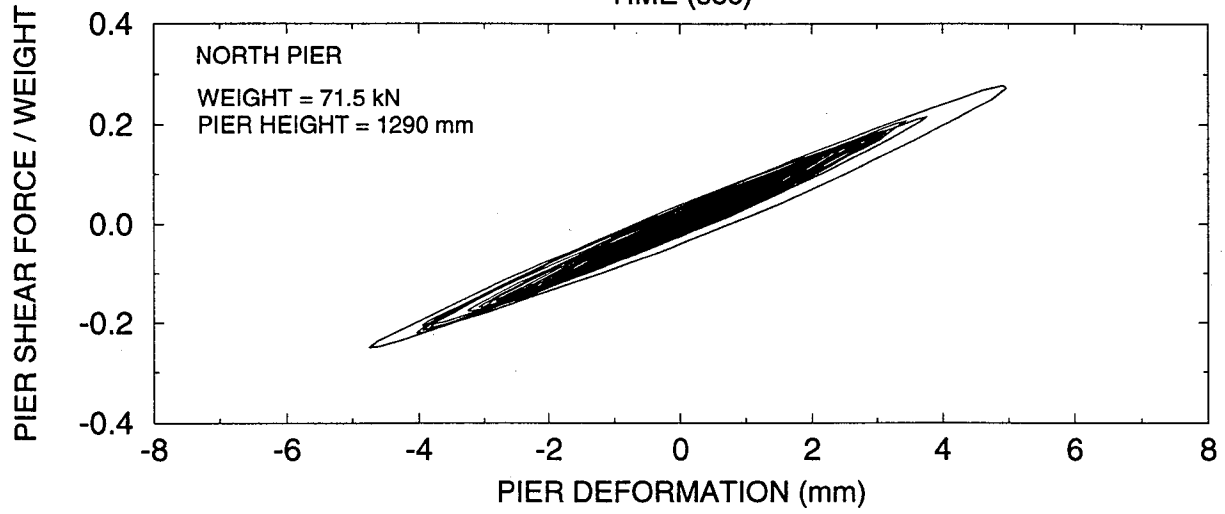
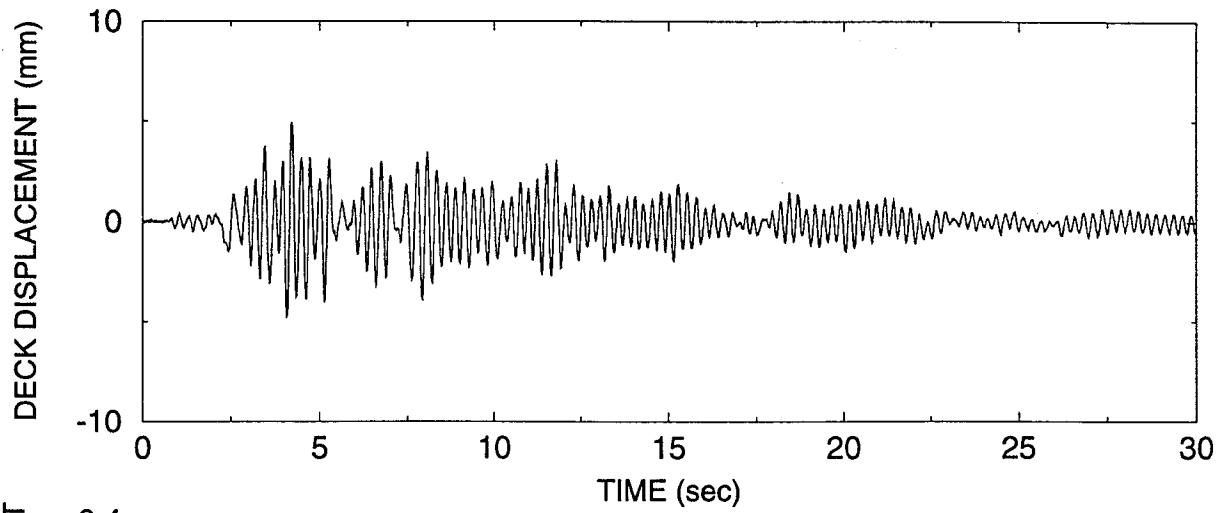
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EL CENTRO S00E 25%



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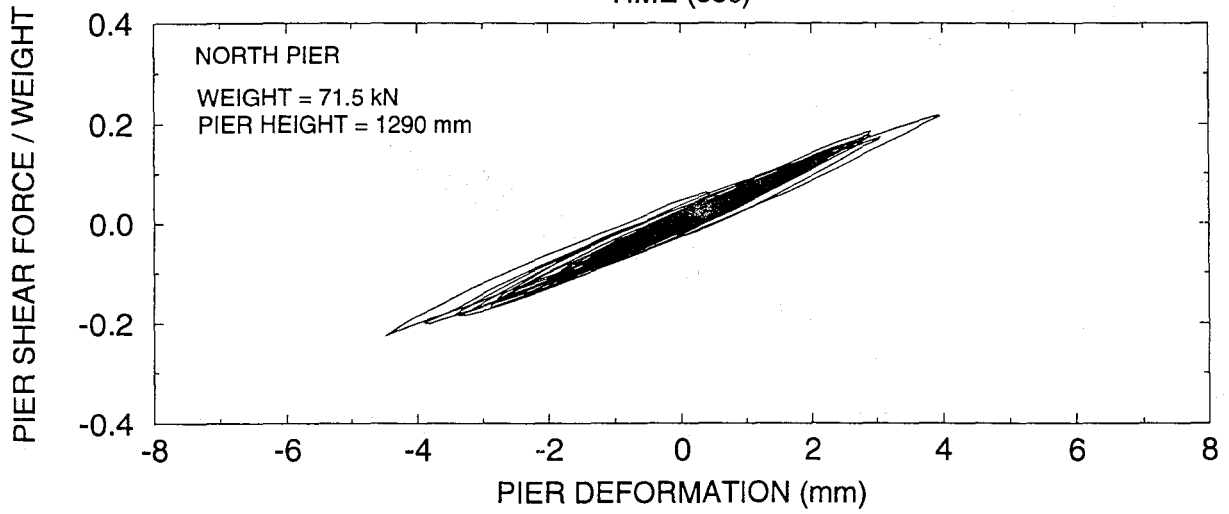
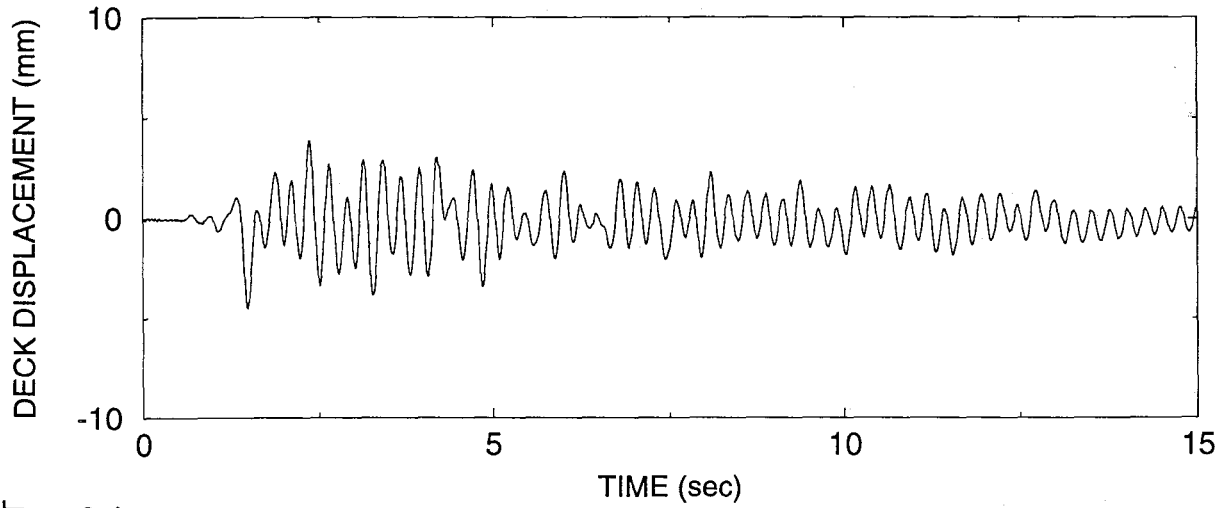


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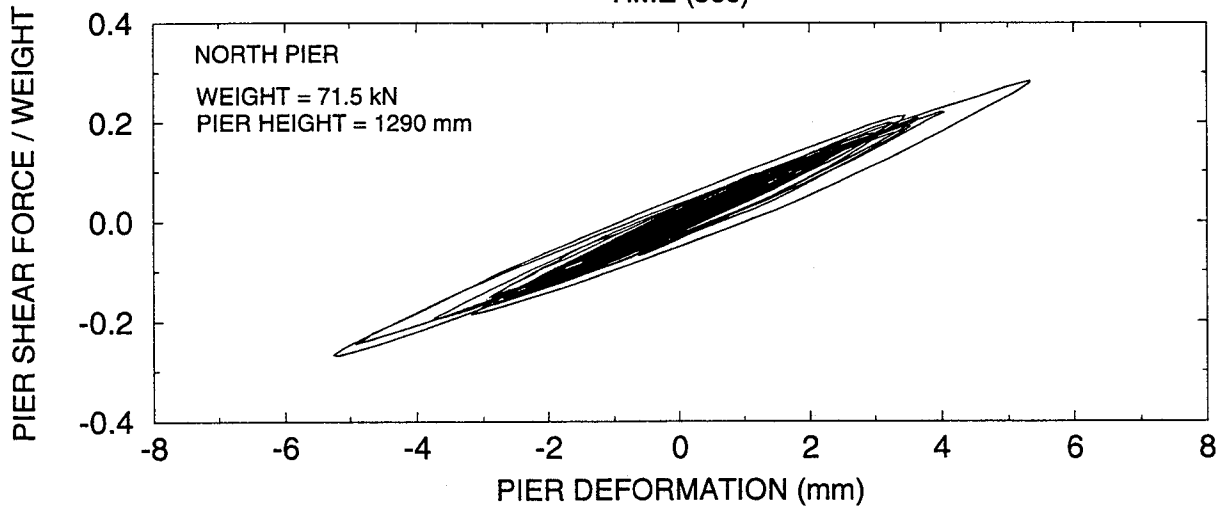
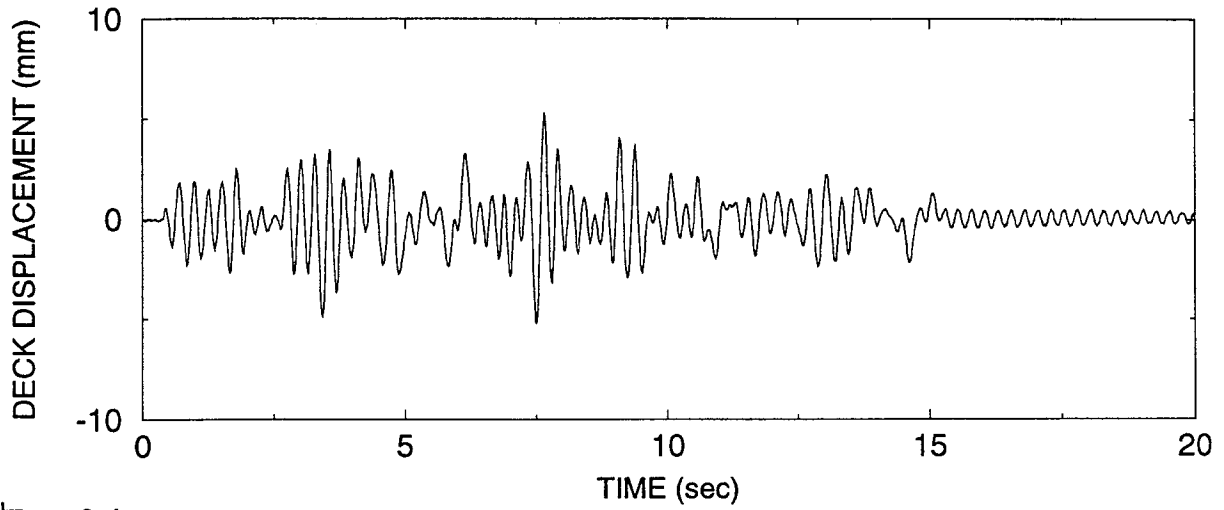




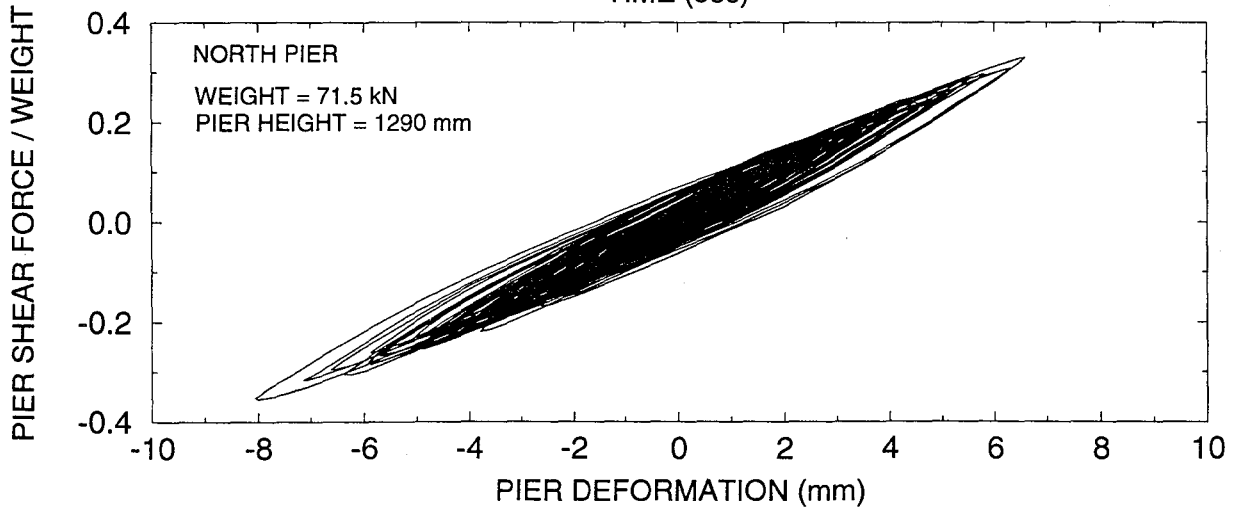
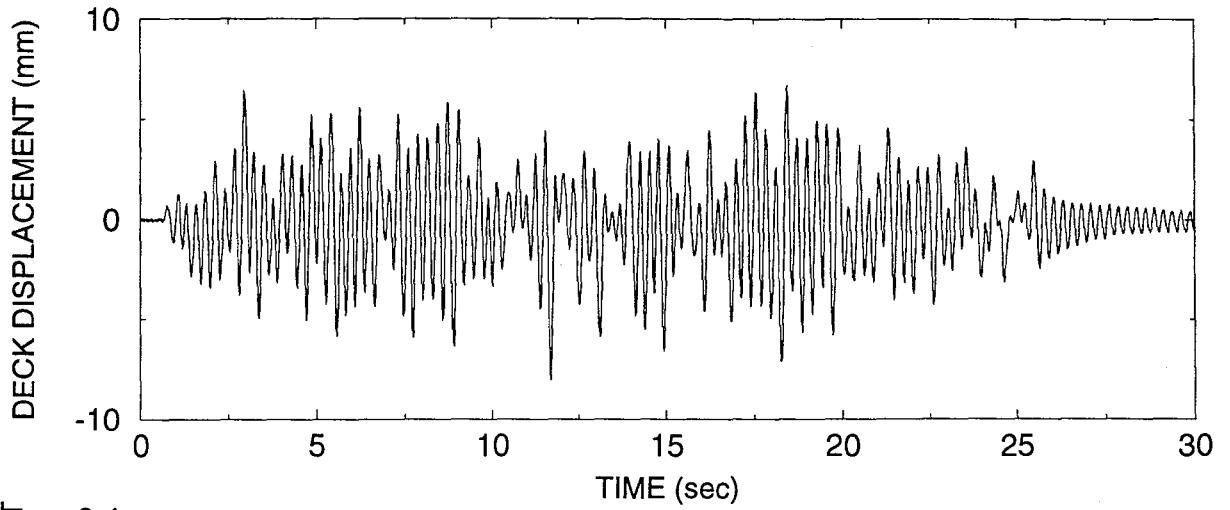
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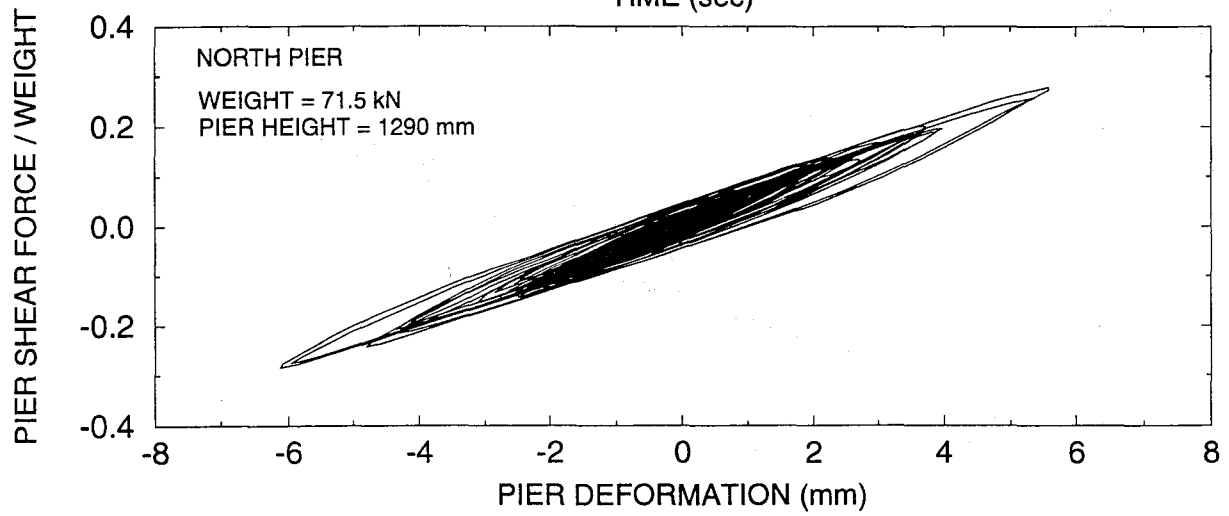
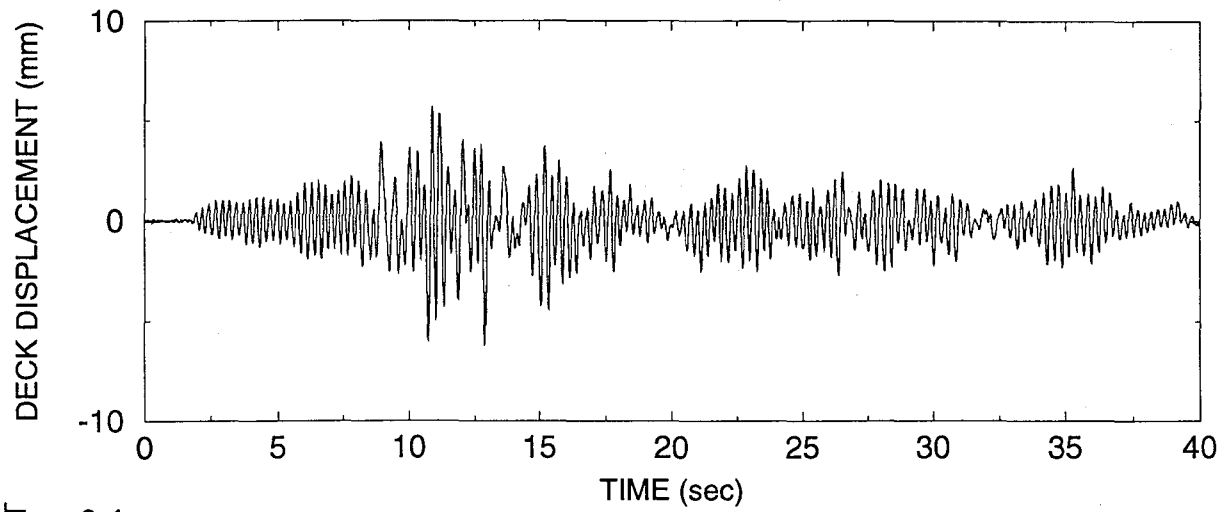
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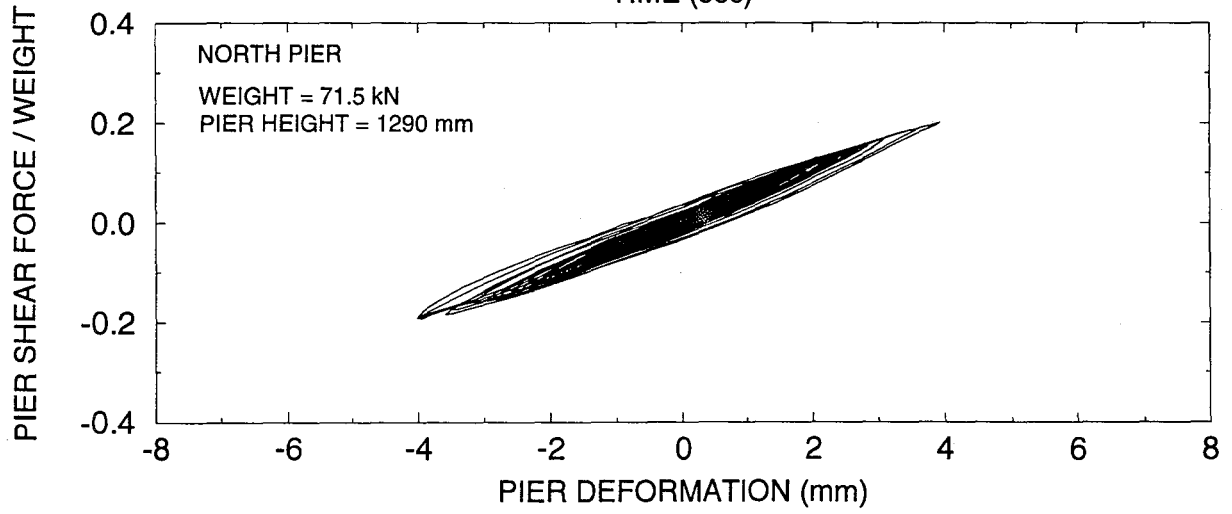
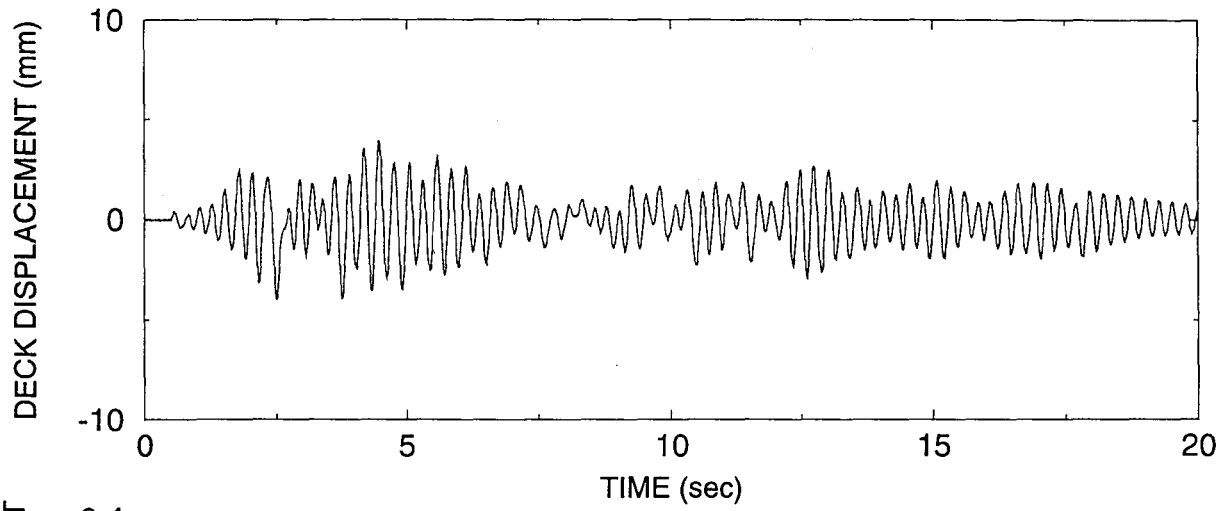
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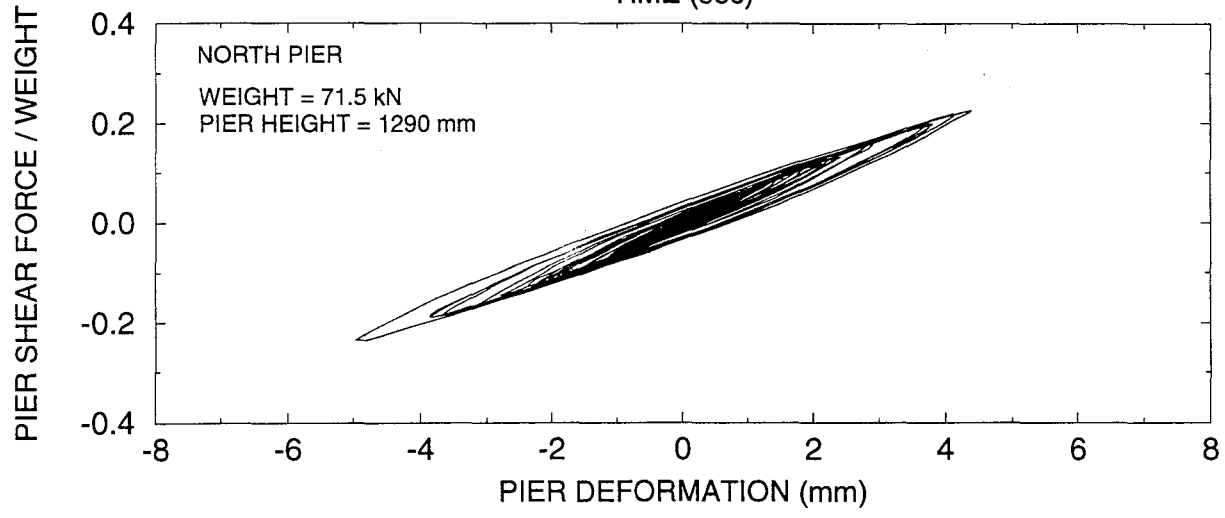
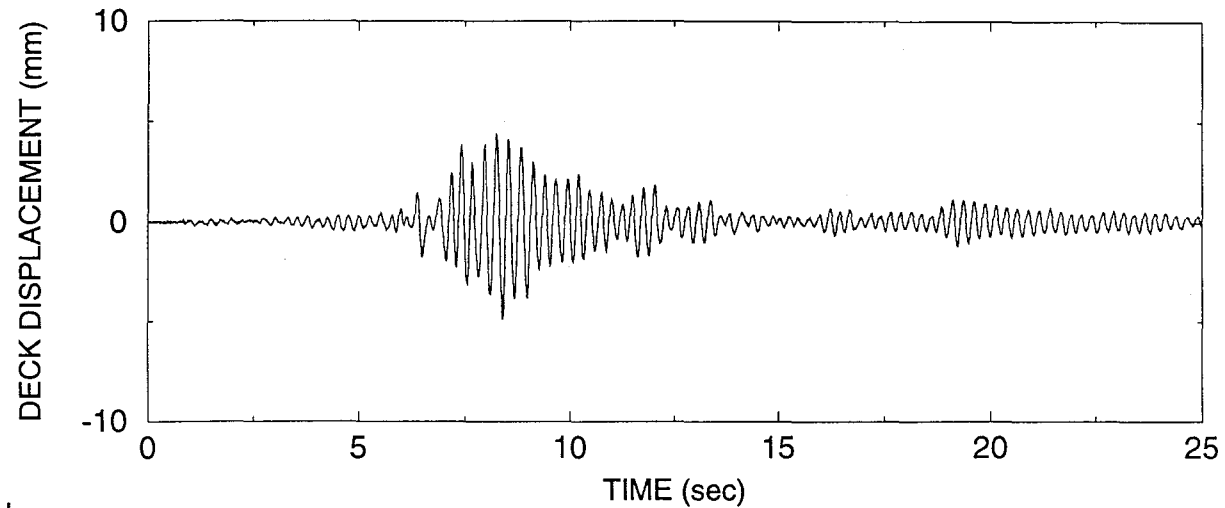
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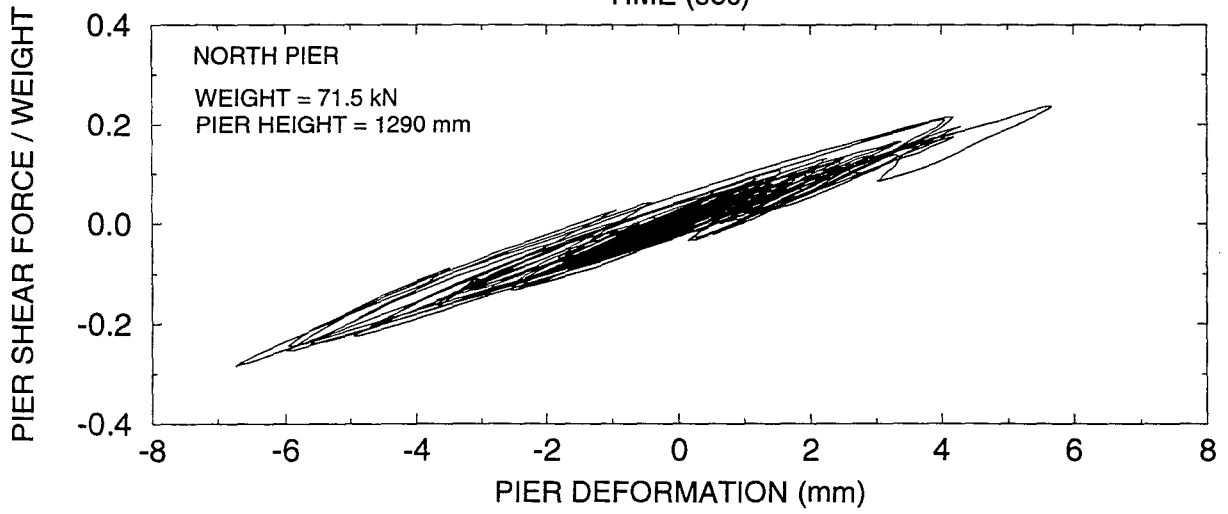
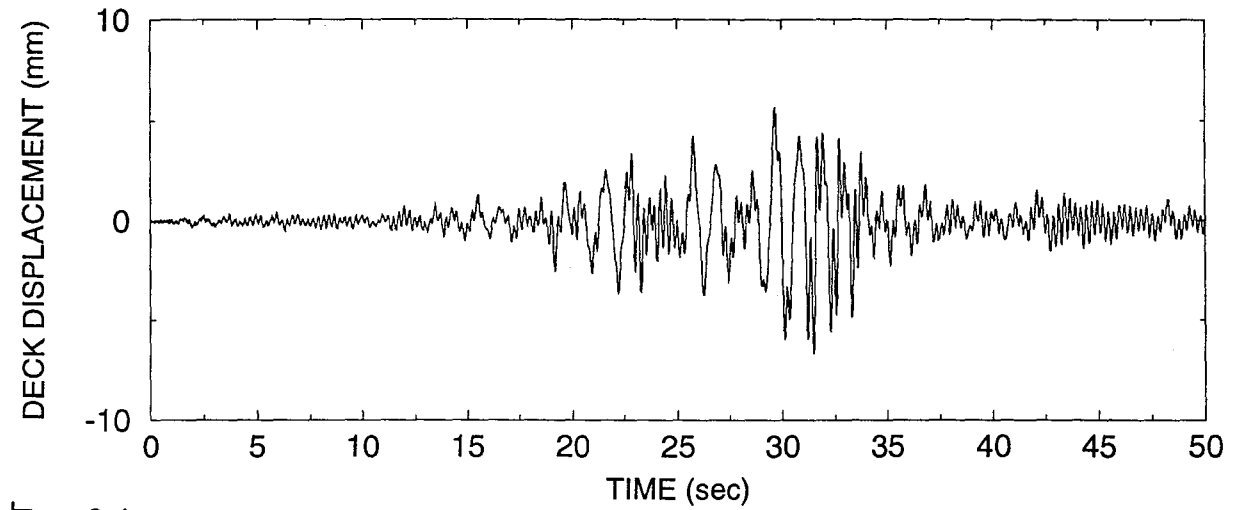
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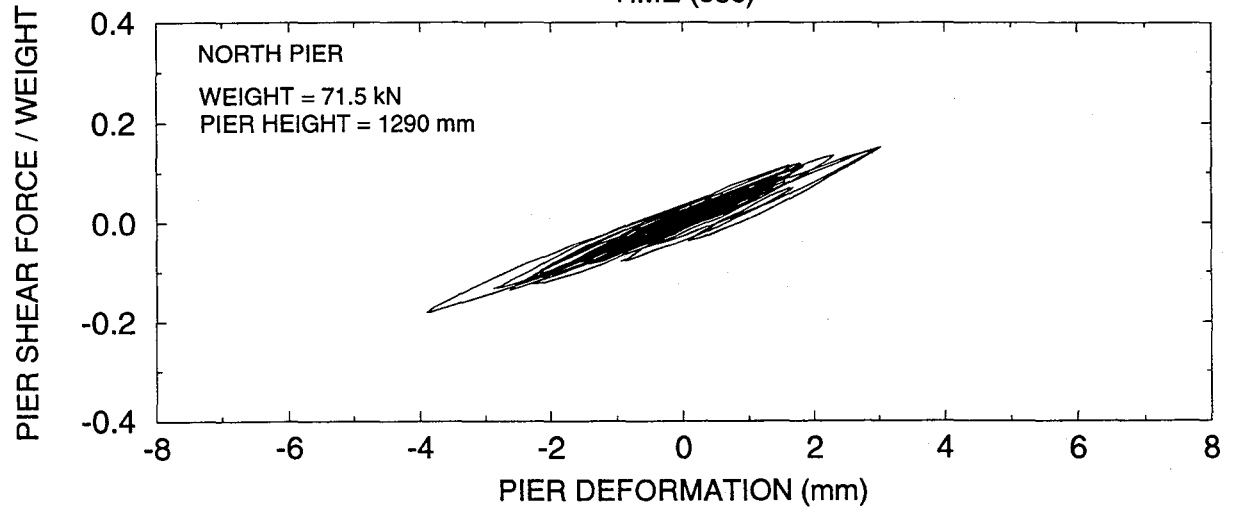
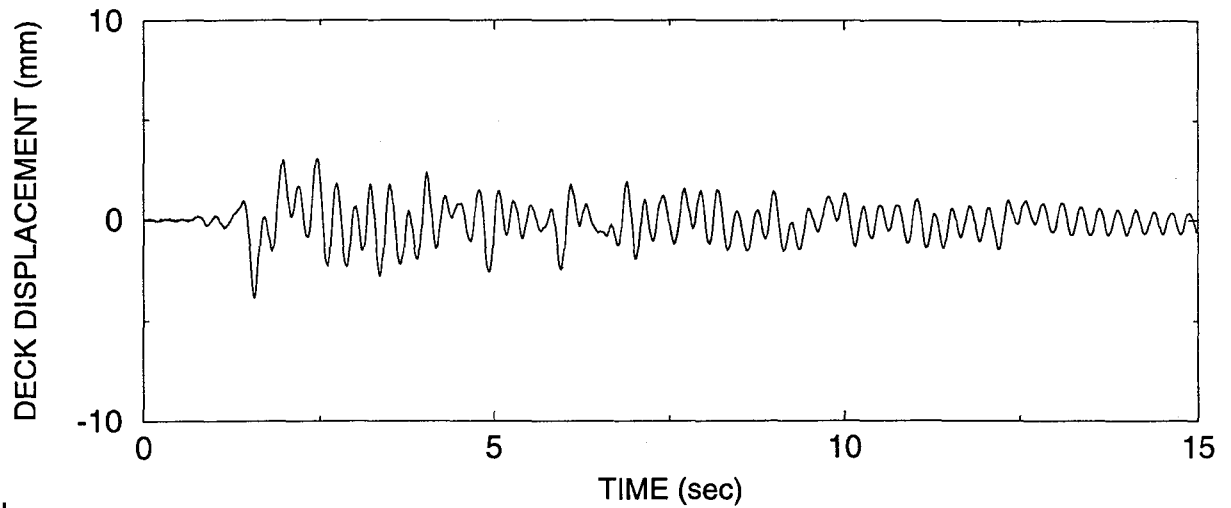
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NON-ISOLATED, TEST No. FRUN14  
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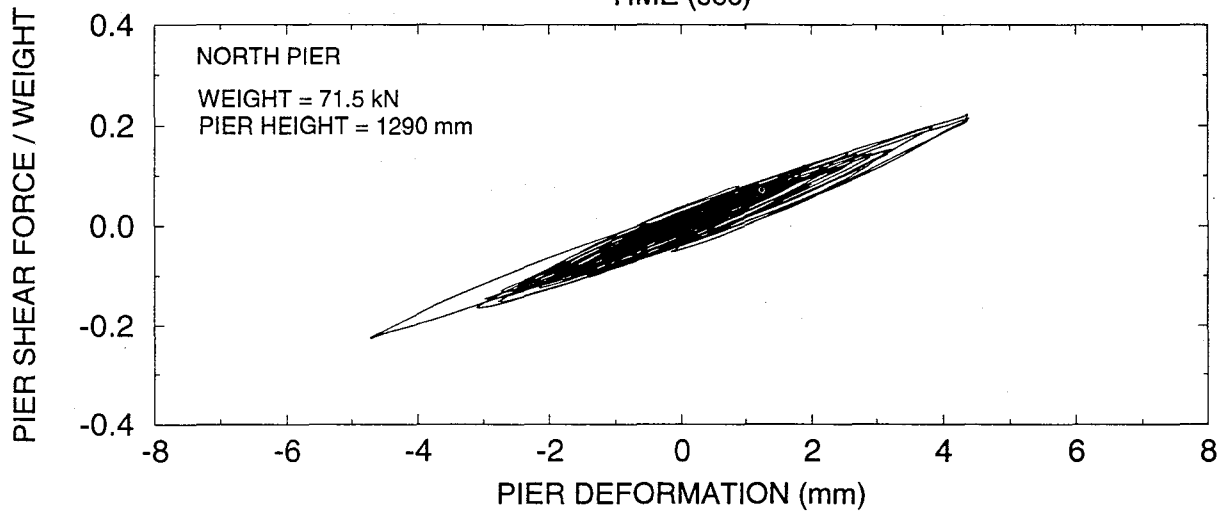
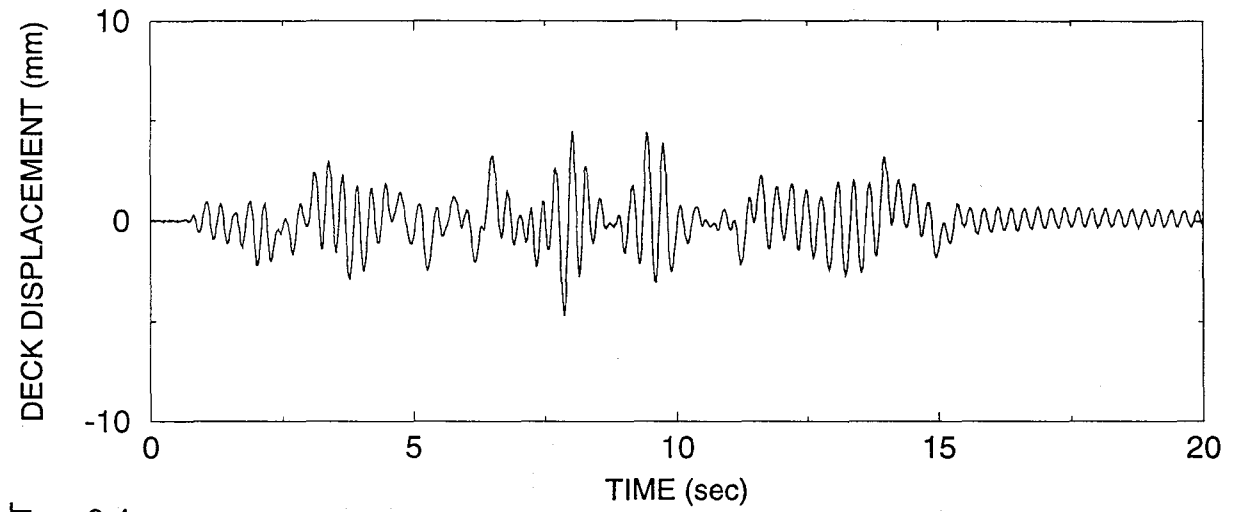


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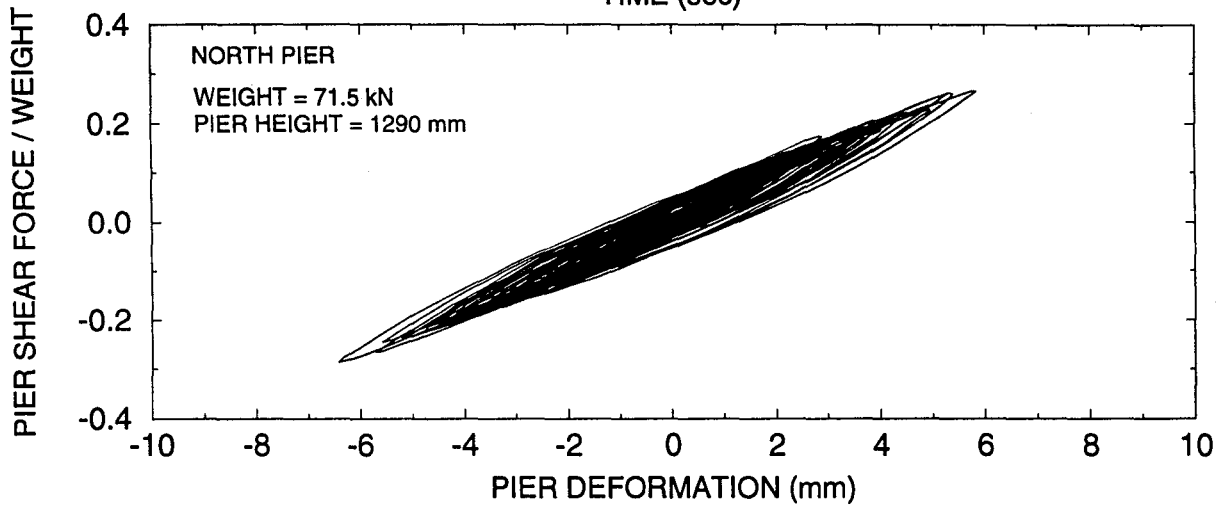
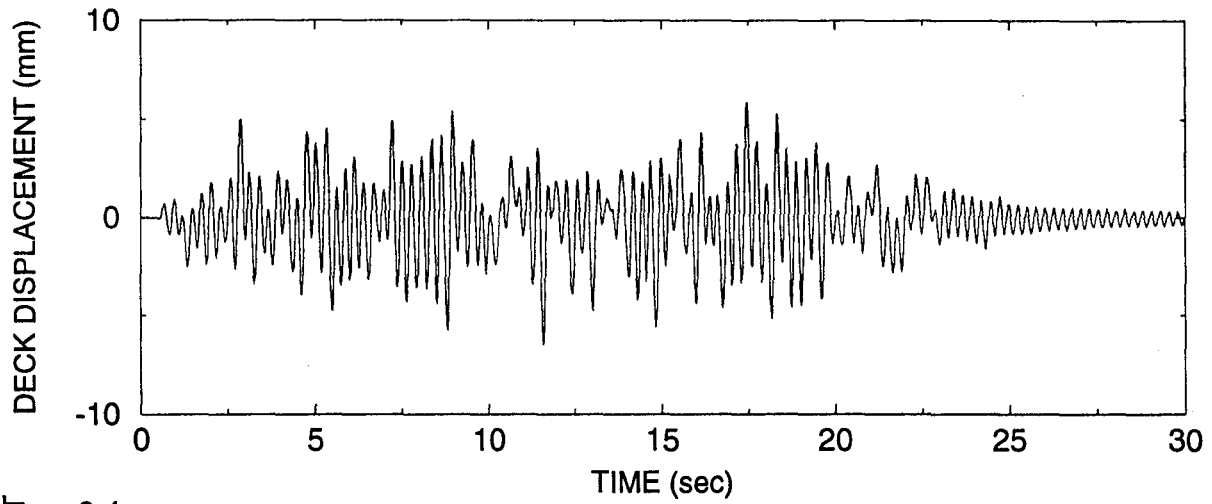




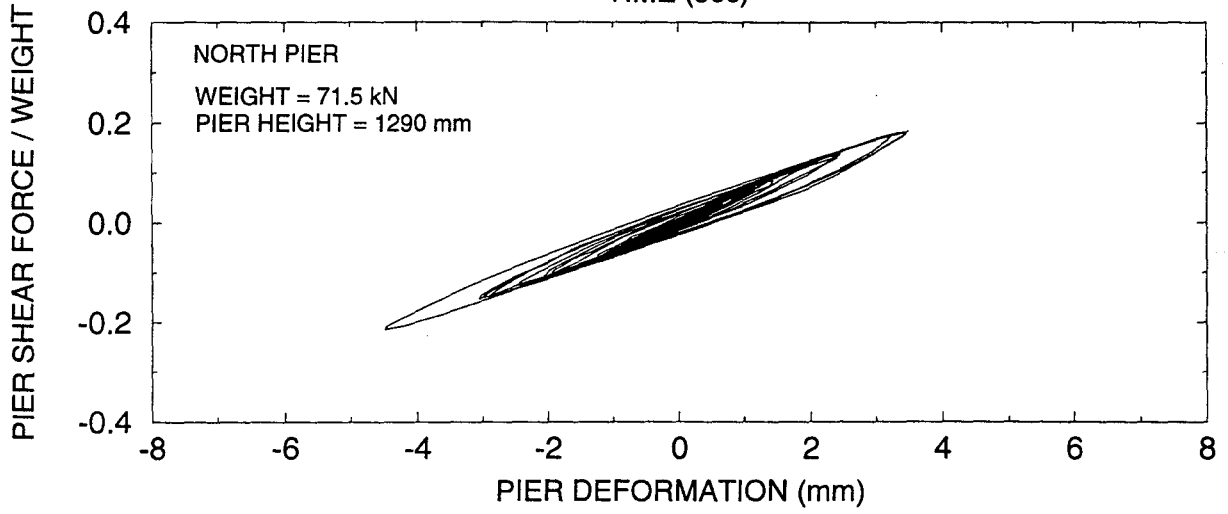
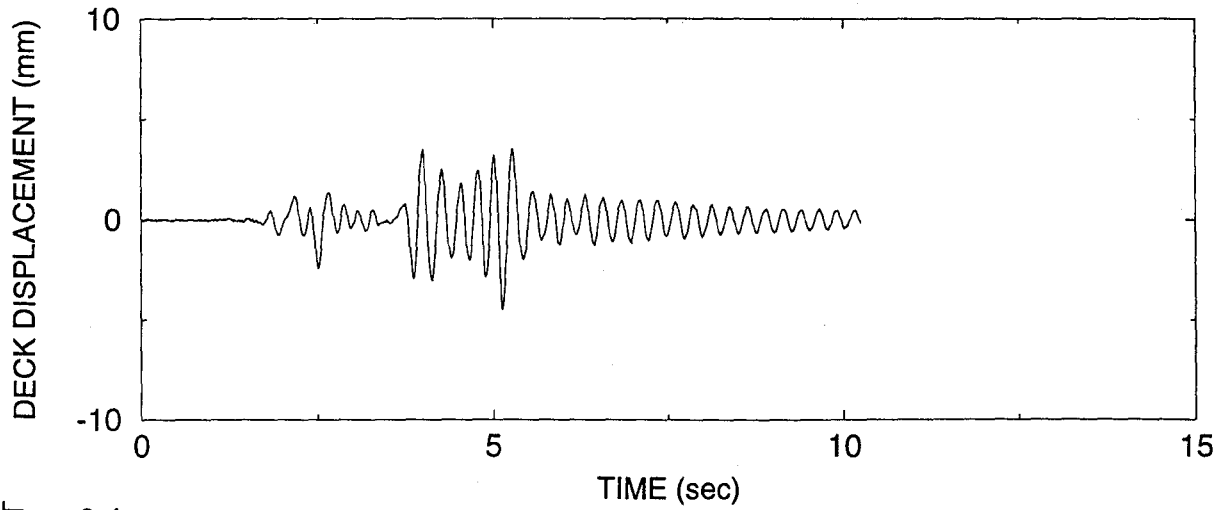
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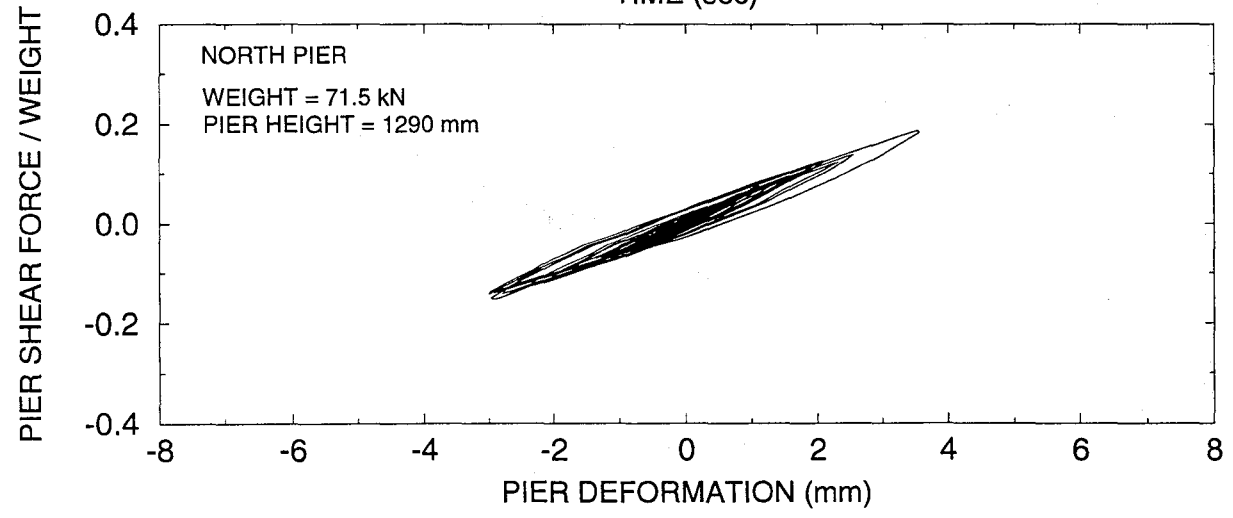
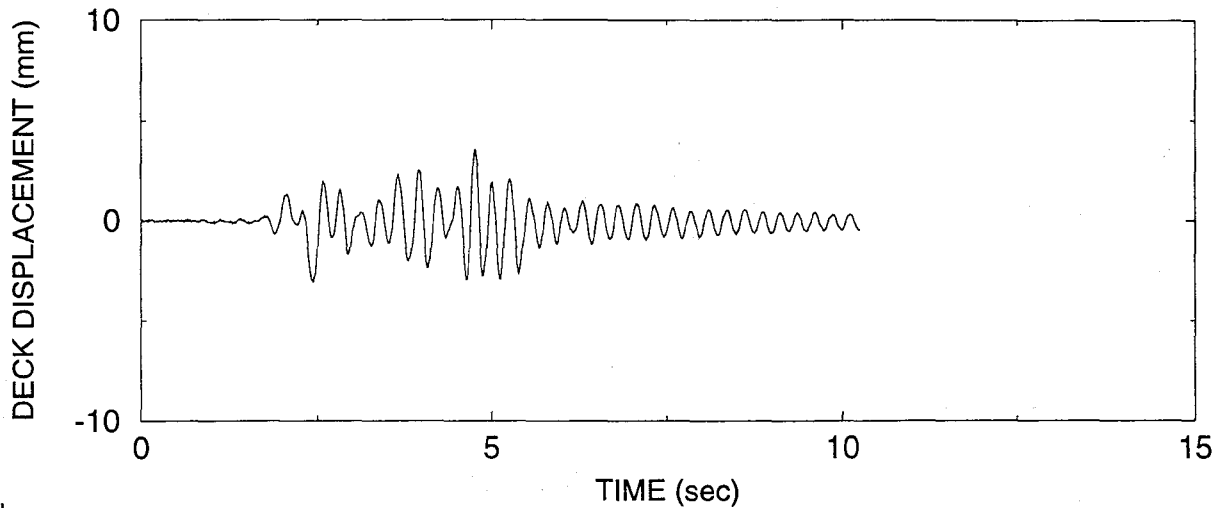
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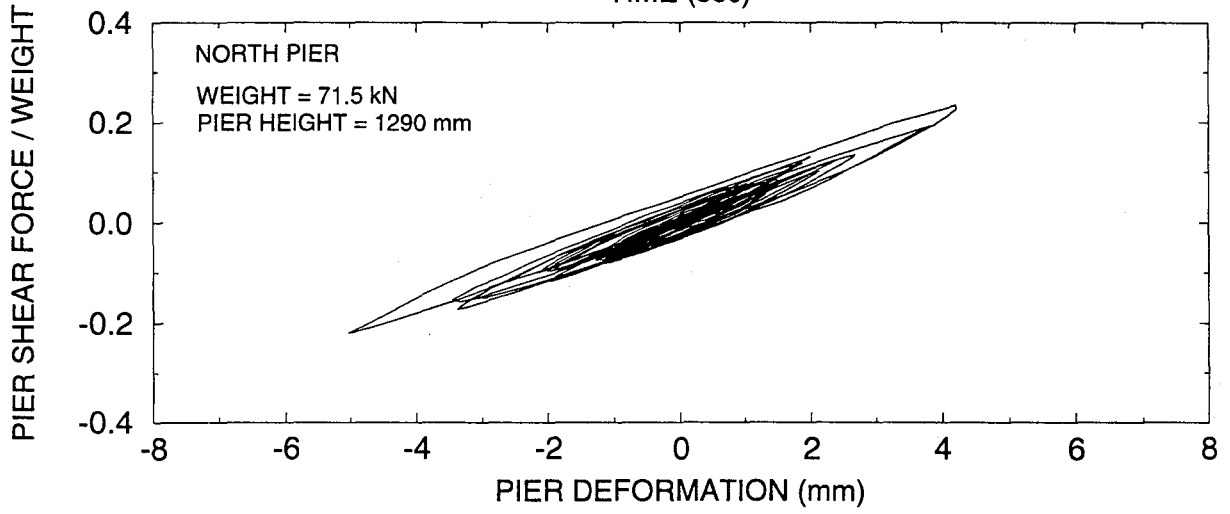
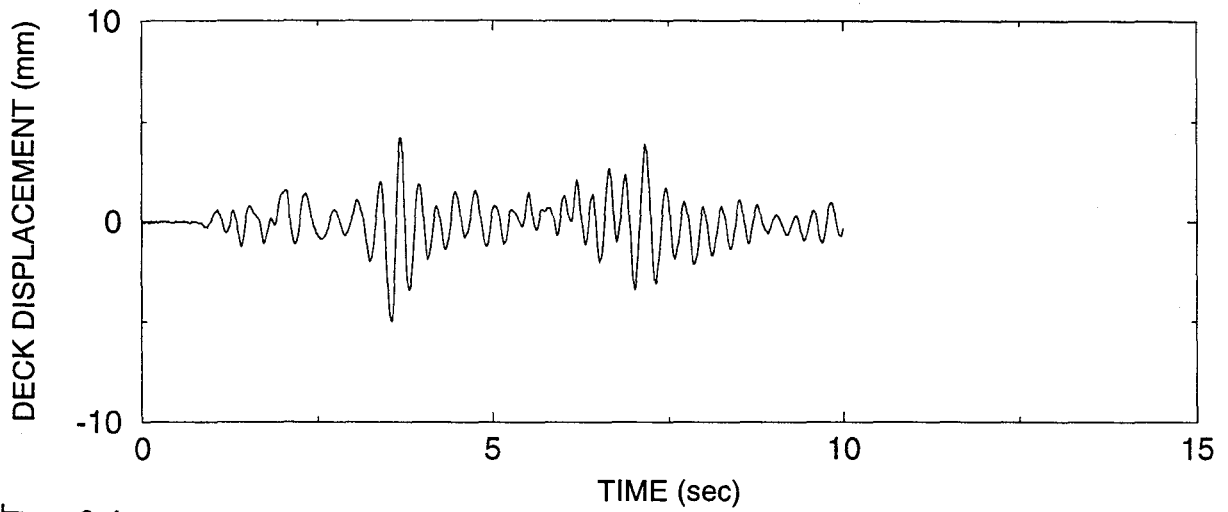
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PACOIMA S74W 13%



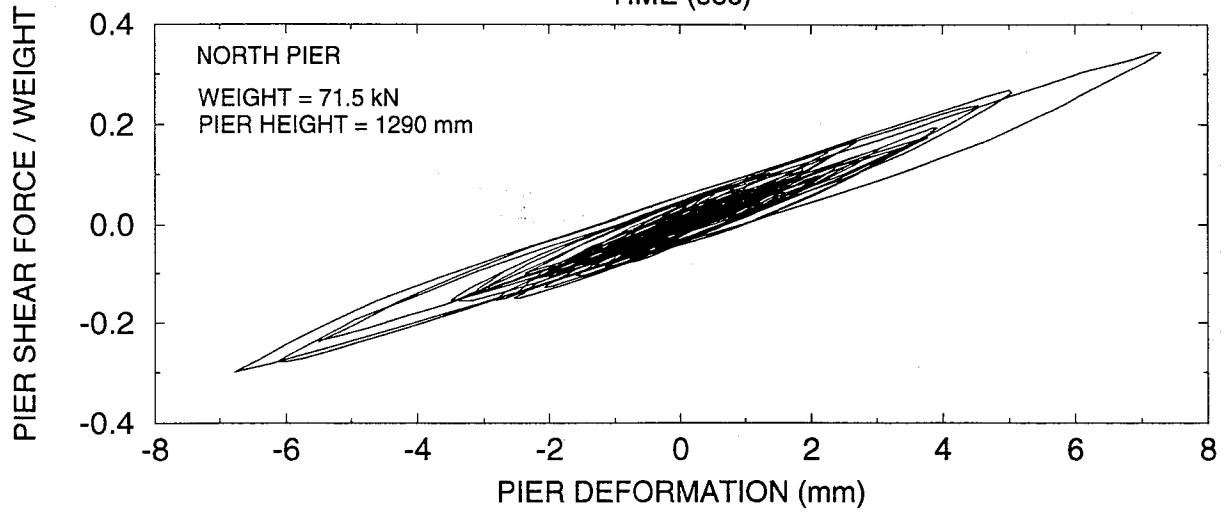
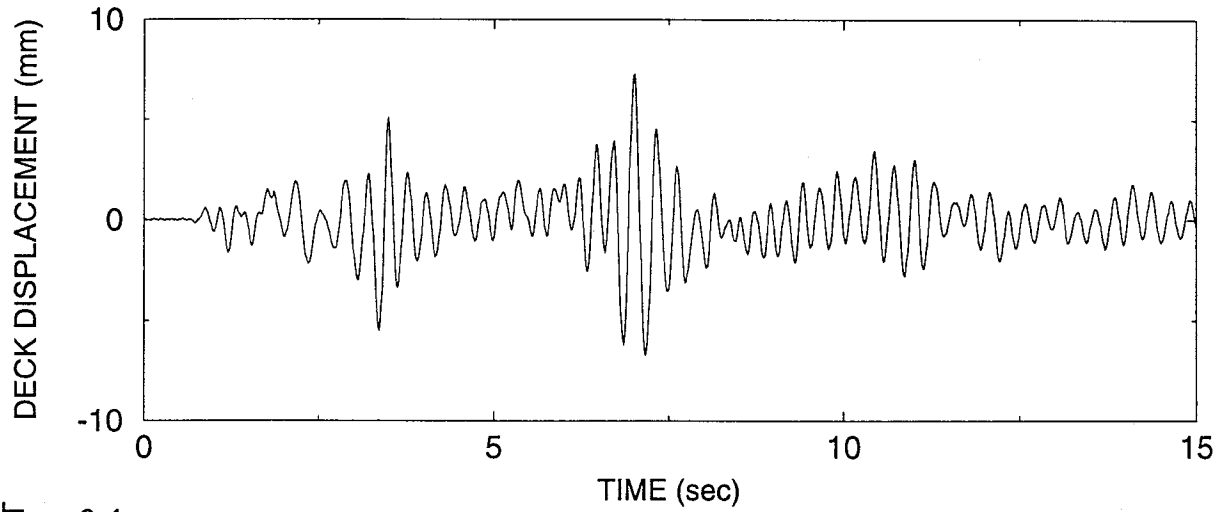
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PACOIMA S16E 13%



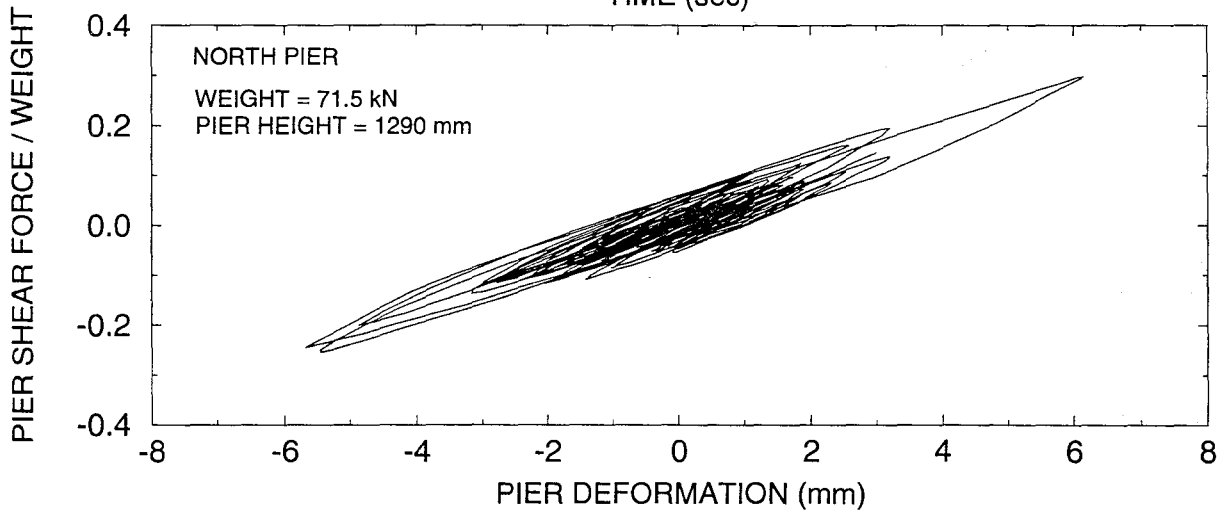
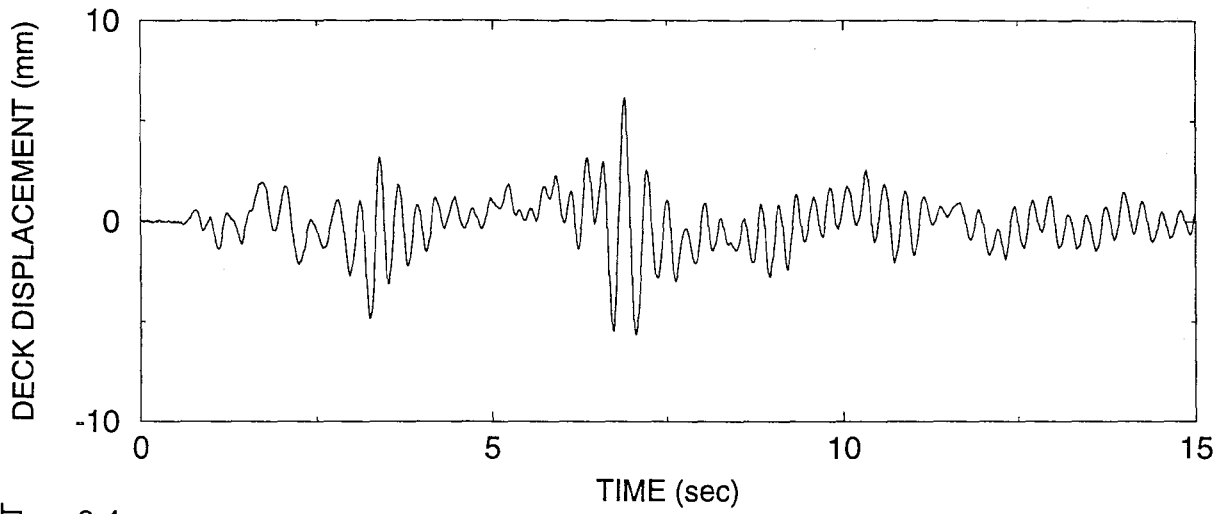
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CALTRANS ROCK 0.6g SPEC. 3 20%



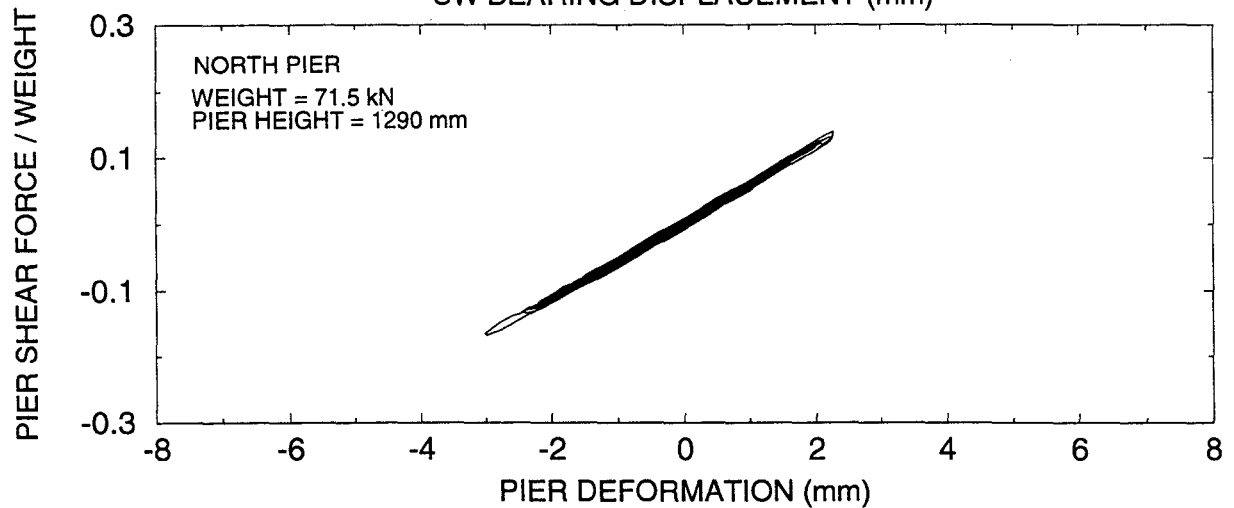
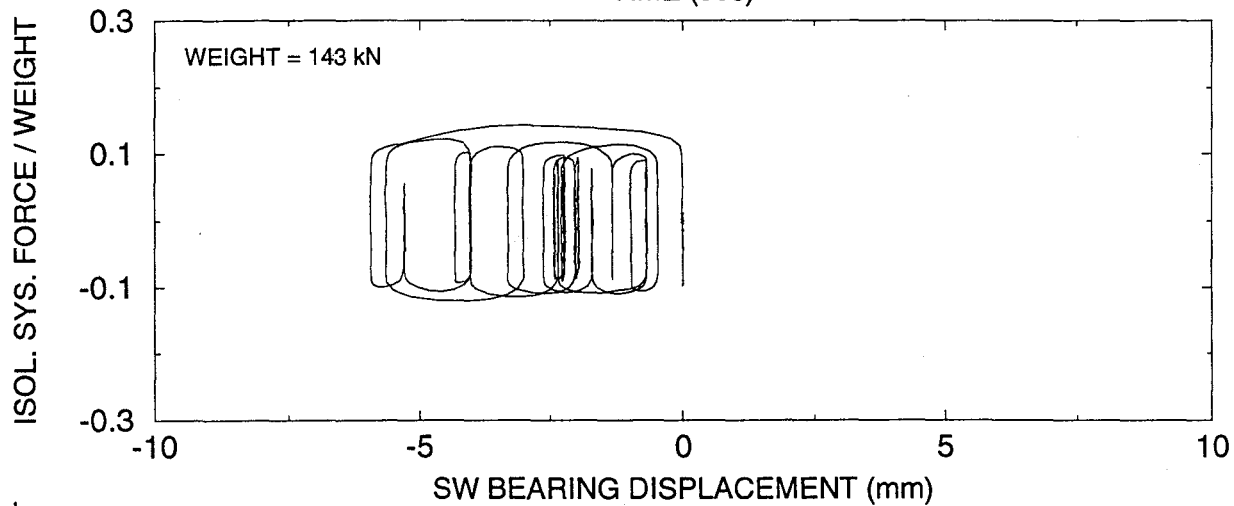
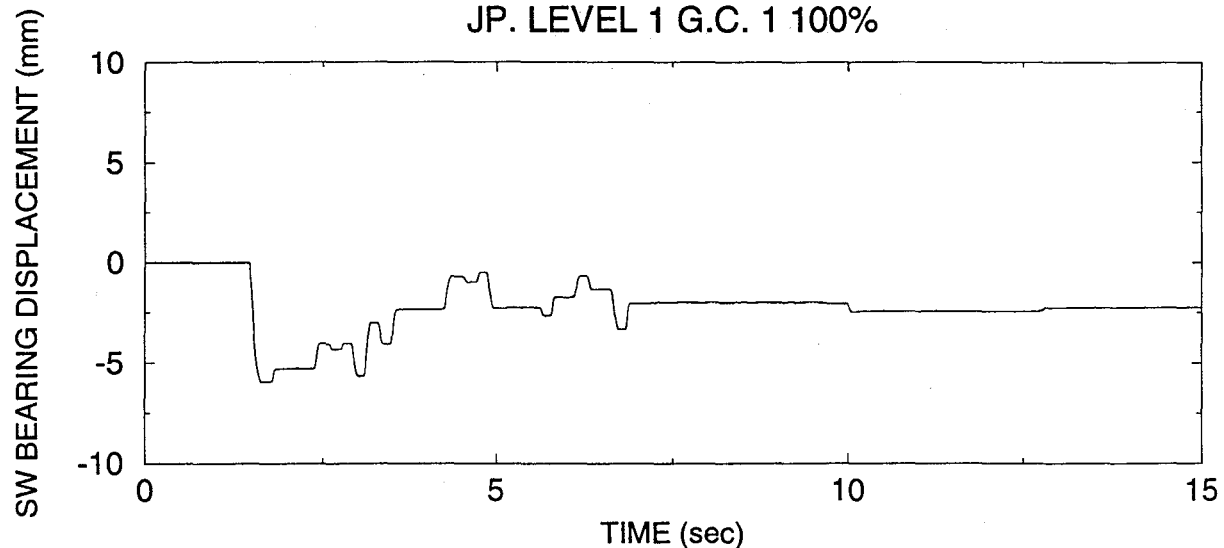
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CALTRANS ALLUVIUM 10'-80' 0.6g SPEC. 3 20%



NON-ISOLATED, TEST No. FRUN22  
CALTRANS ALLUVIUM 80'-150' 0.6g SPEC. 2 20%

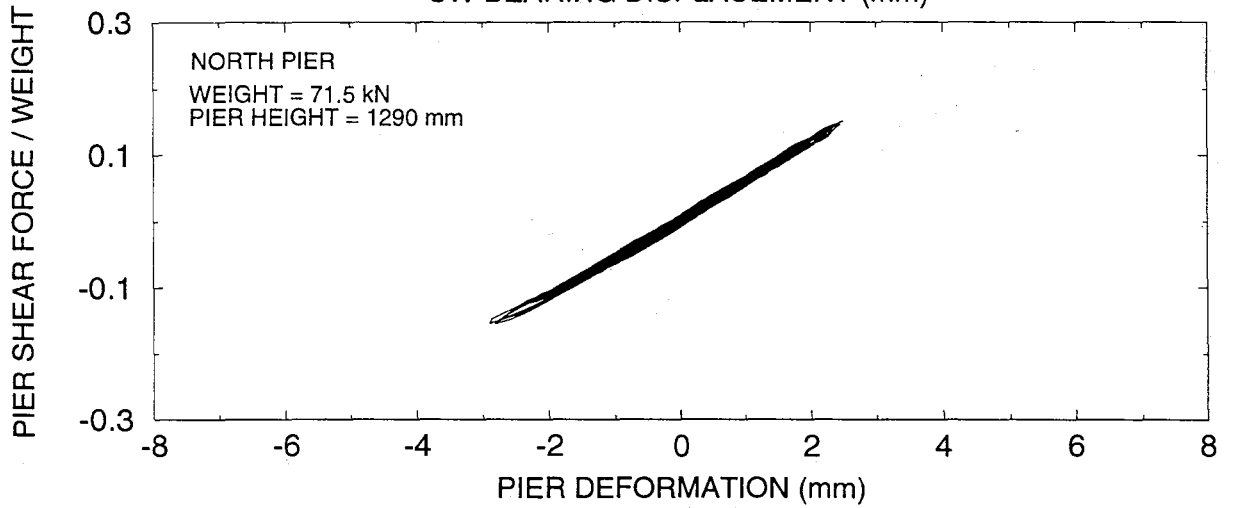
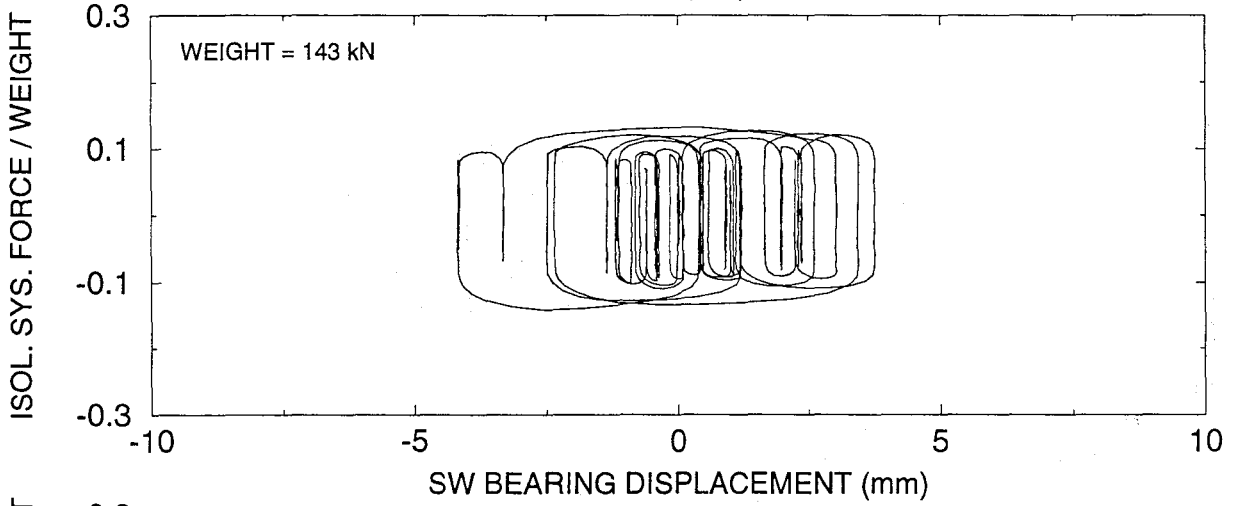
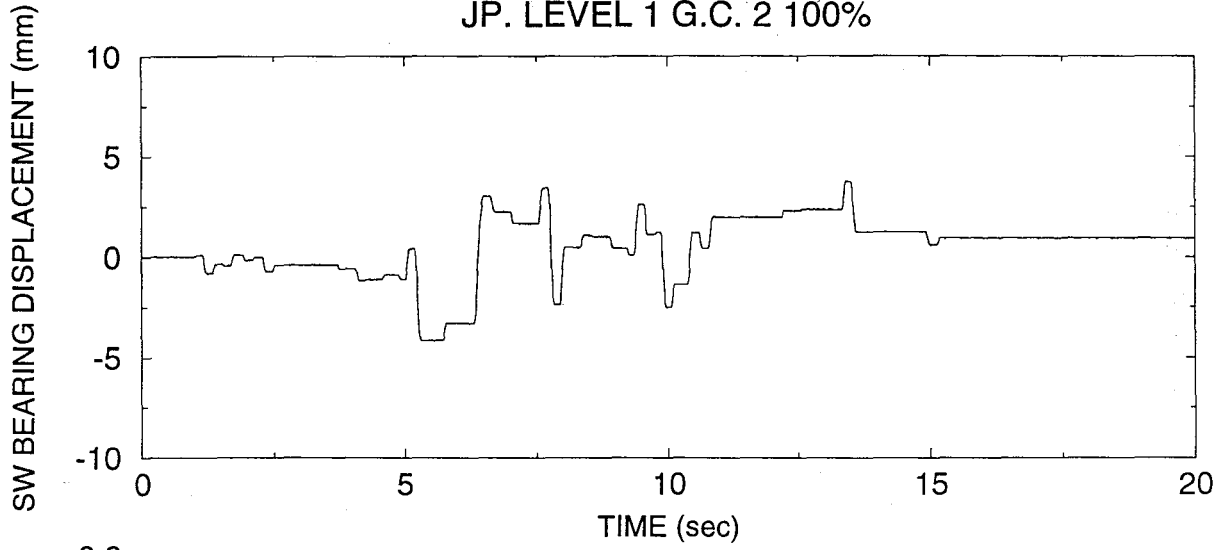


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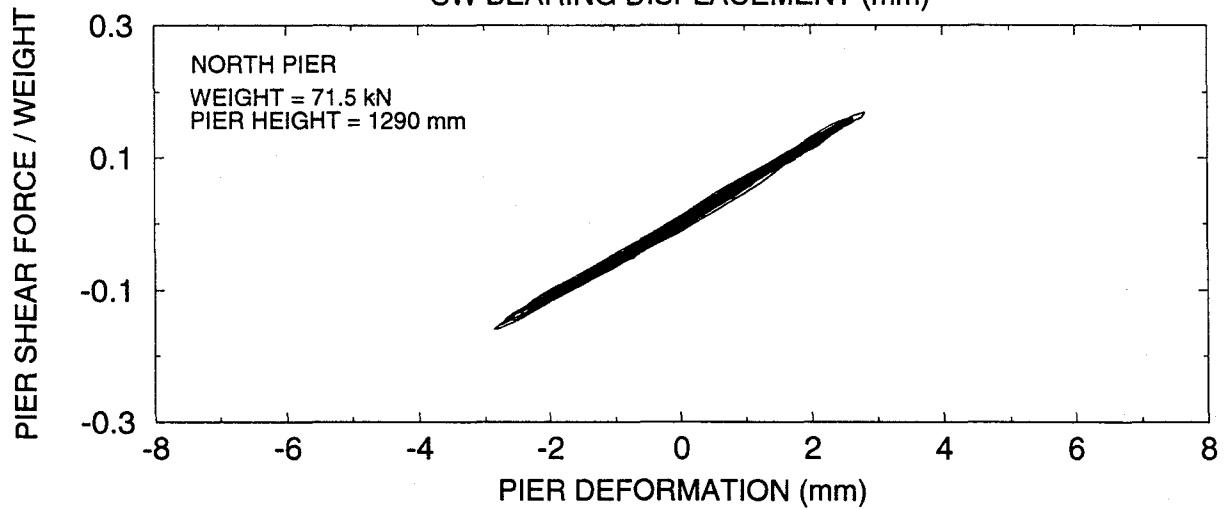
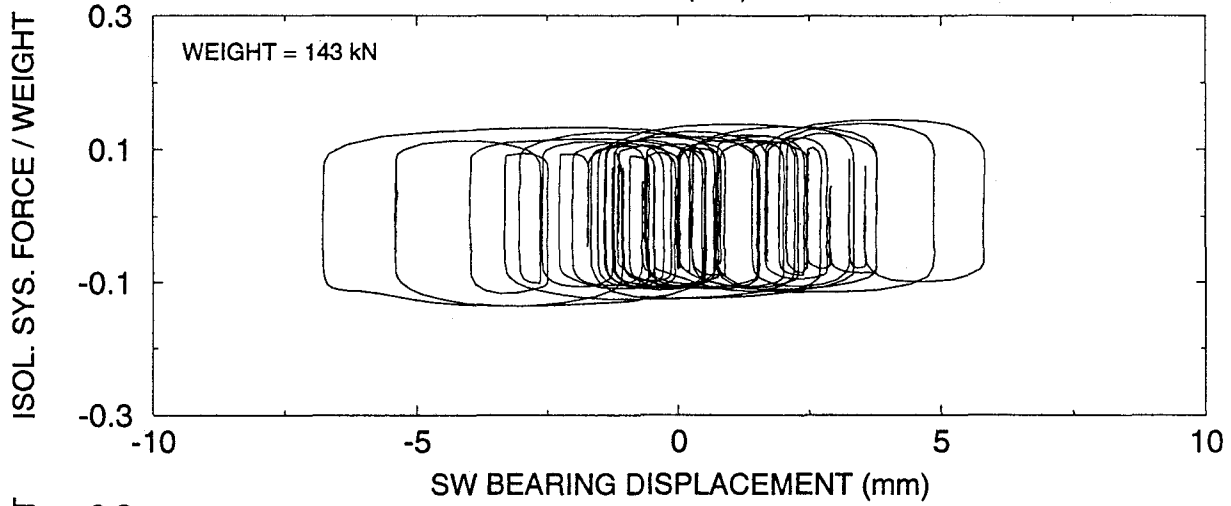
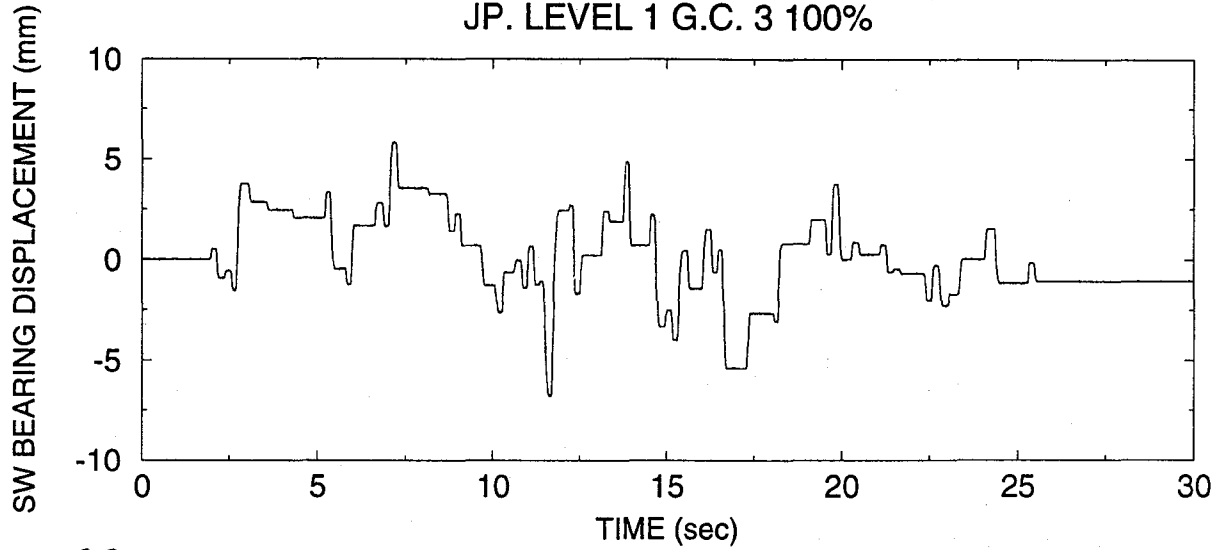




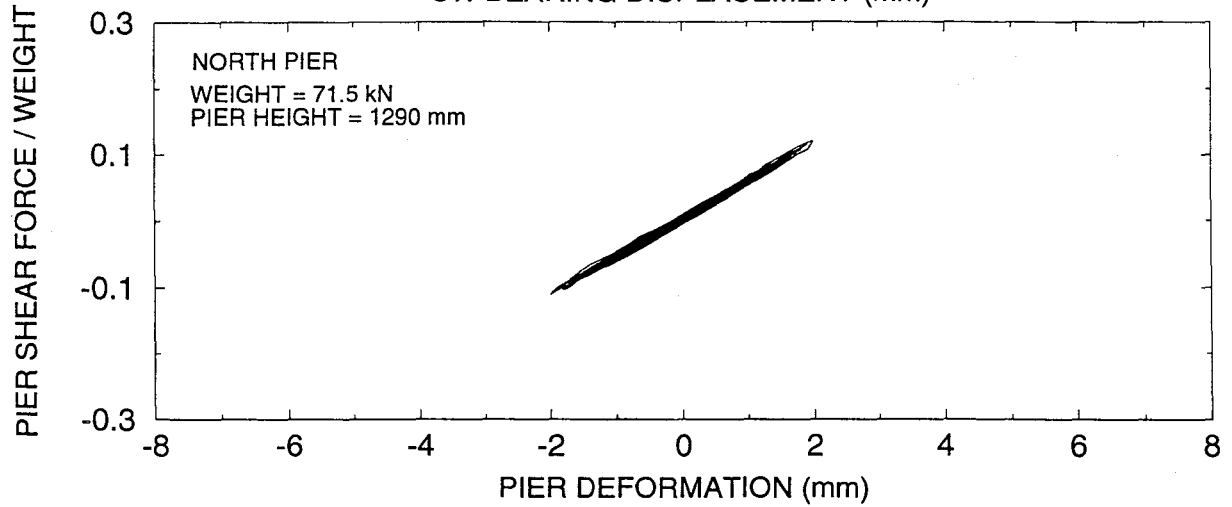
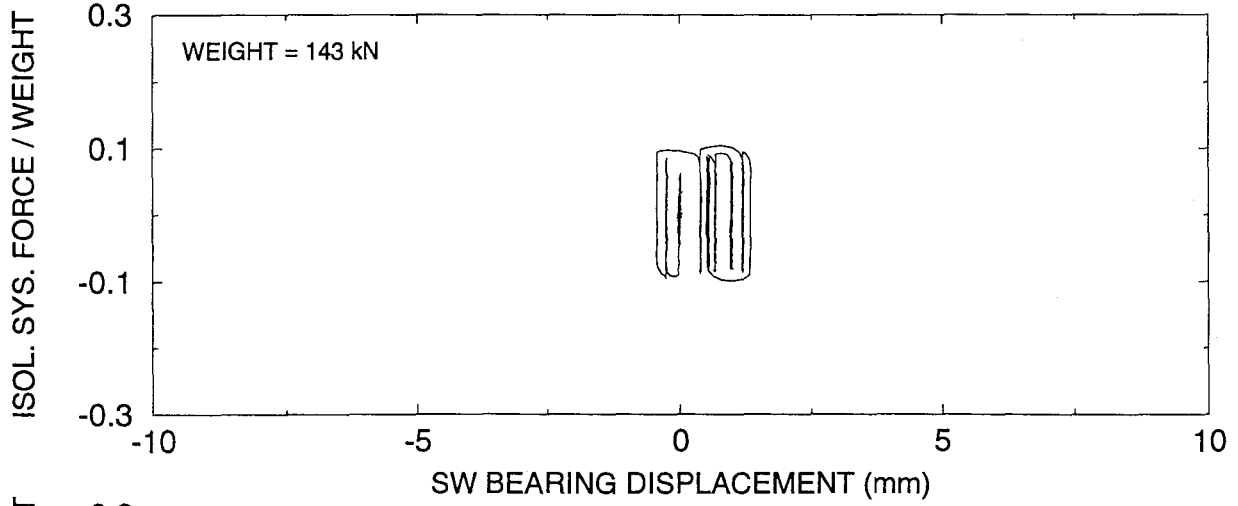
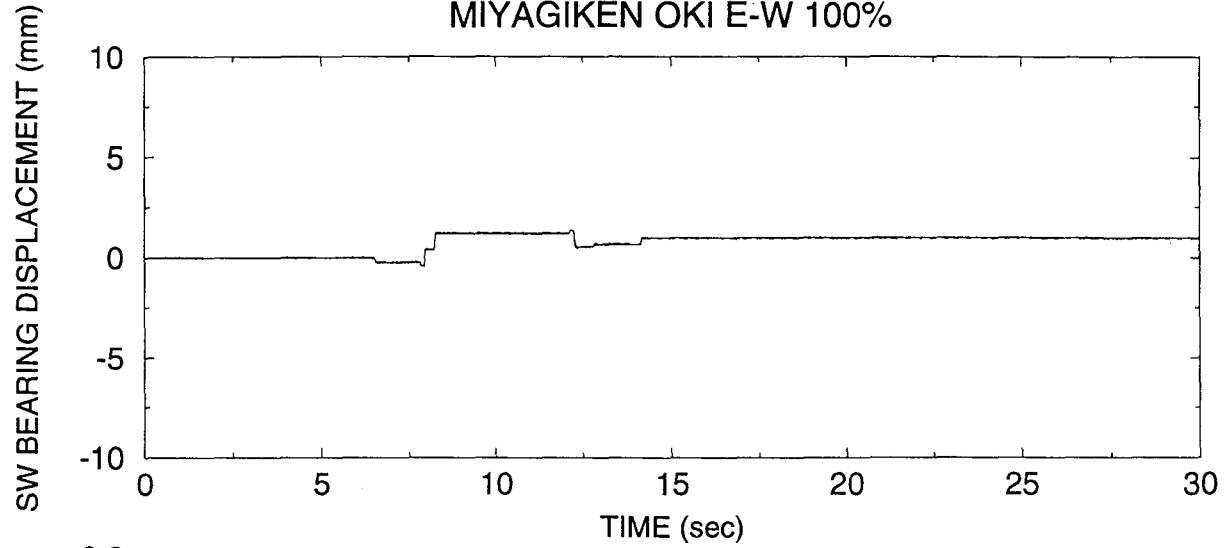
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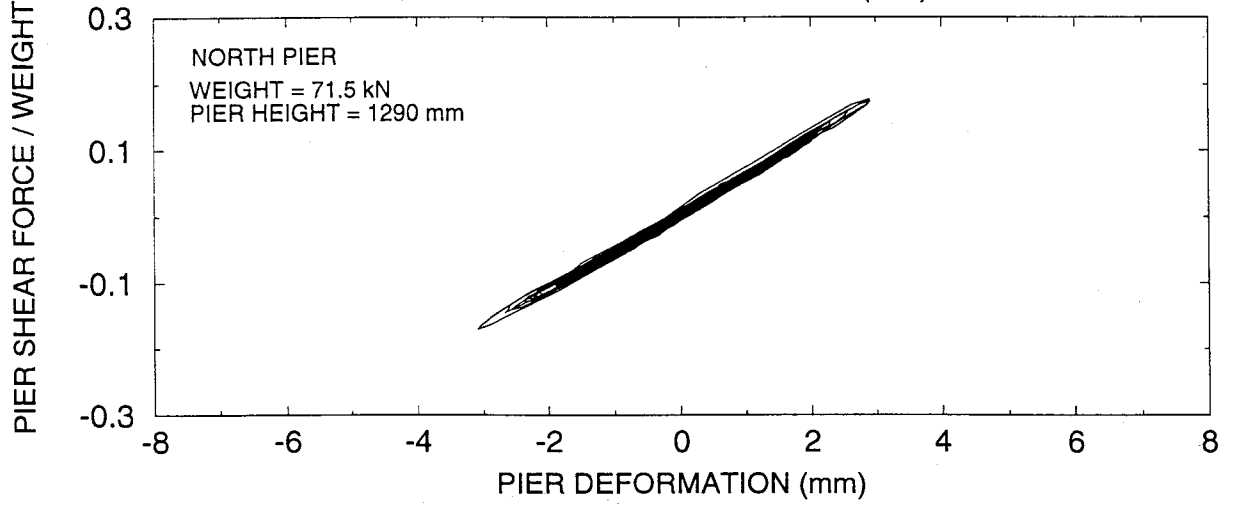
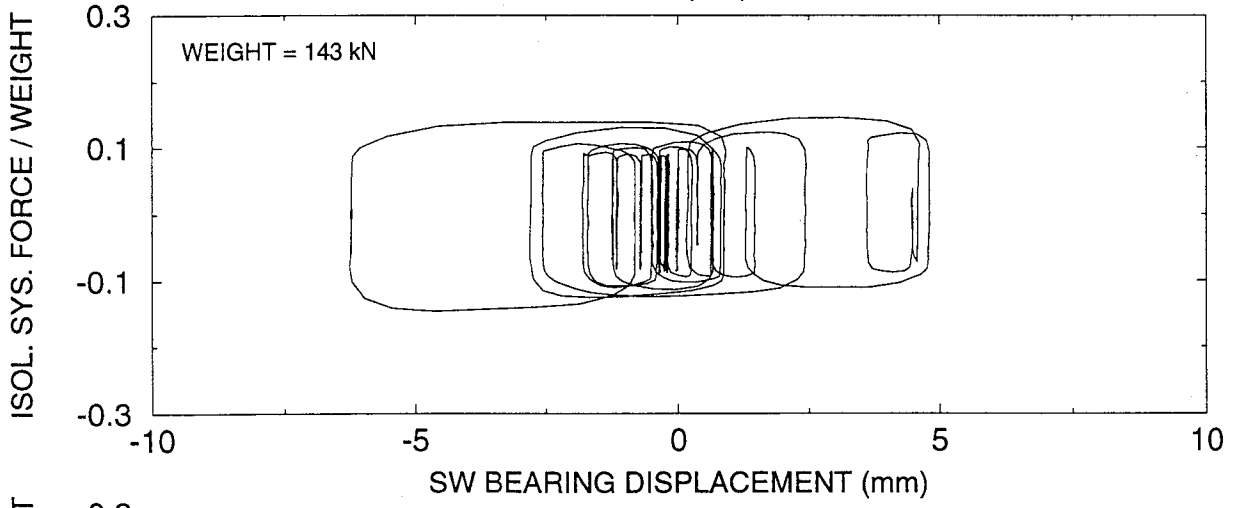
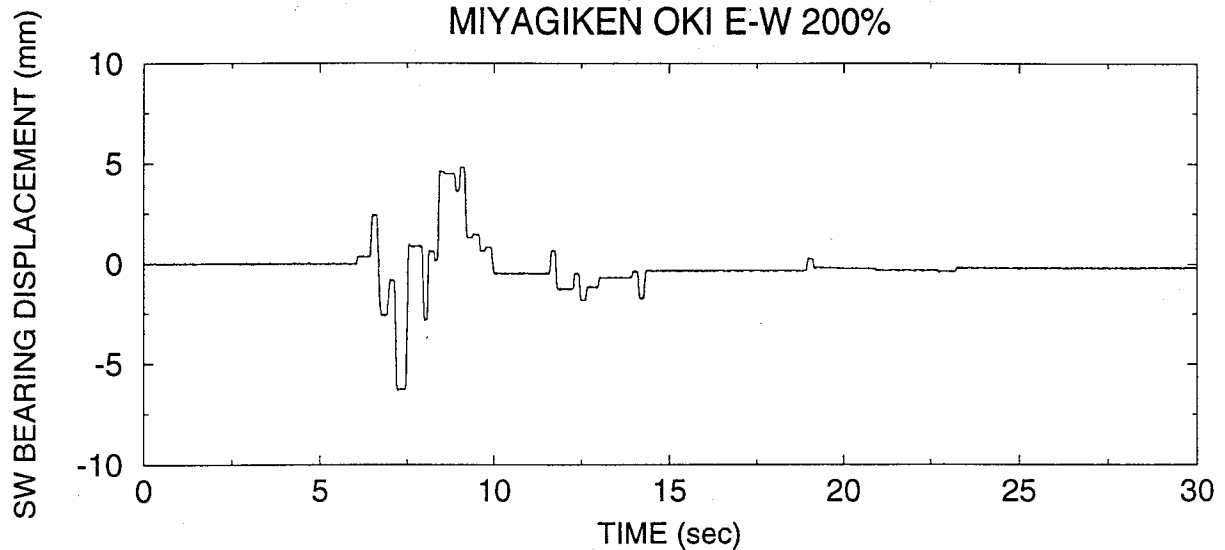
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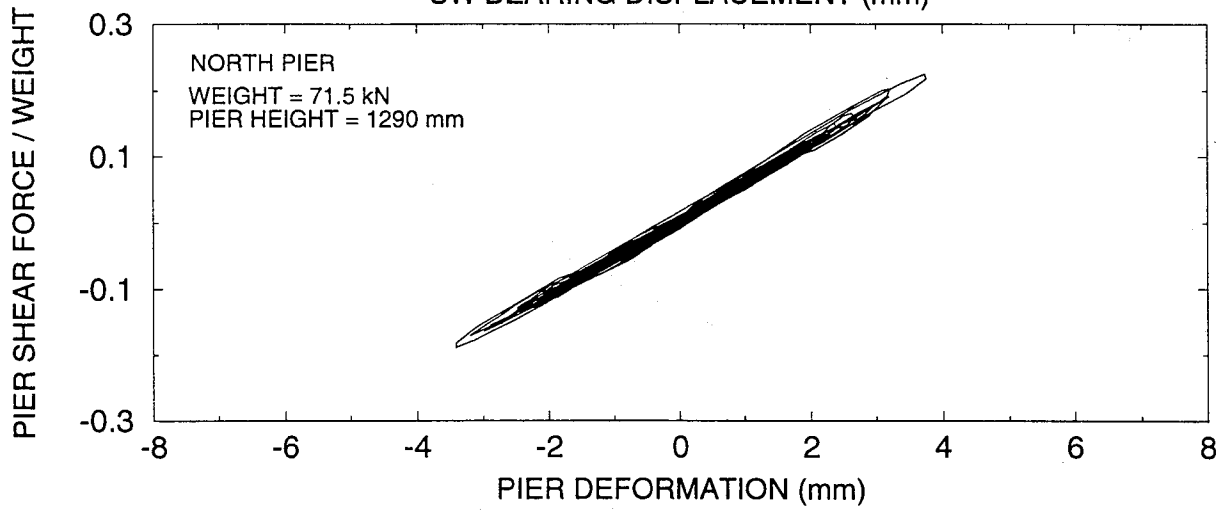
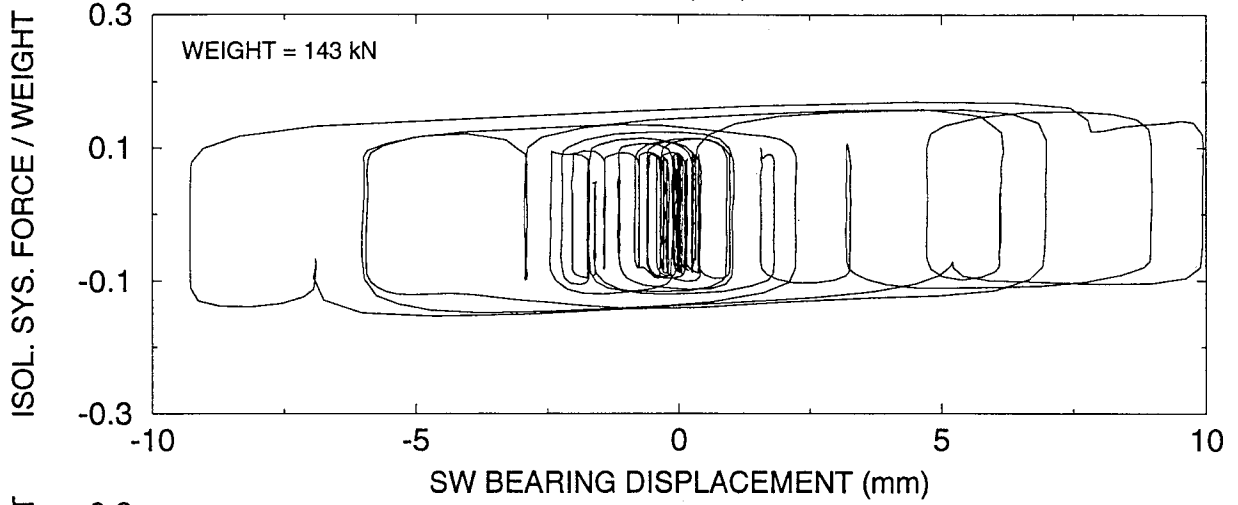
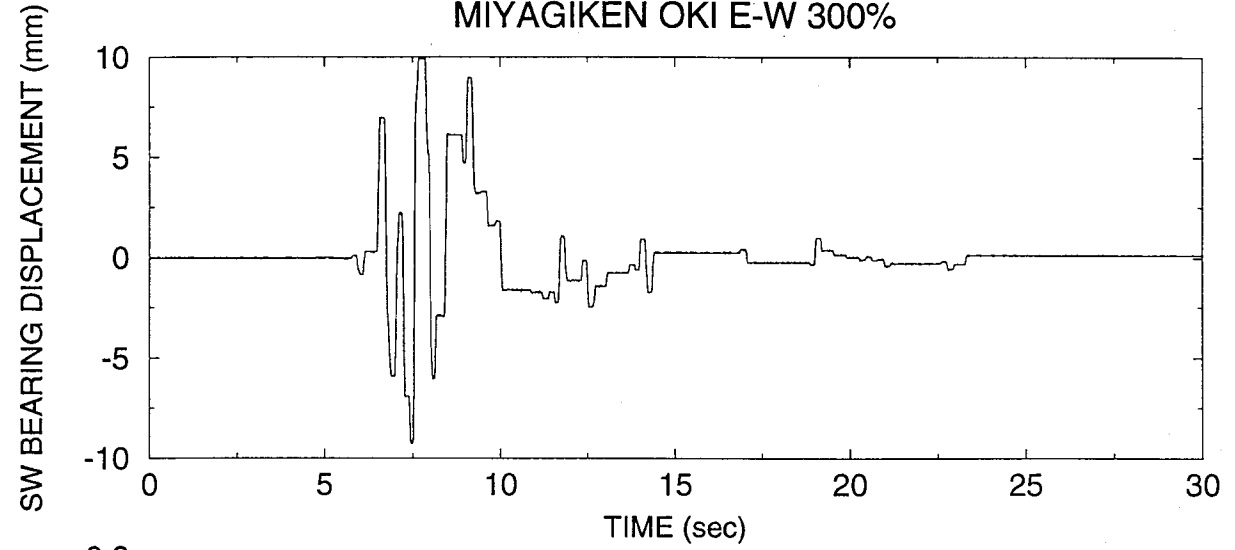
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MIYAGIKEN OKI E-W 100%



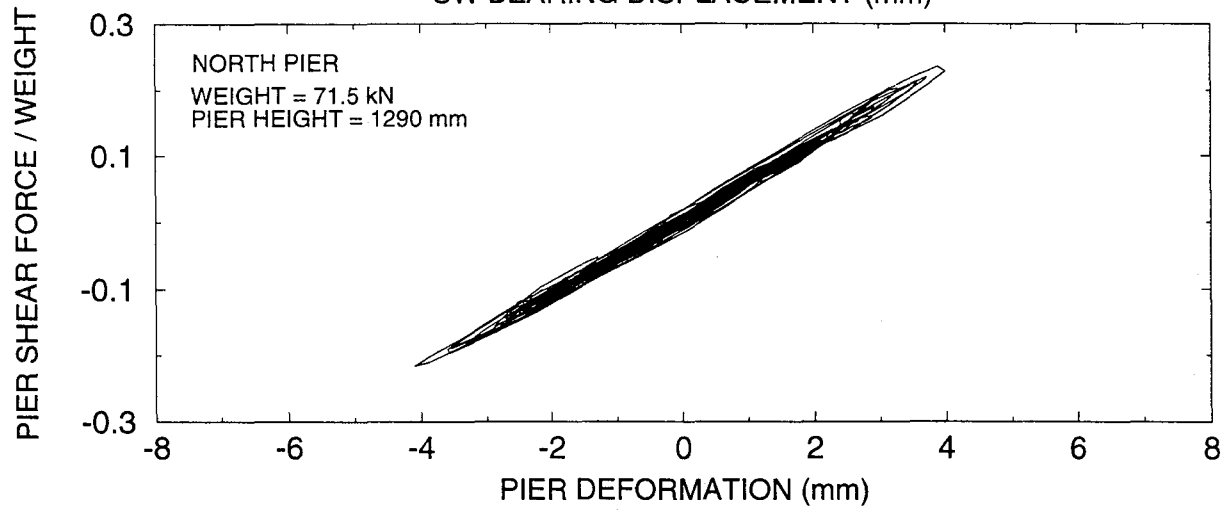
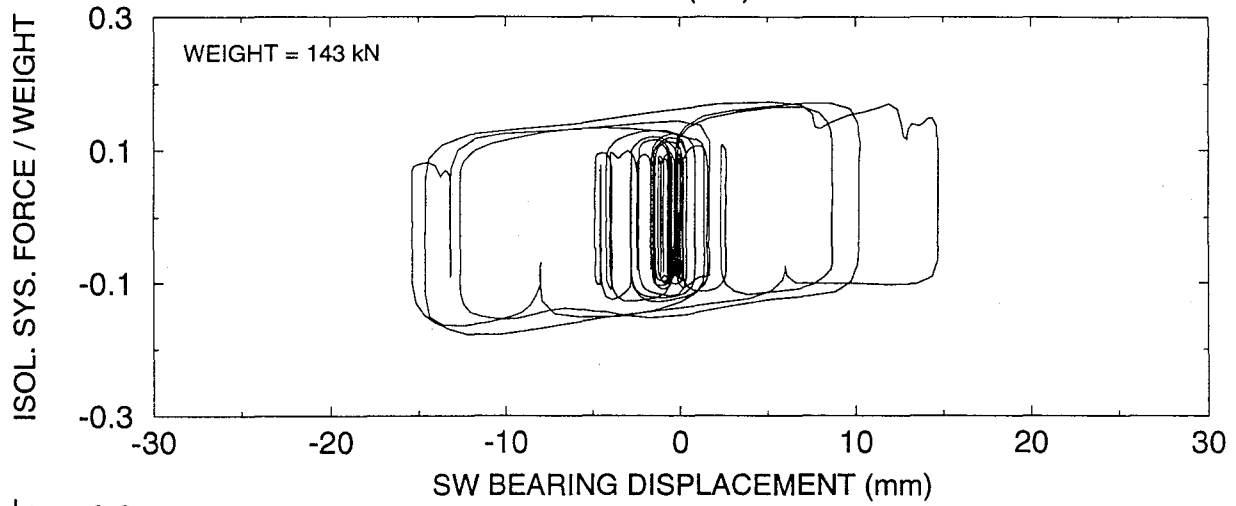
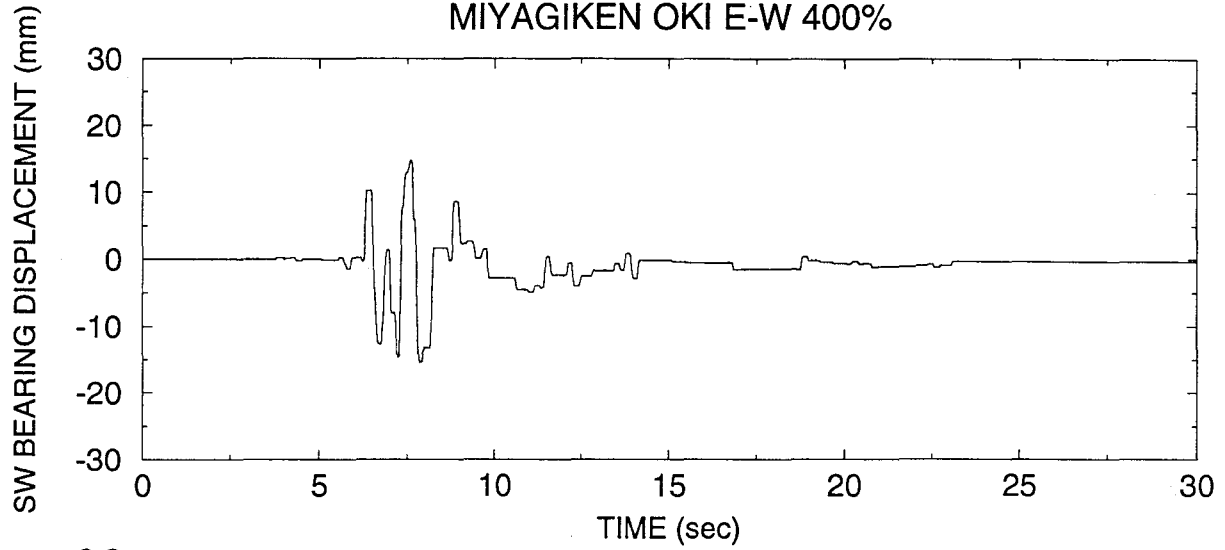
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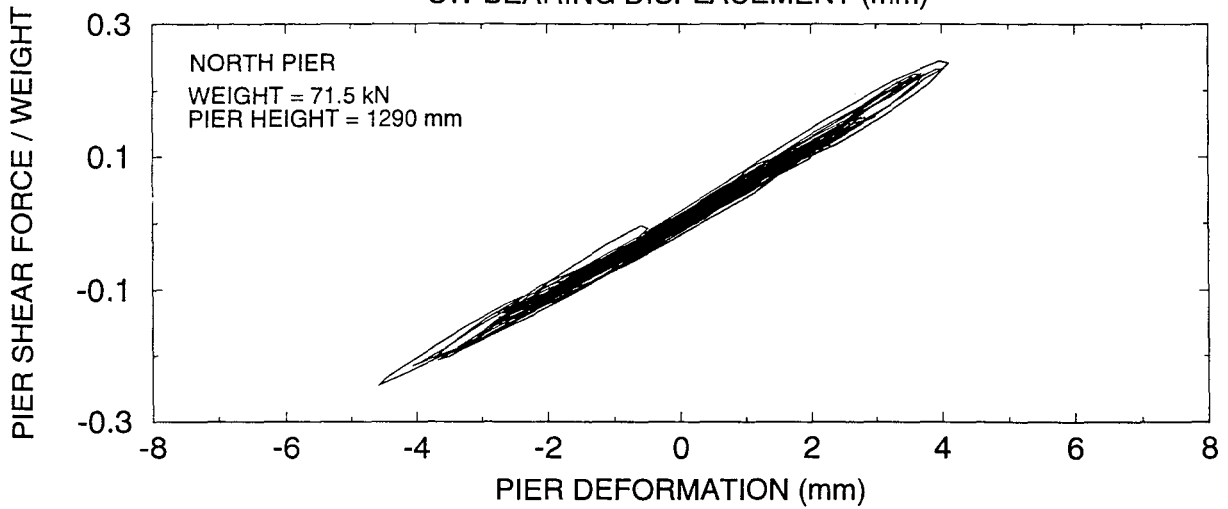
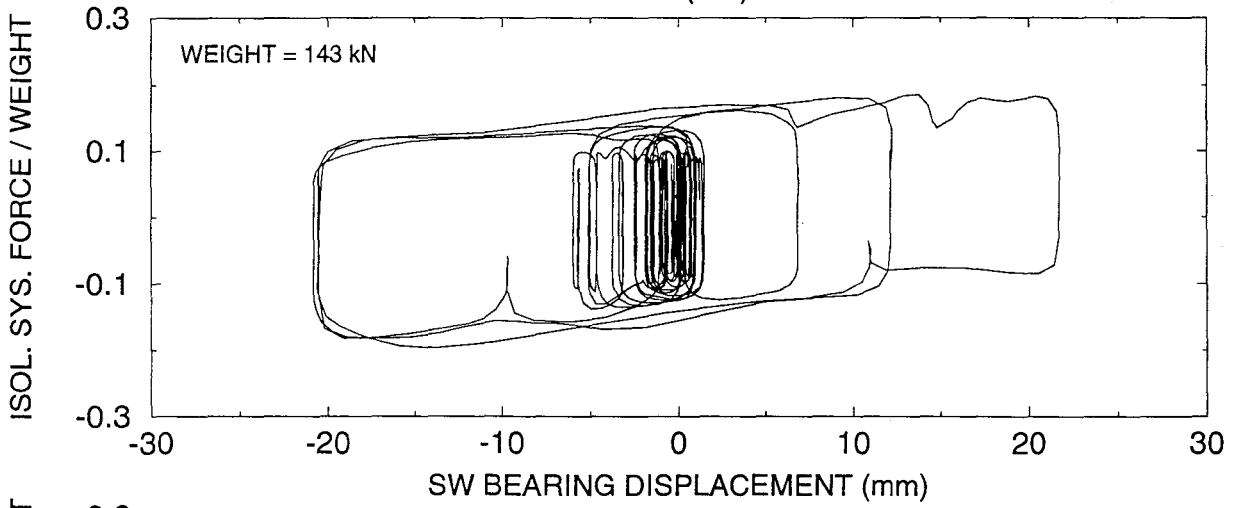
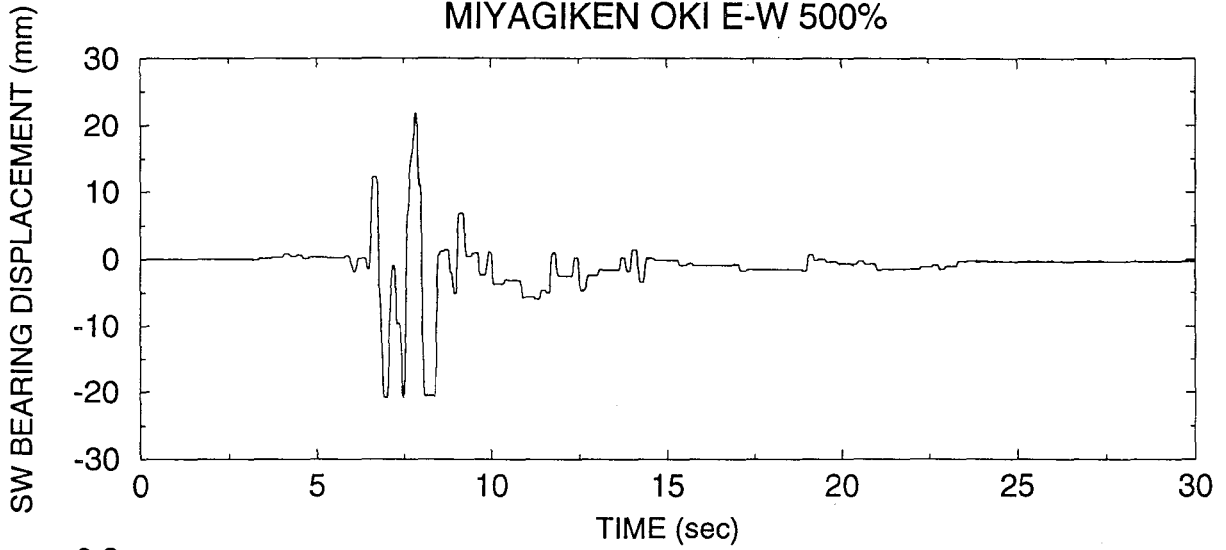
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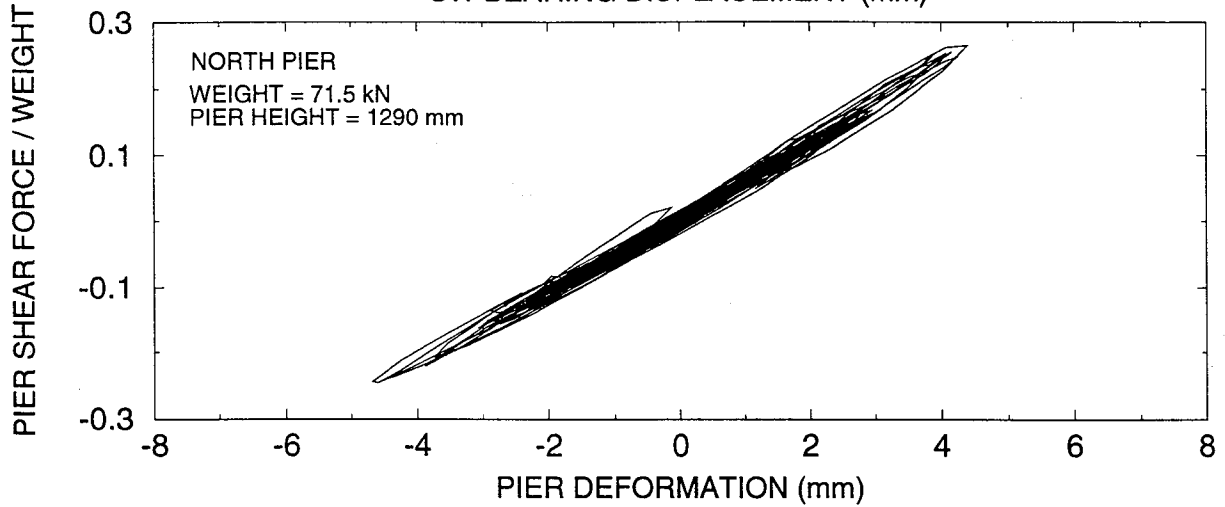
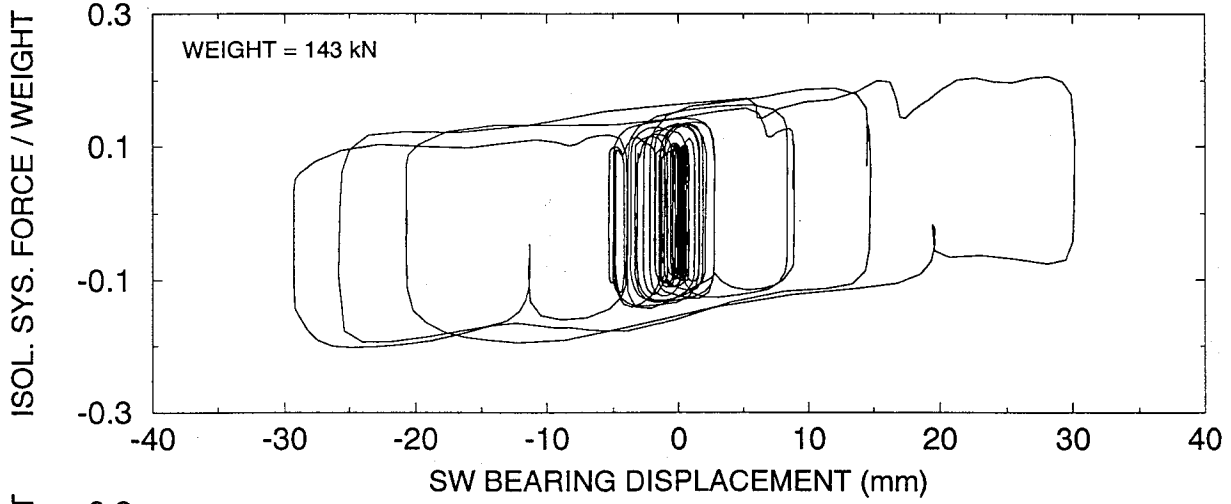
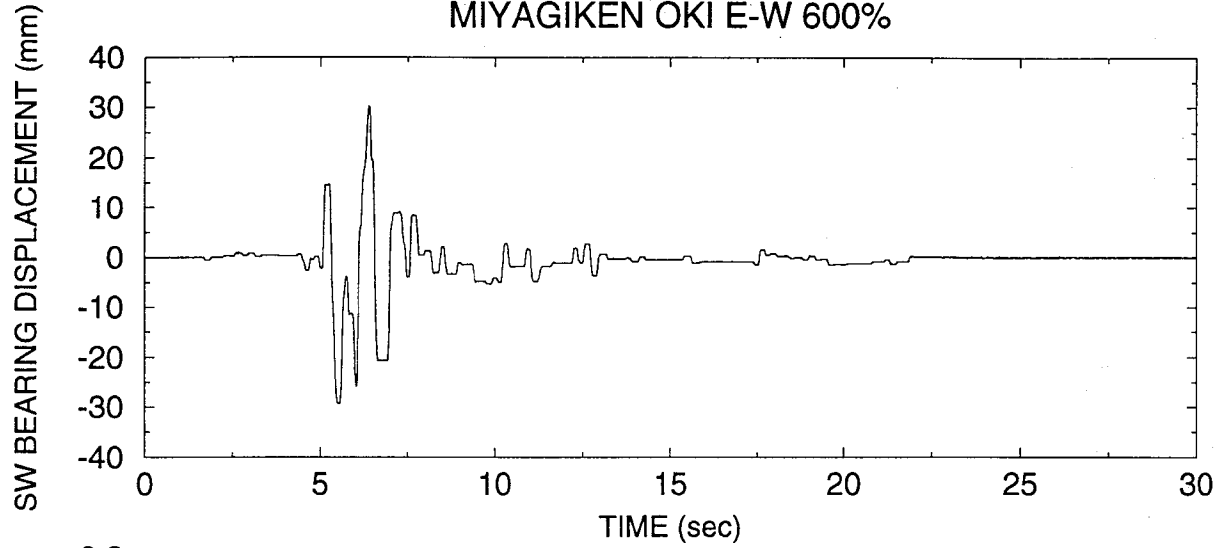
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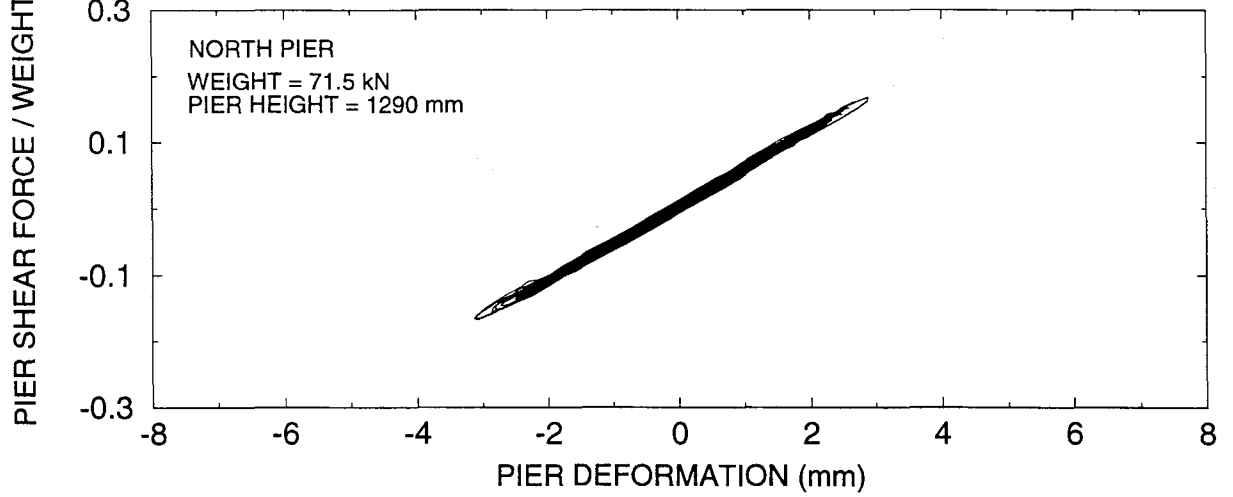
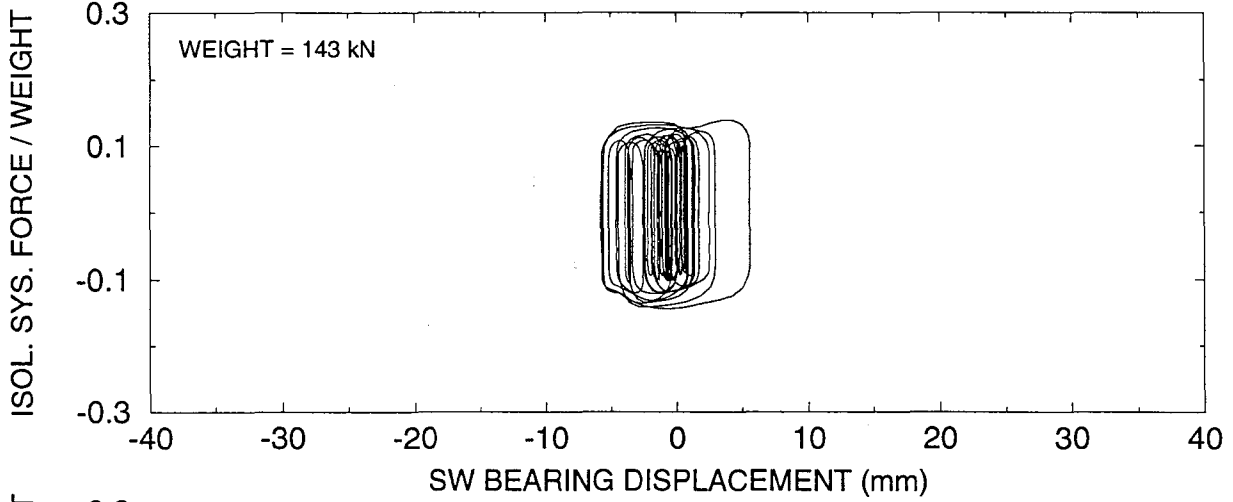
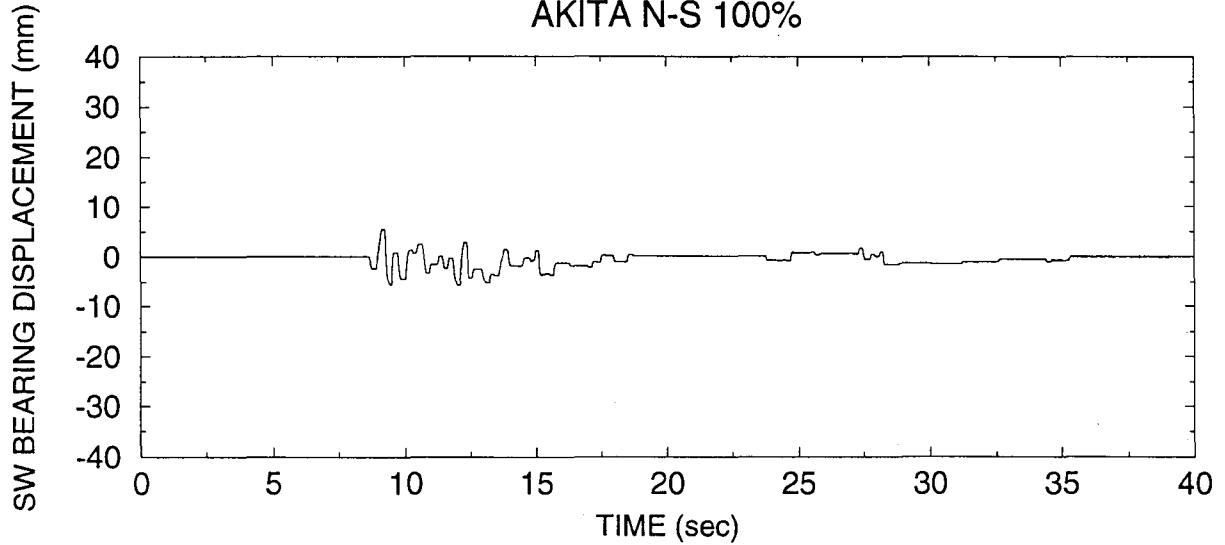


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MIYAGIKEN OKI E-W 600%

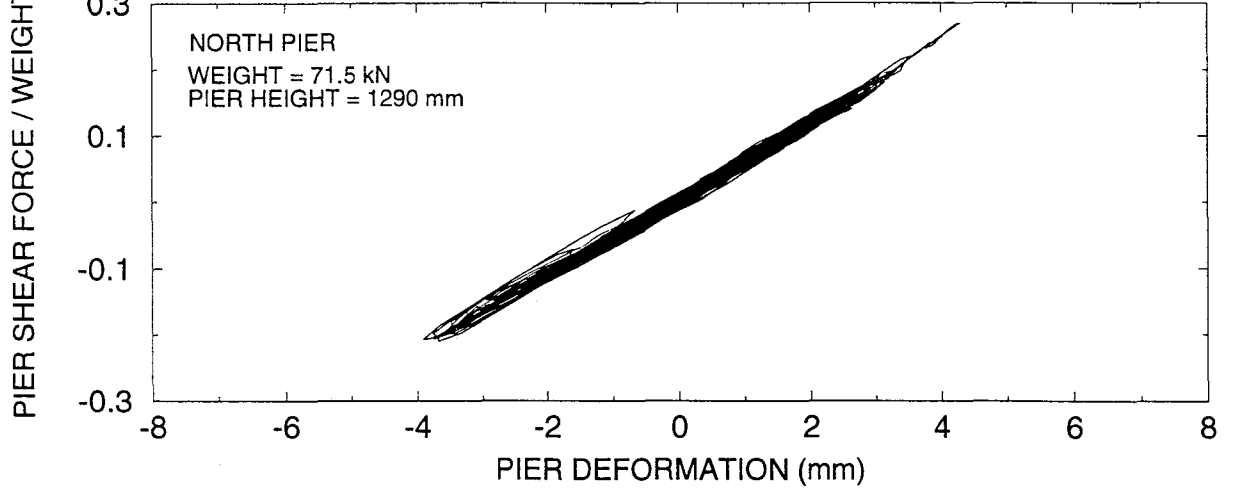
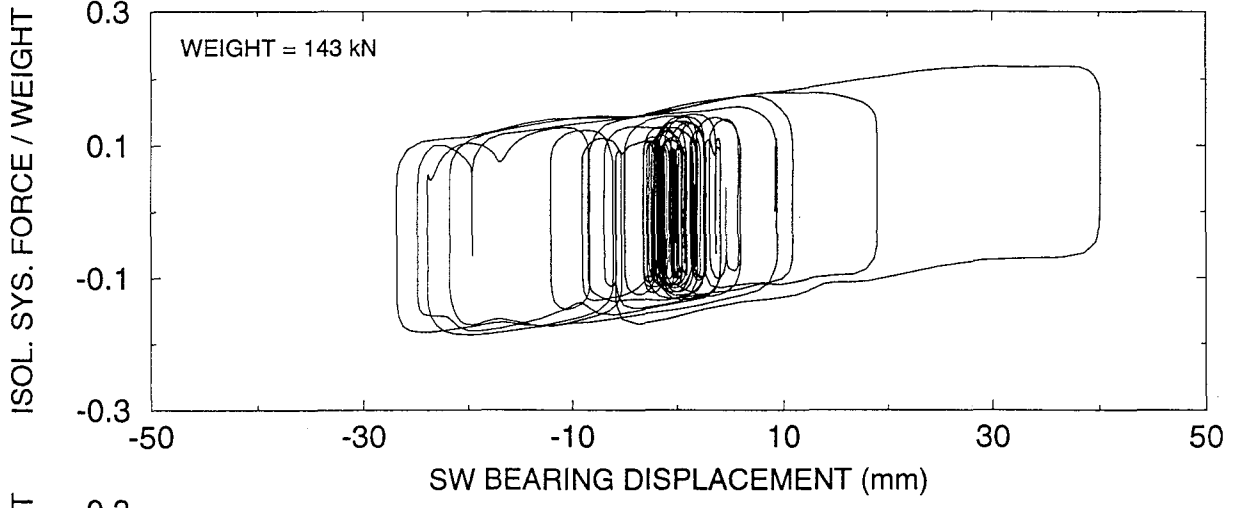
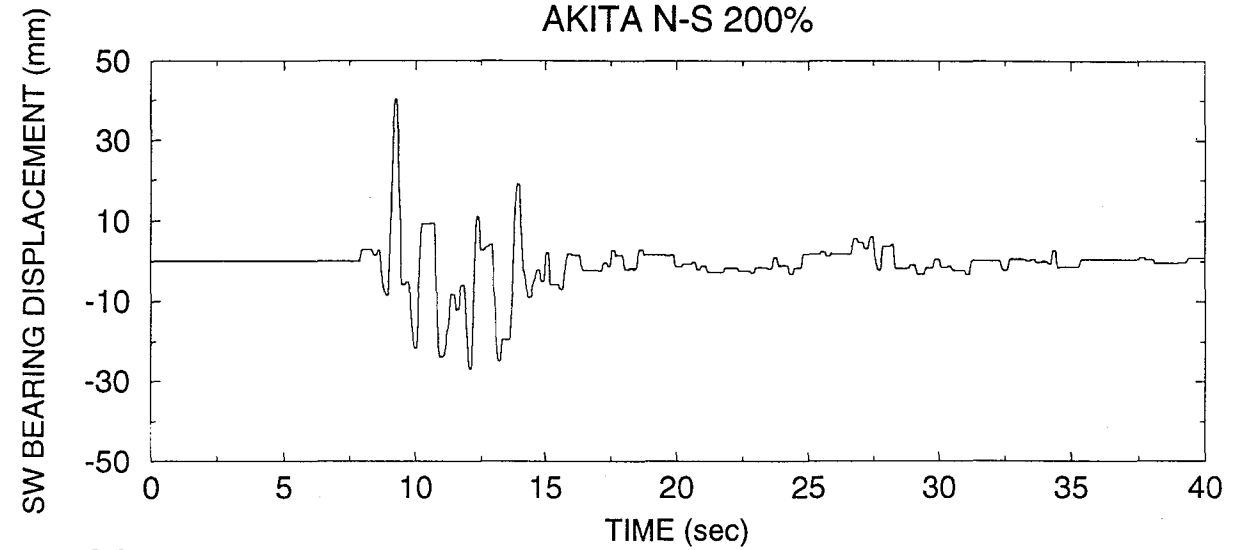




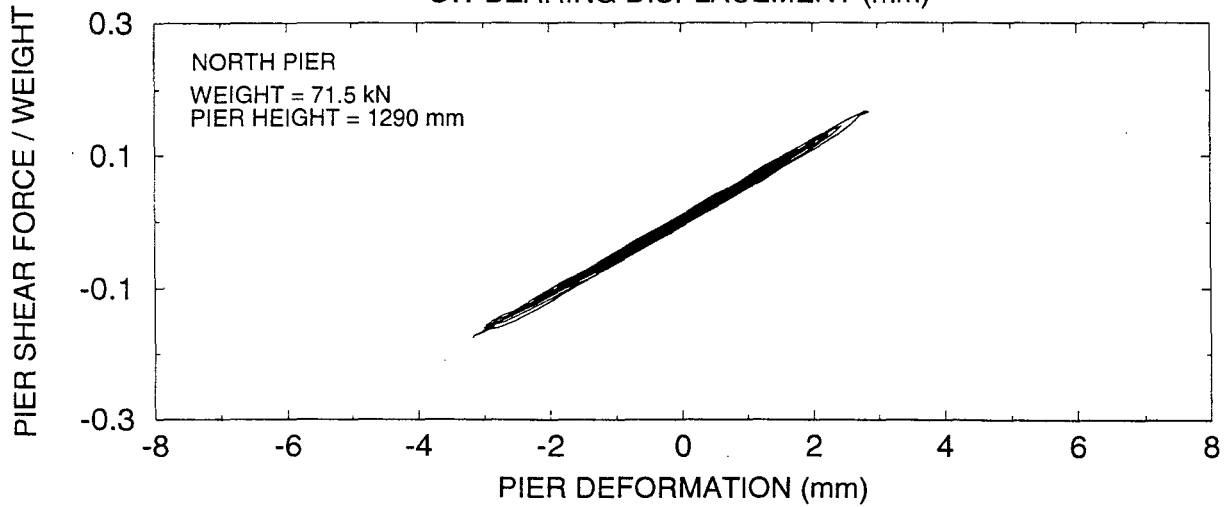
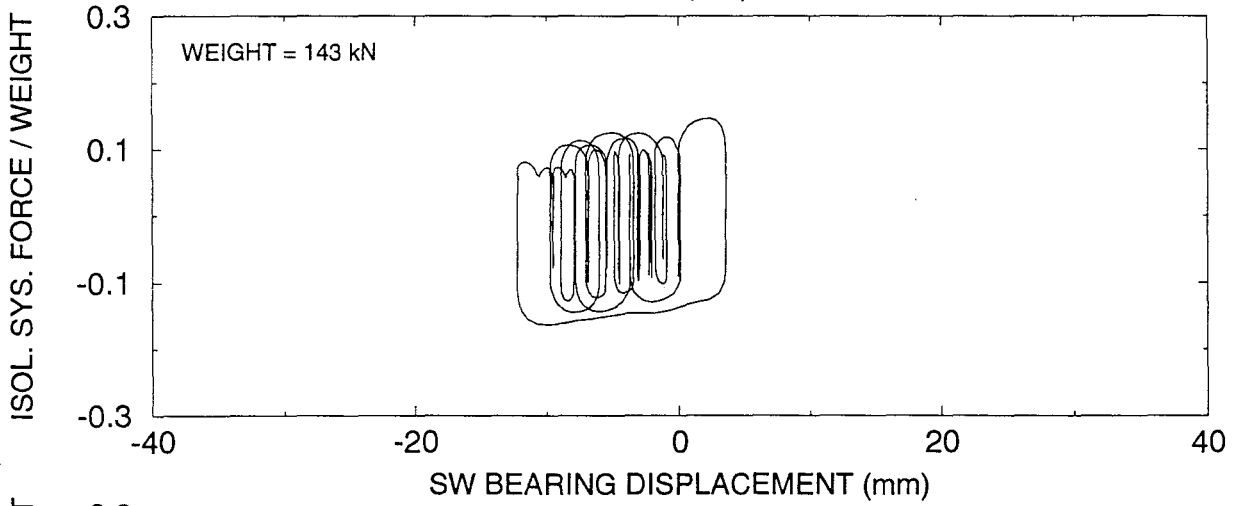
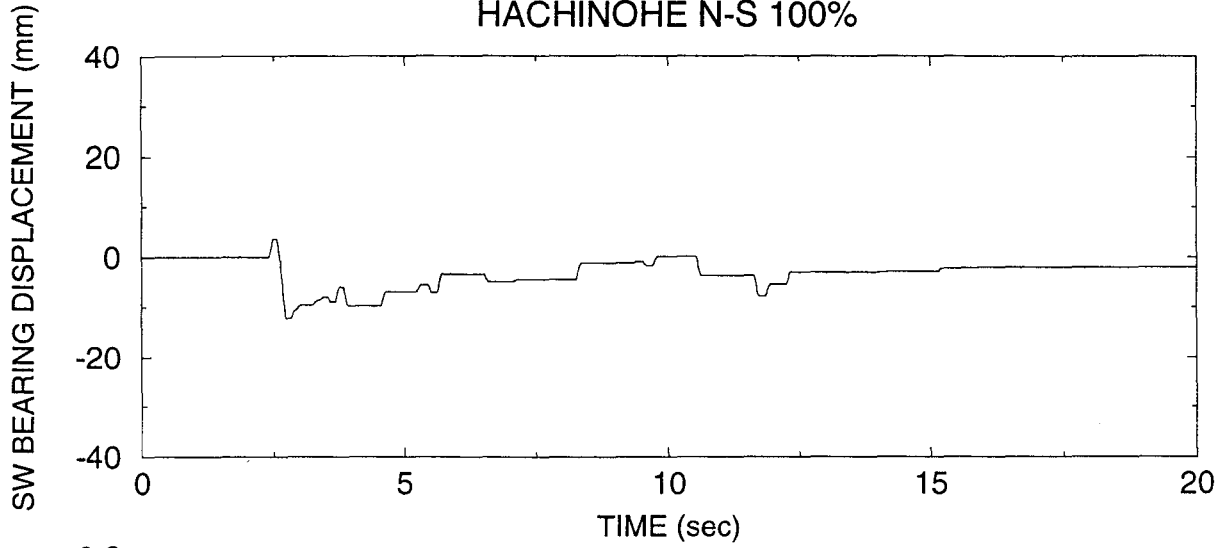
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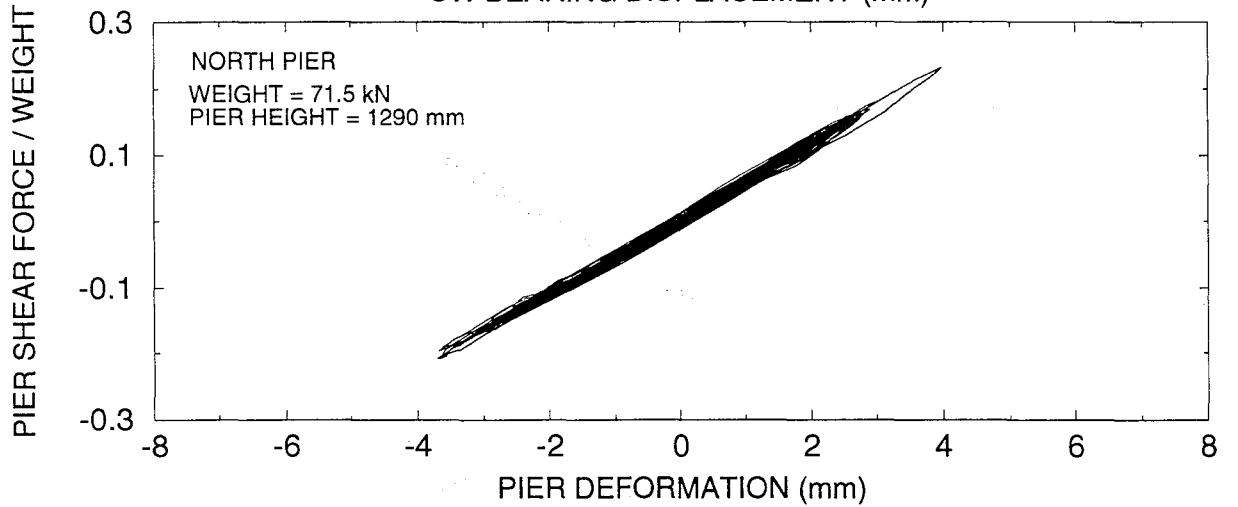
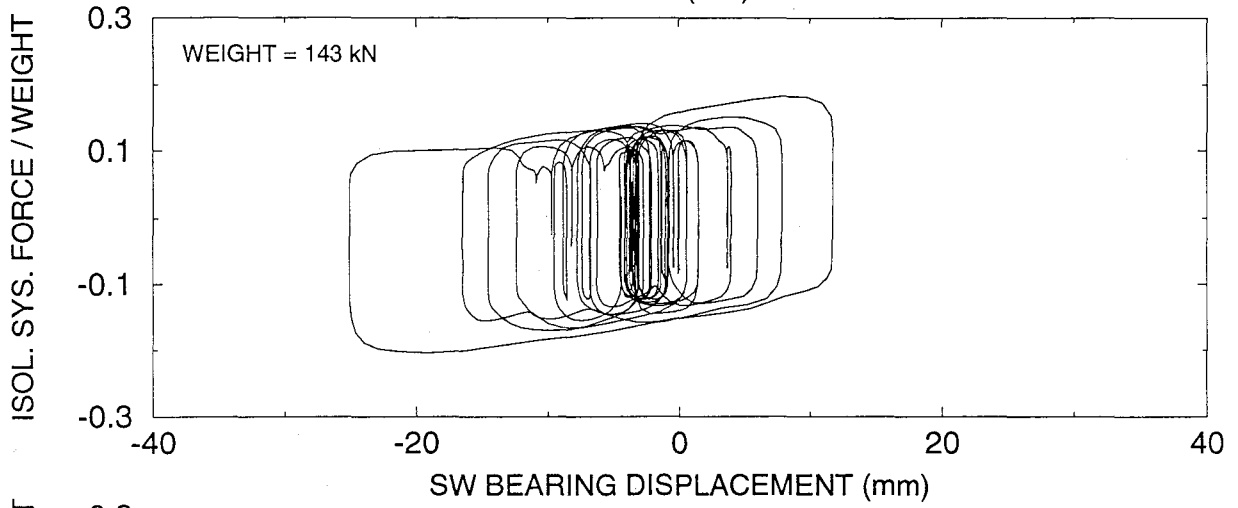
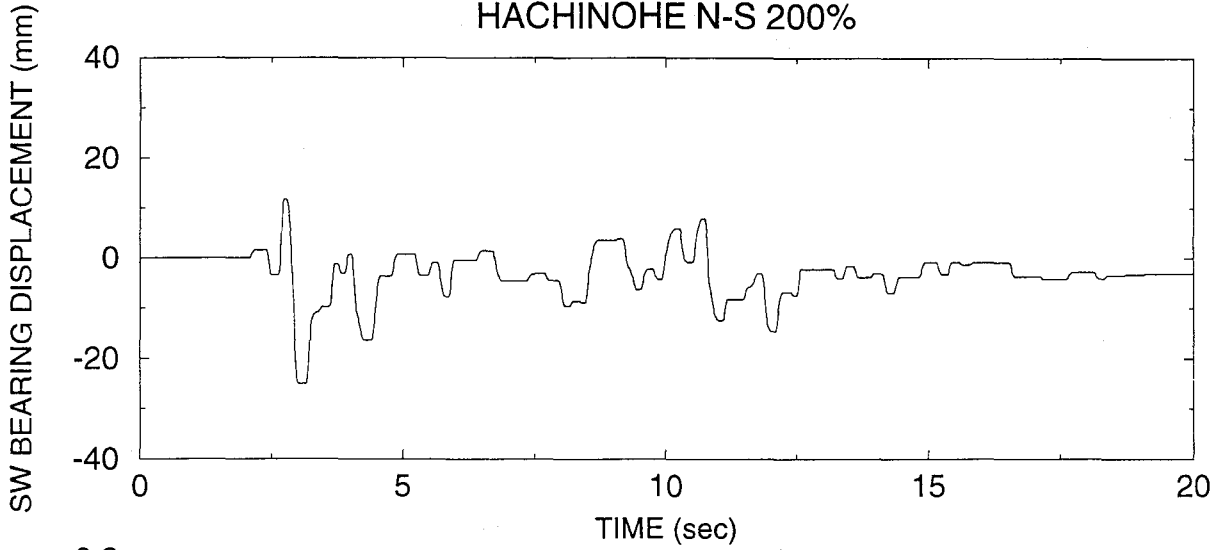
SYSTEM T1-No.2, TEST No. IRDRUN37  
AKITA N-S 200%



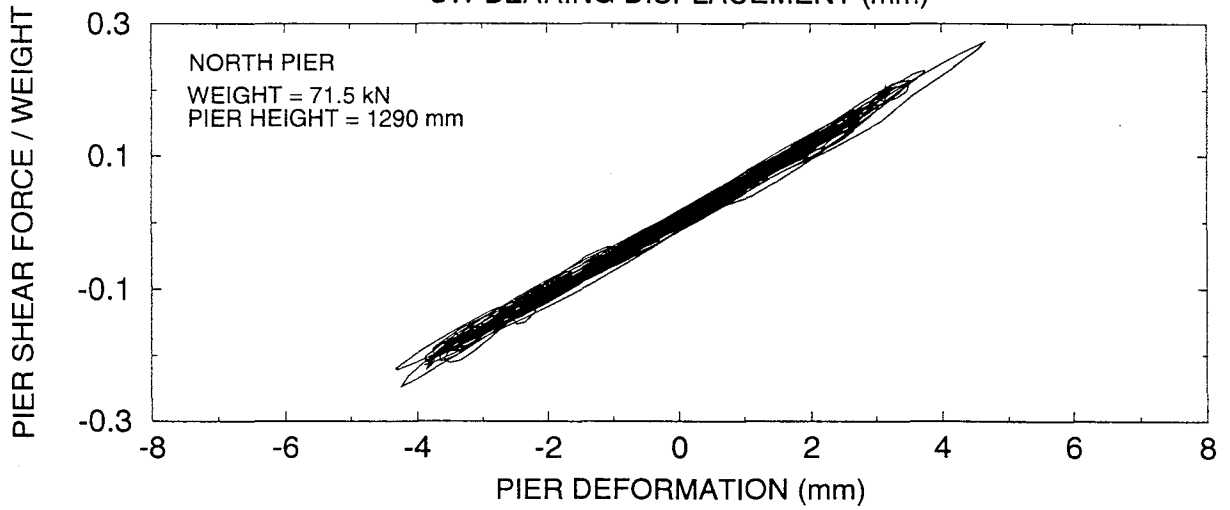
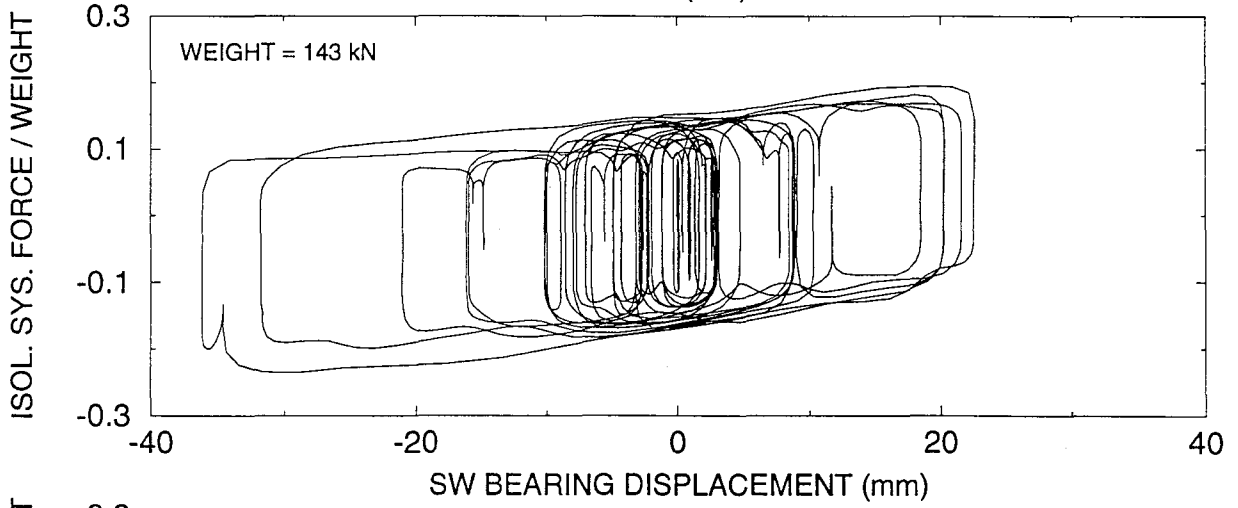
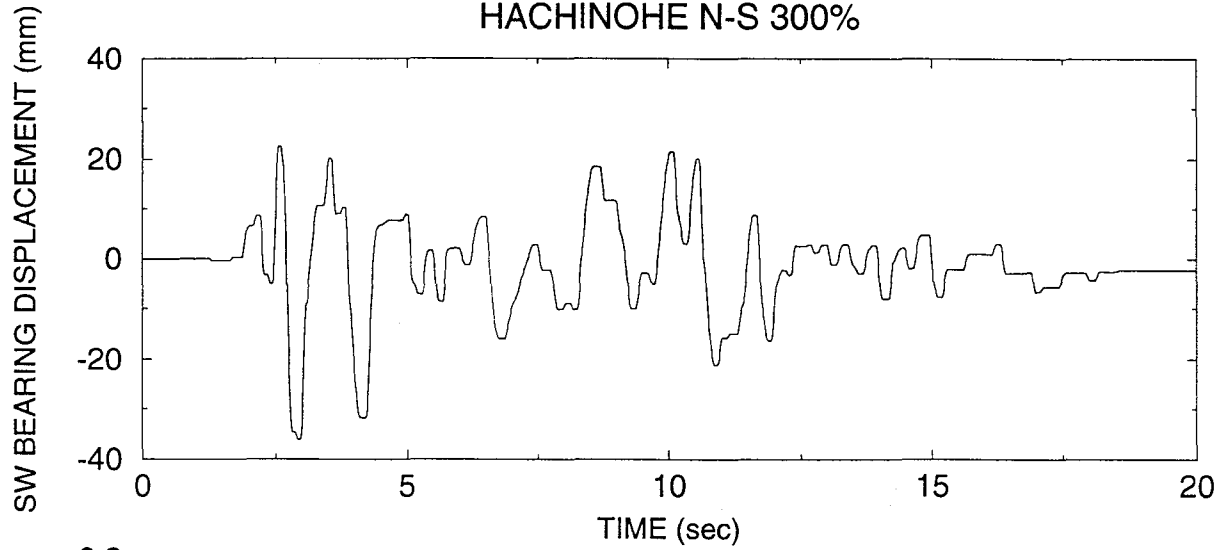
SYSTEM T1-No.2, TEST No. IRDRUN38  
HACHINOHE N-S 100%



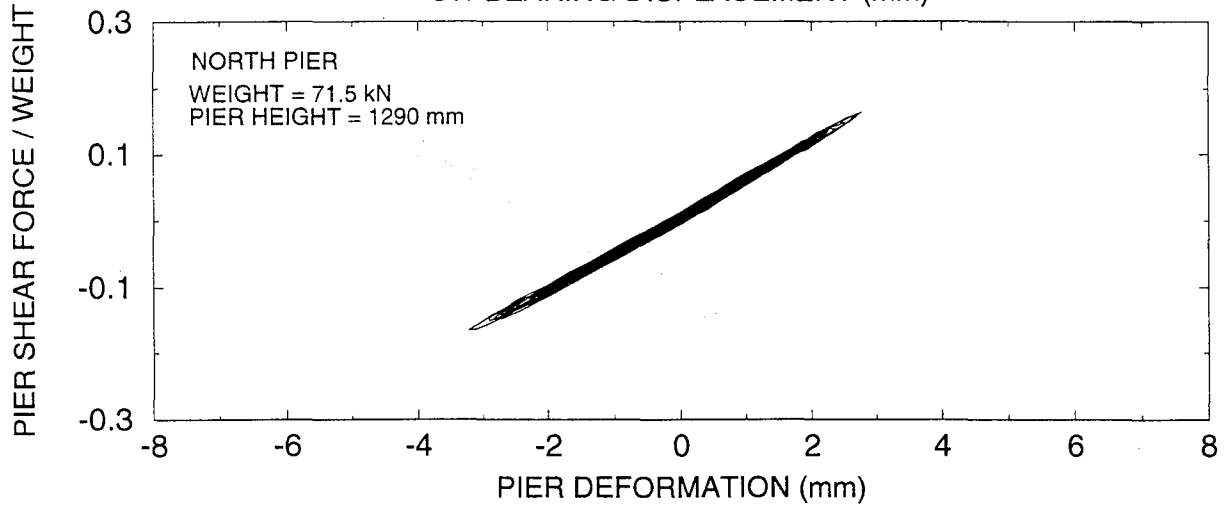
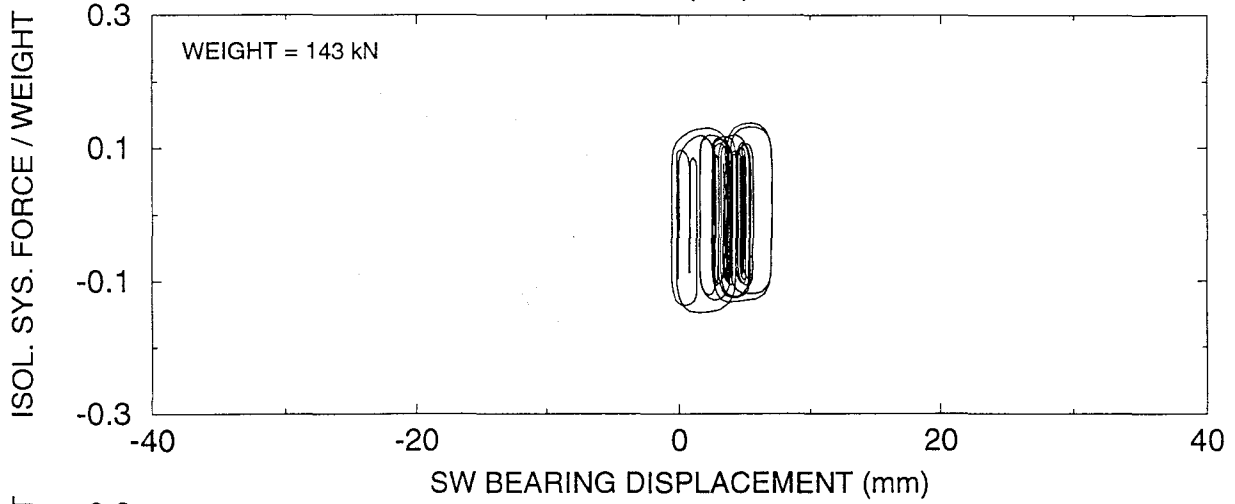
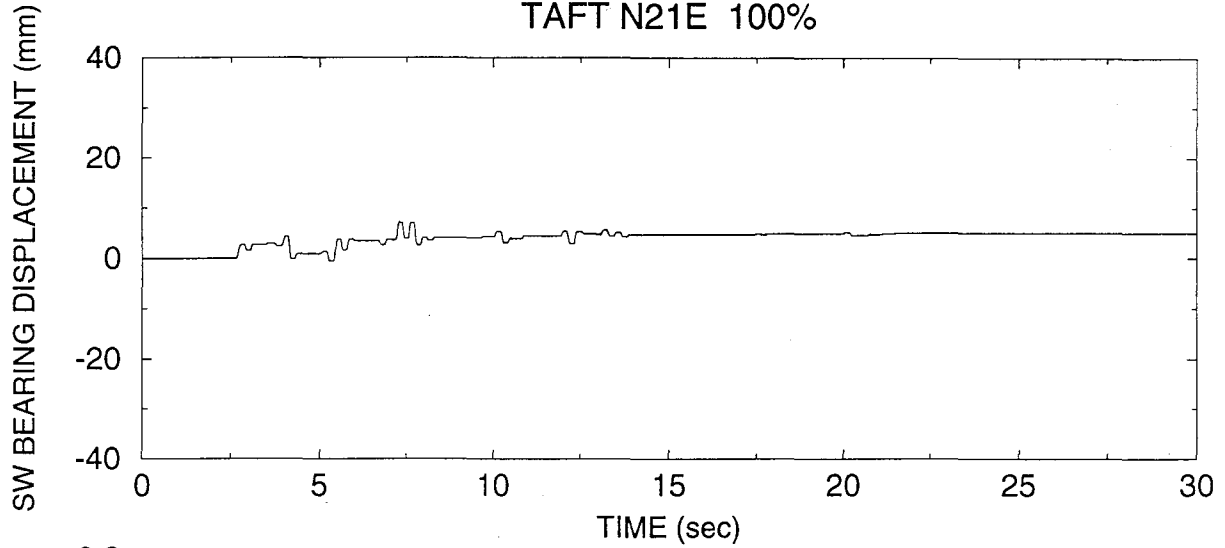
SYSTEM T1-No.2, TEST No. IRDRUN39  
HACHINOHE N-S 200%



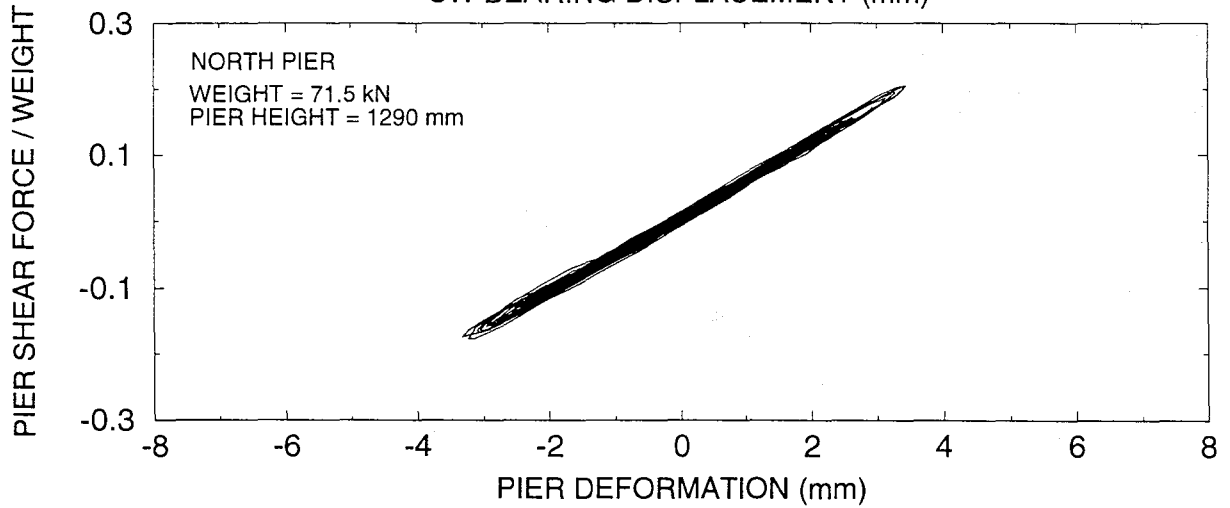
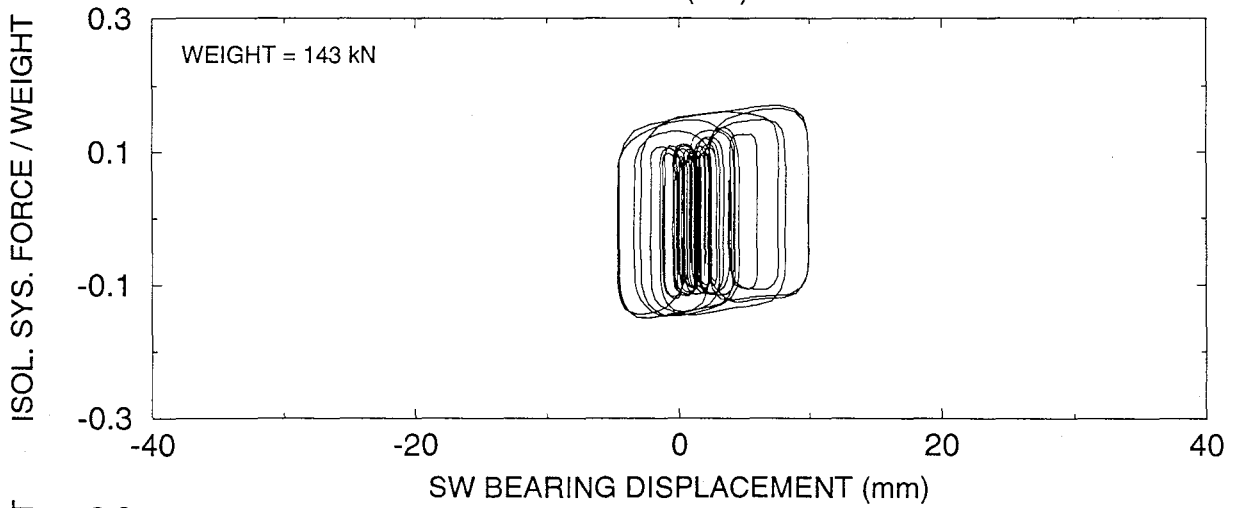
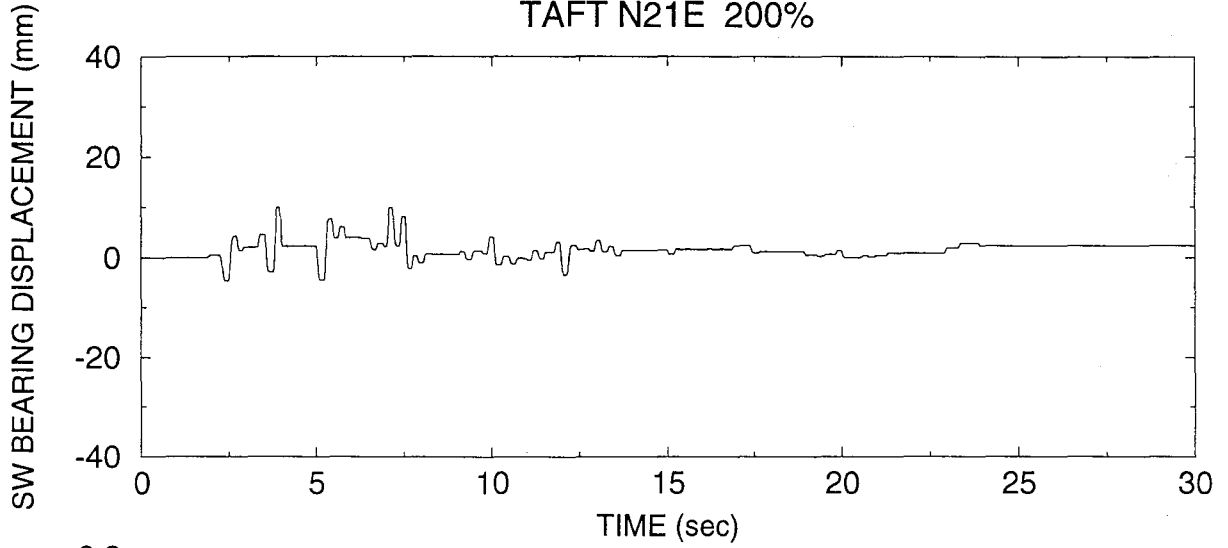
SYSTEM T1-No.2, TEST No. IRDRUN41  
HACHINOHE N-S 300%



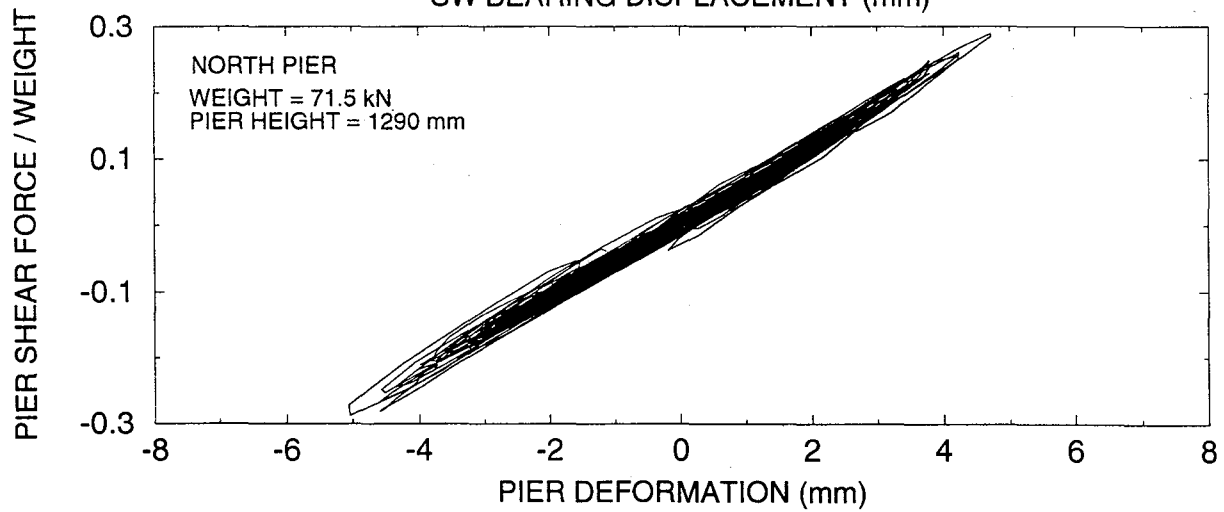
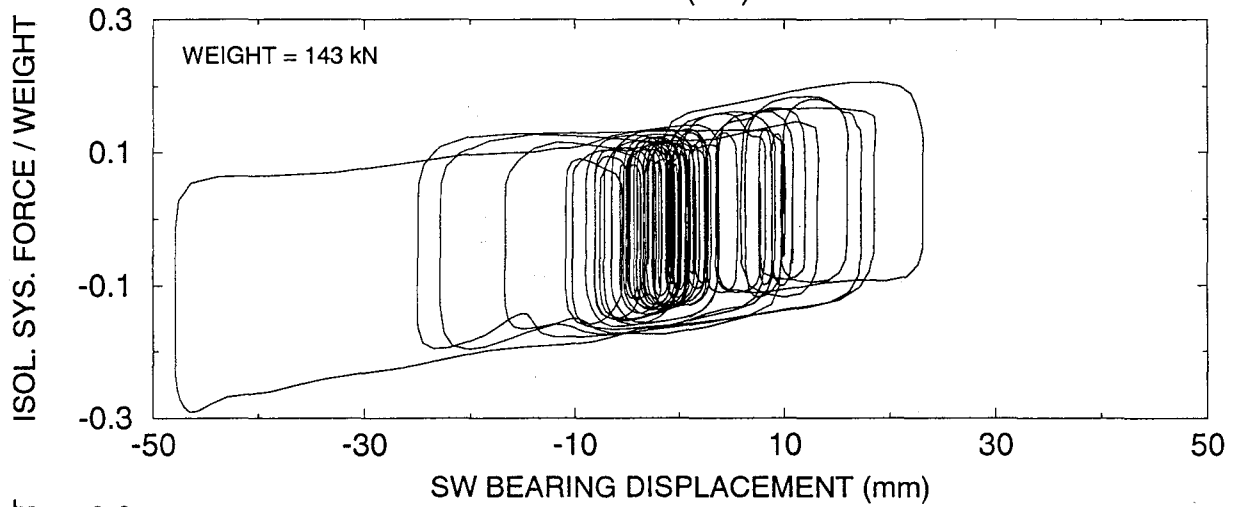
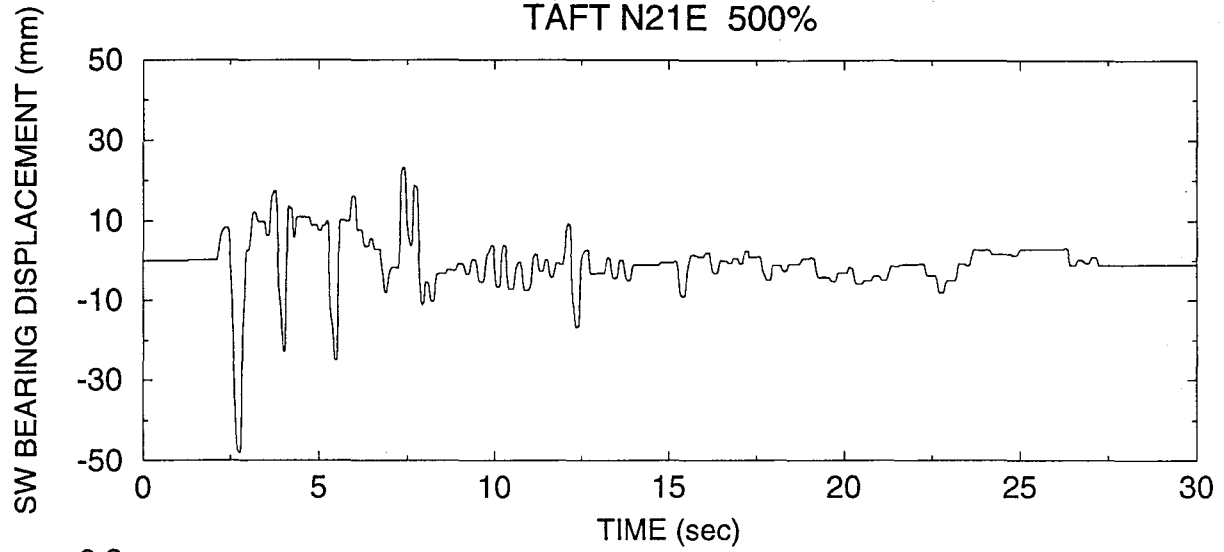
SYSTEM T1-No.2, TEST No. IRDRUN42  
TAFT N21E 100%



SYSTEM T1-No.2, TEST No. IRDRUN43  
TAFT N21E 200%

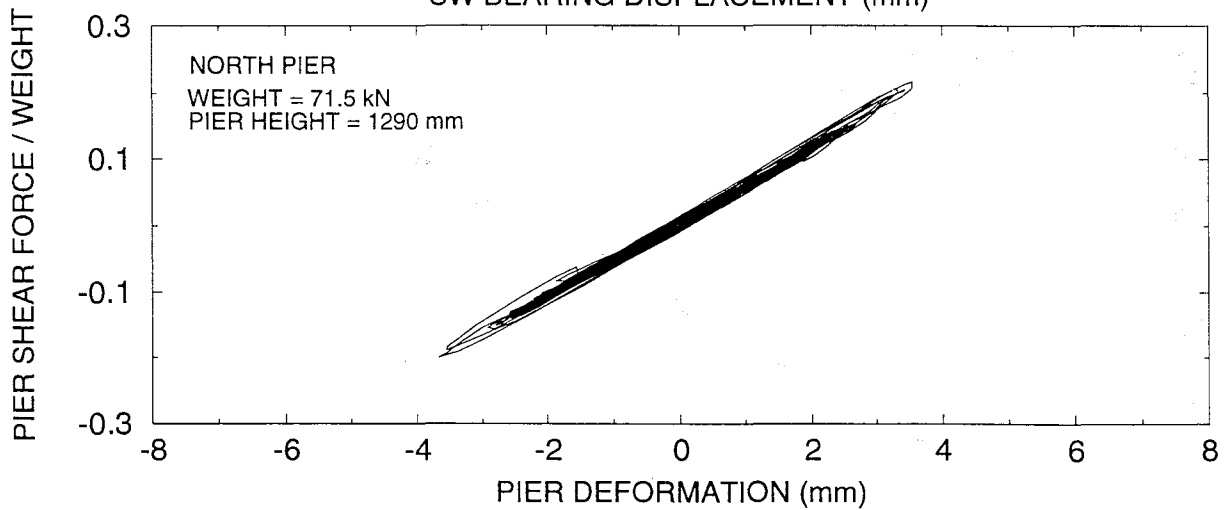
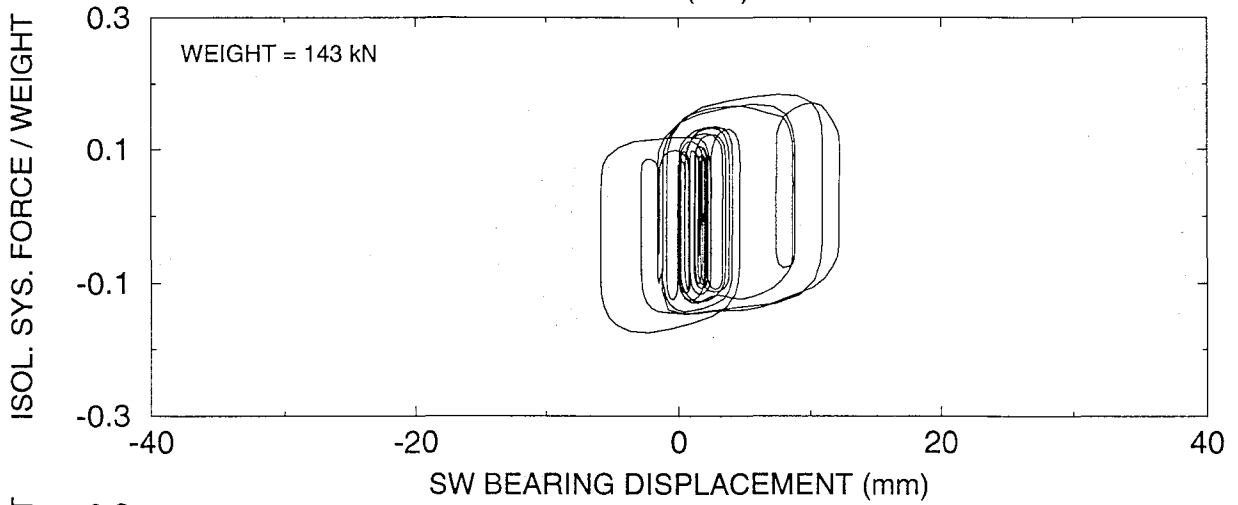
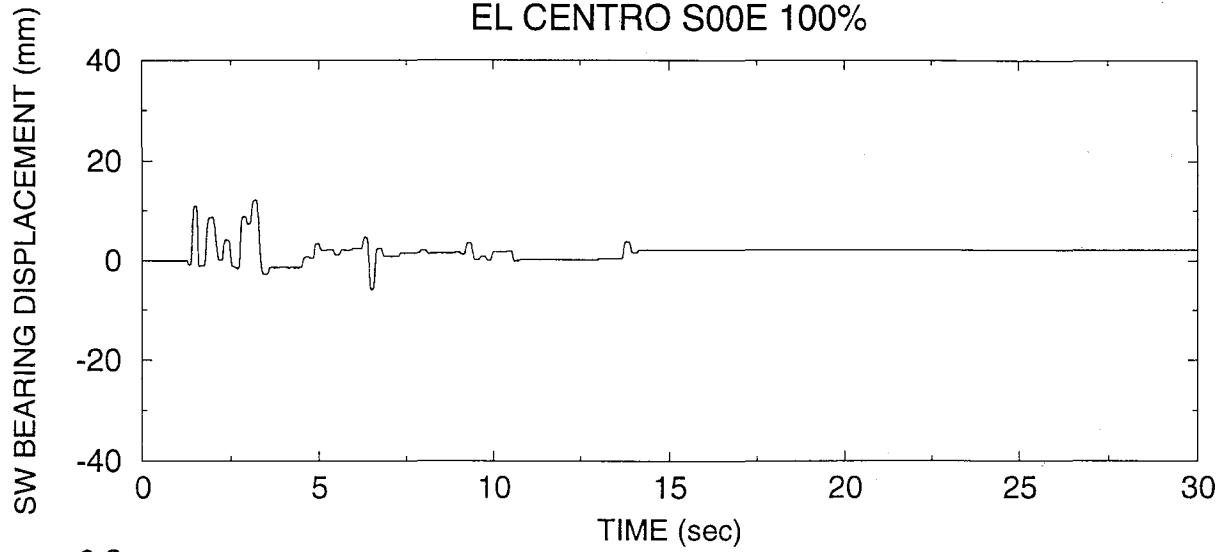


SYSTEM T1-No.2, TEST No. IRDRUN45  
TAFT N21E 500%

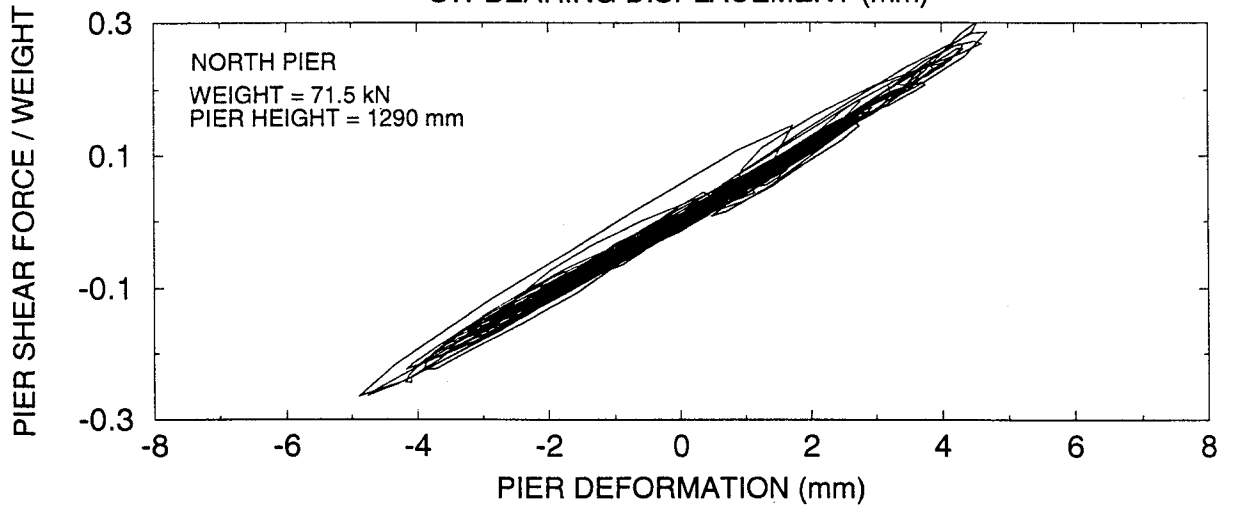
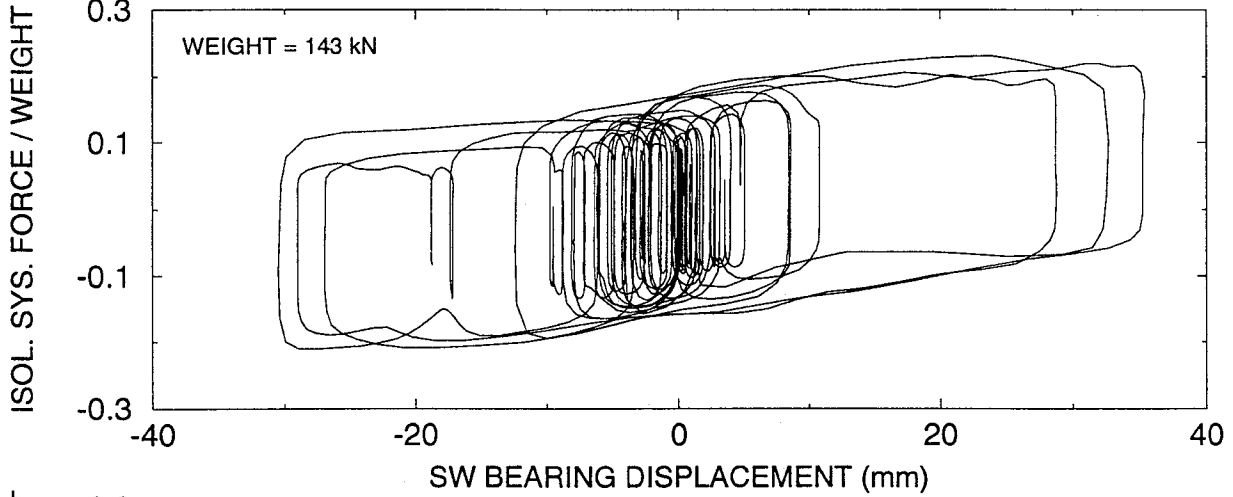
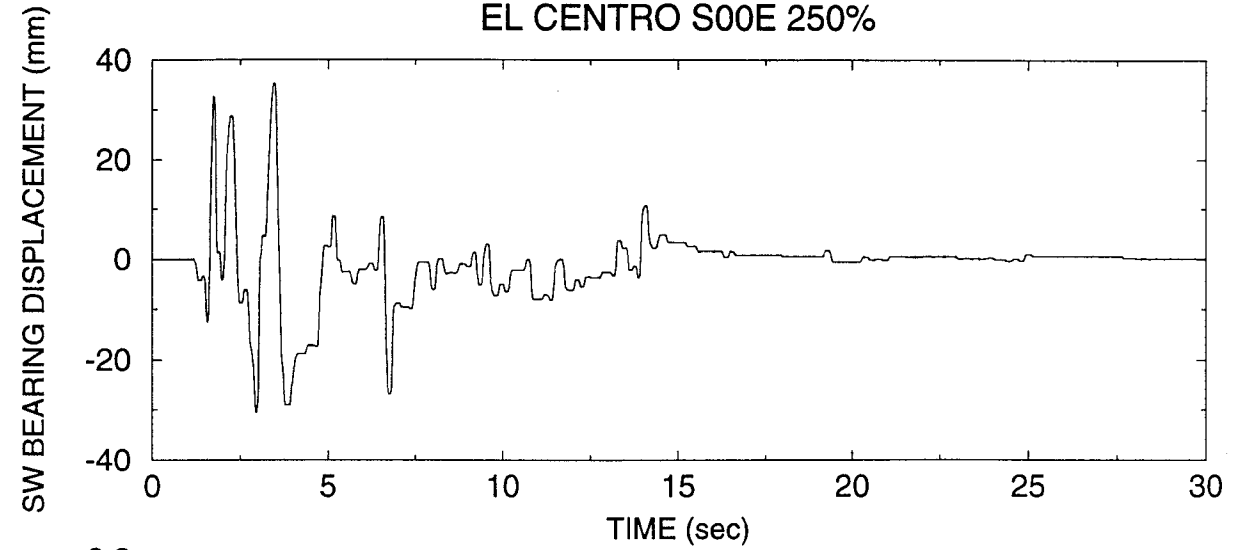




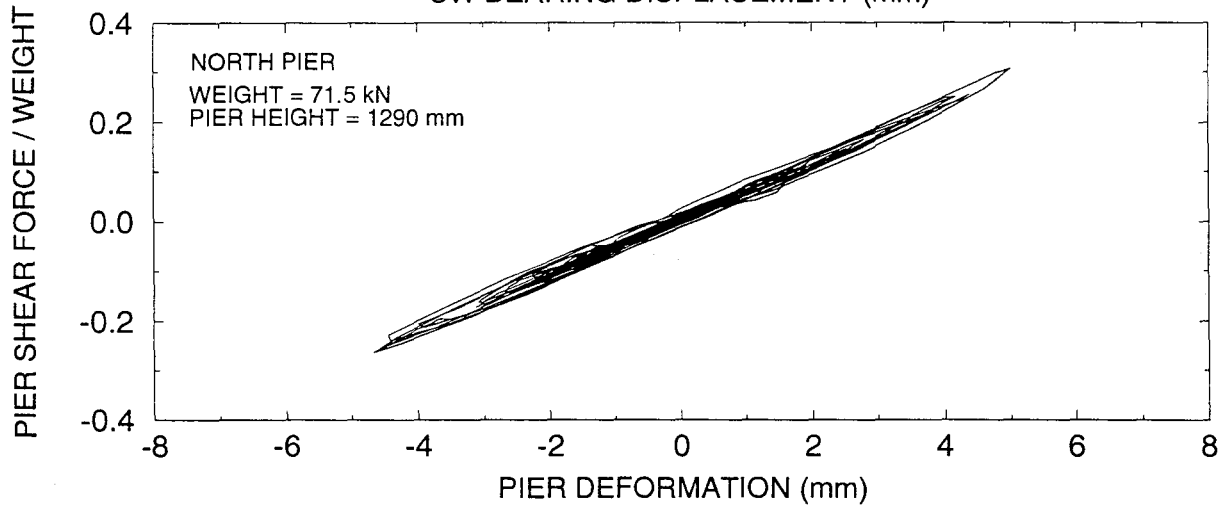
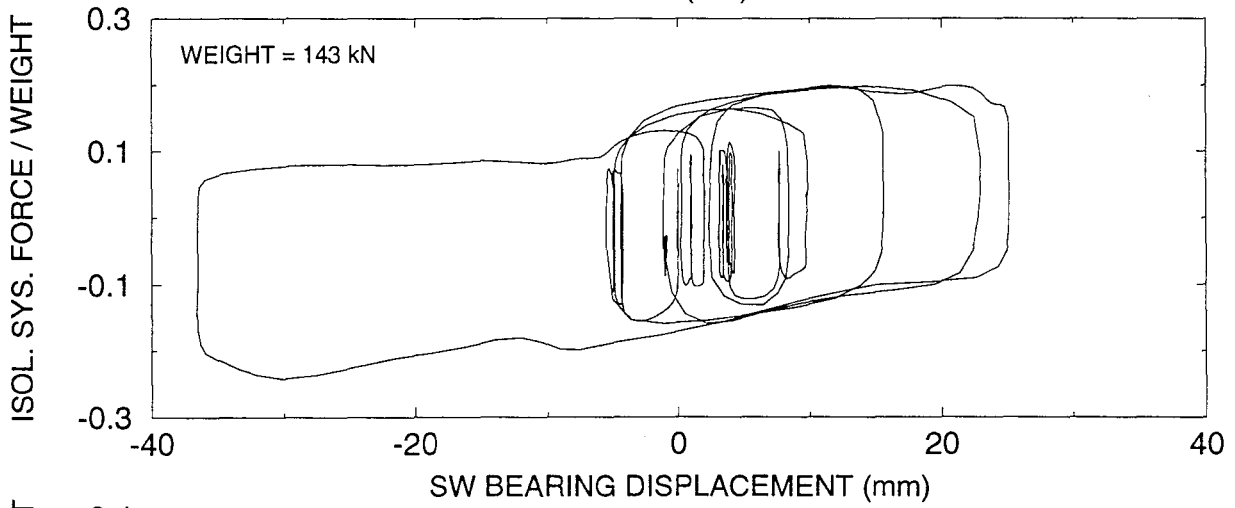
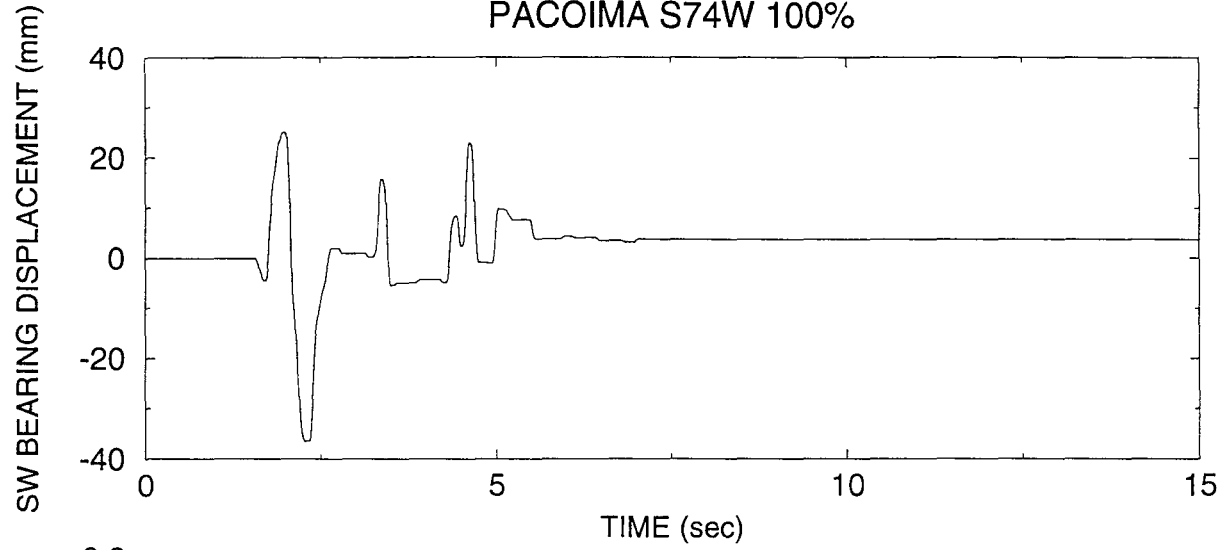
SYSTEM T1-No.2, TEST No. IRDRUN46  
EL CENTRO S00E 100%



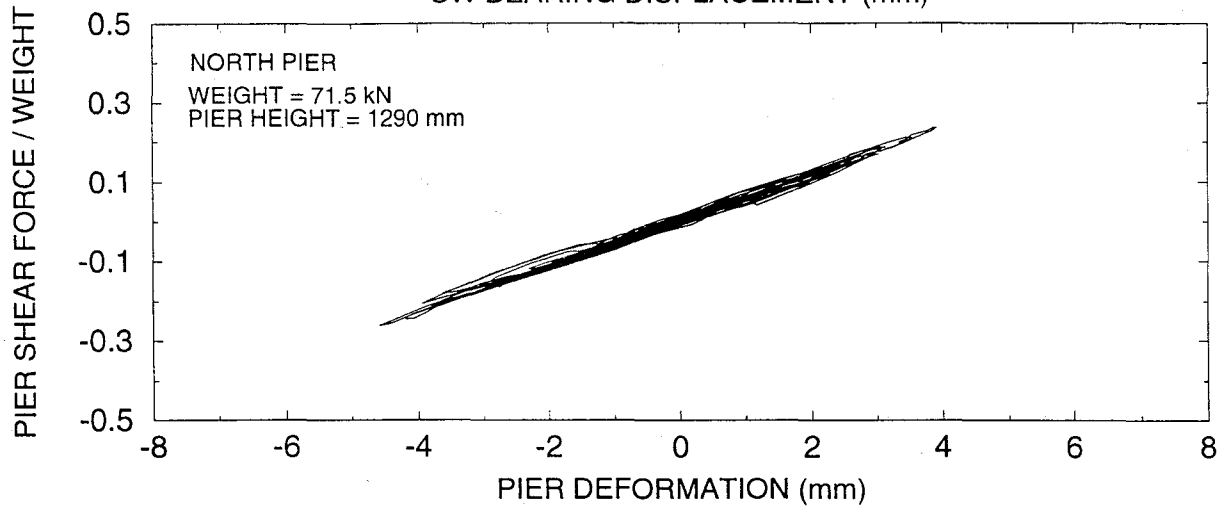
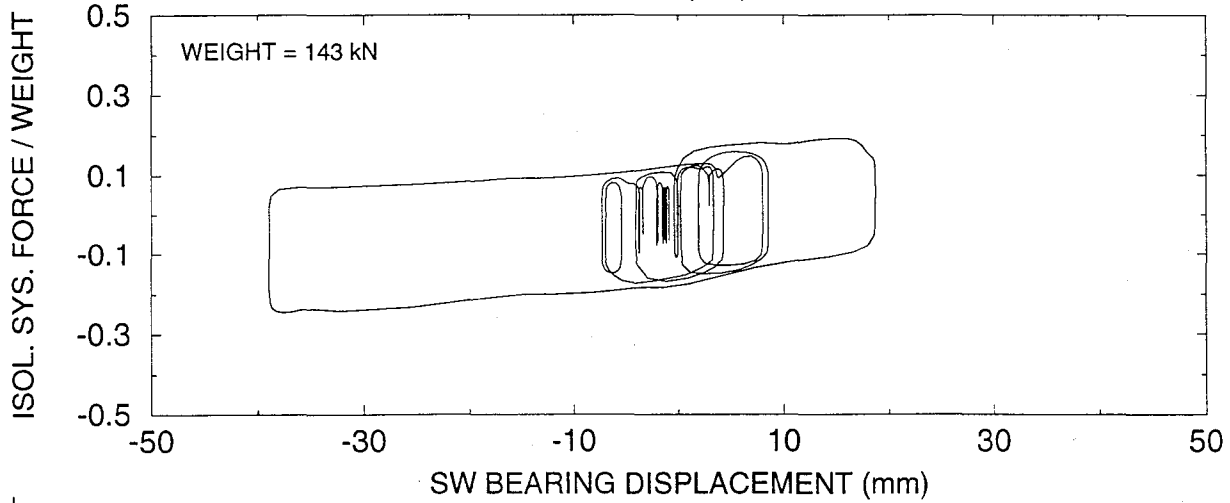
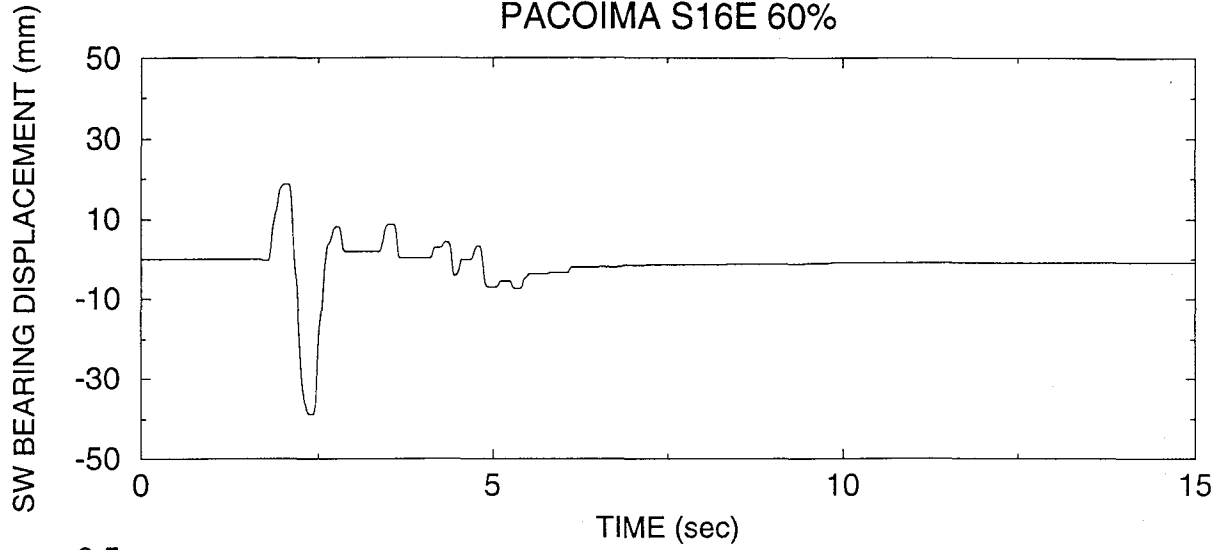
SYSTEM T1-No.2, TEST No. IRDRUN48  
EL CENTRO S00E 250%



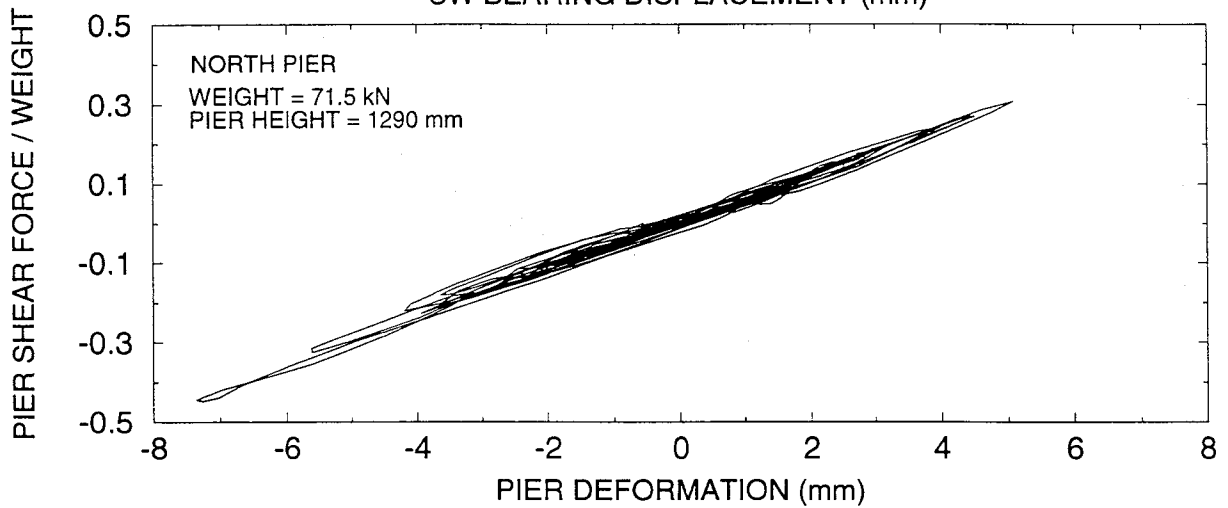
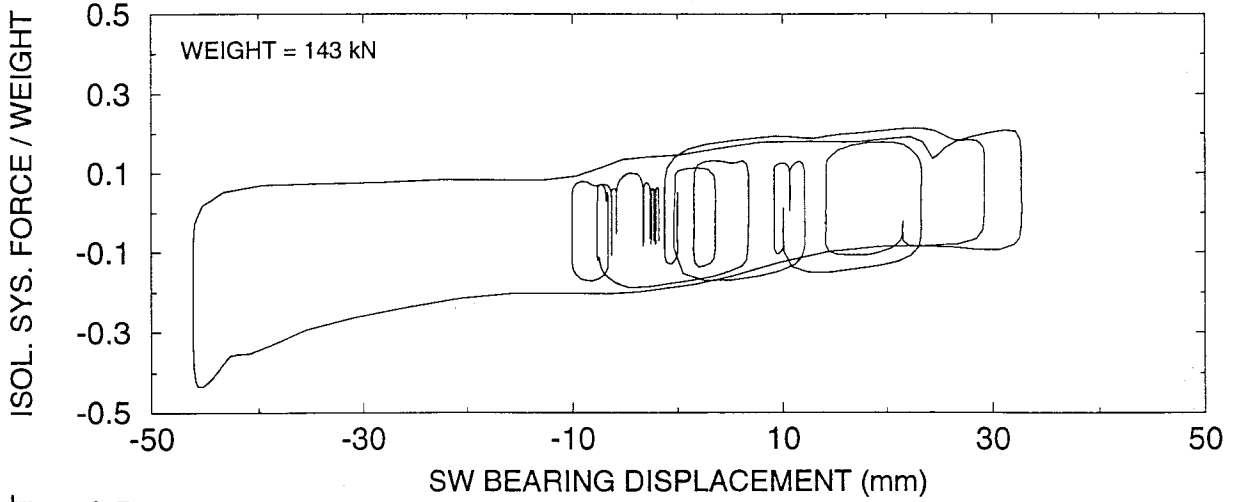
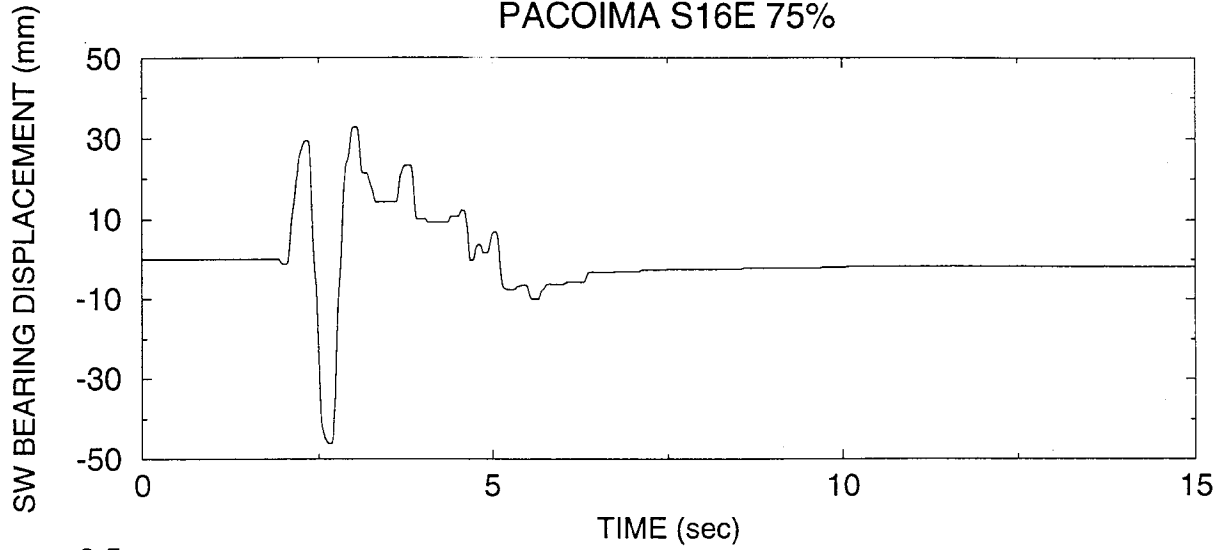
SYSTEM T1-No.2, TEST No. IRDRUN50  
PACOIMA S74W 100%



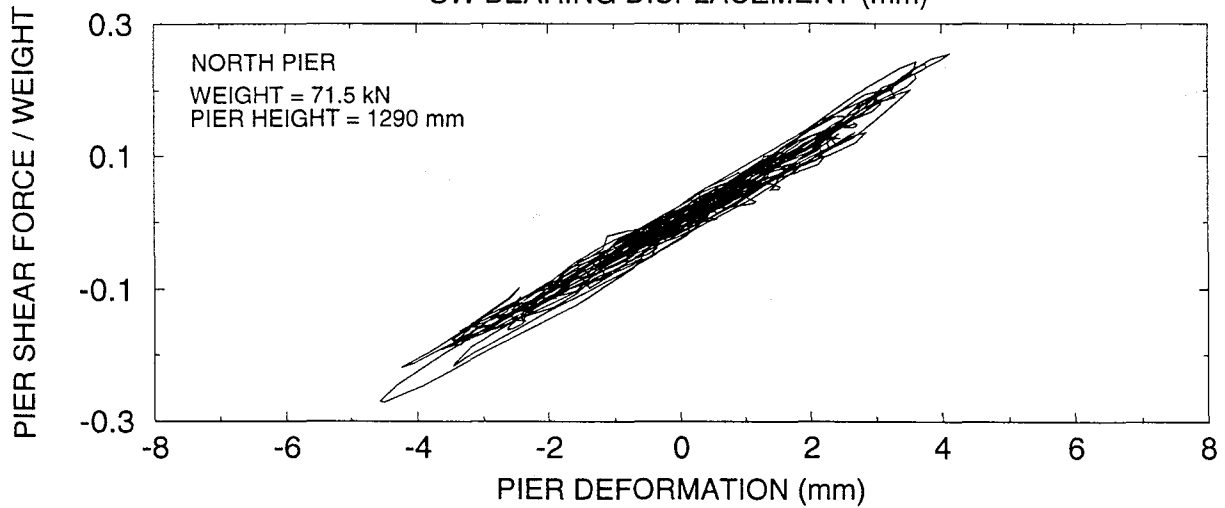
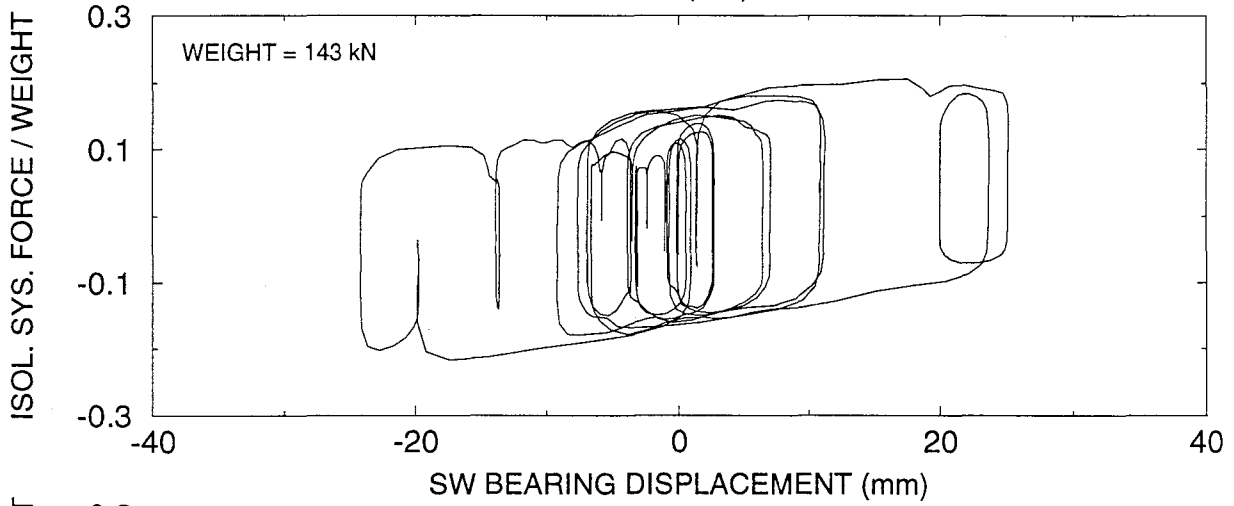
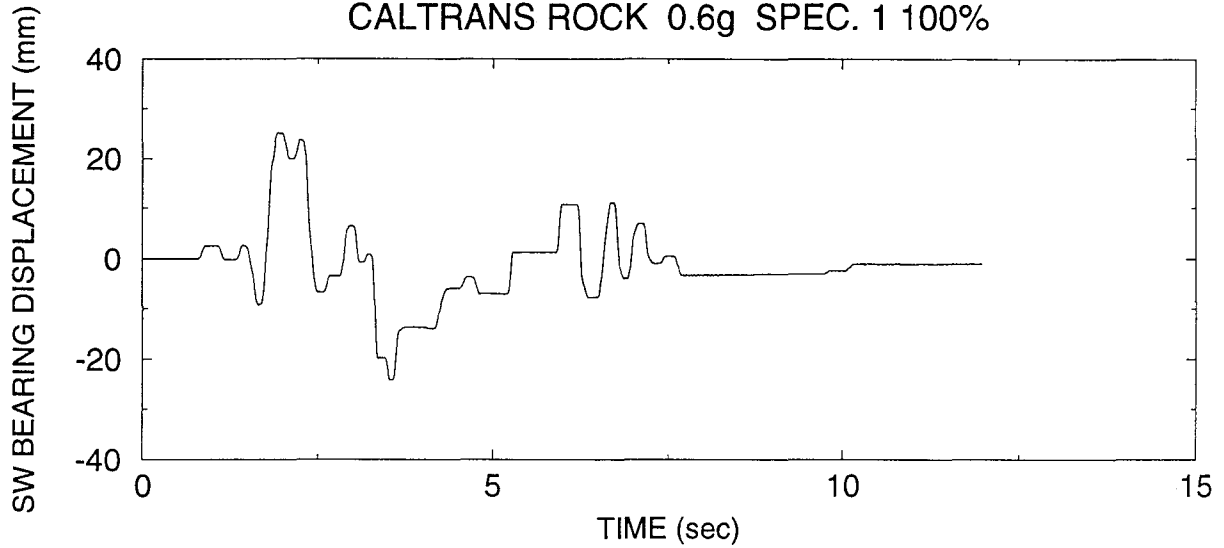
SYSTEM T1-No.2, TEST No. IRDRUN52  
PACOIMA S16E 60%



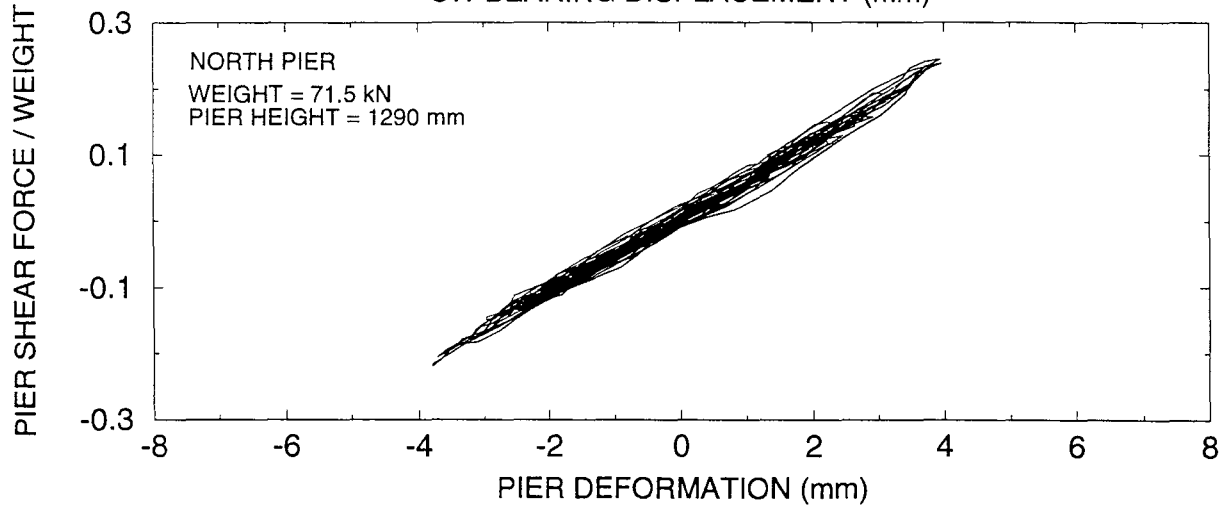
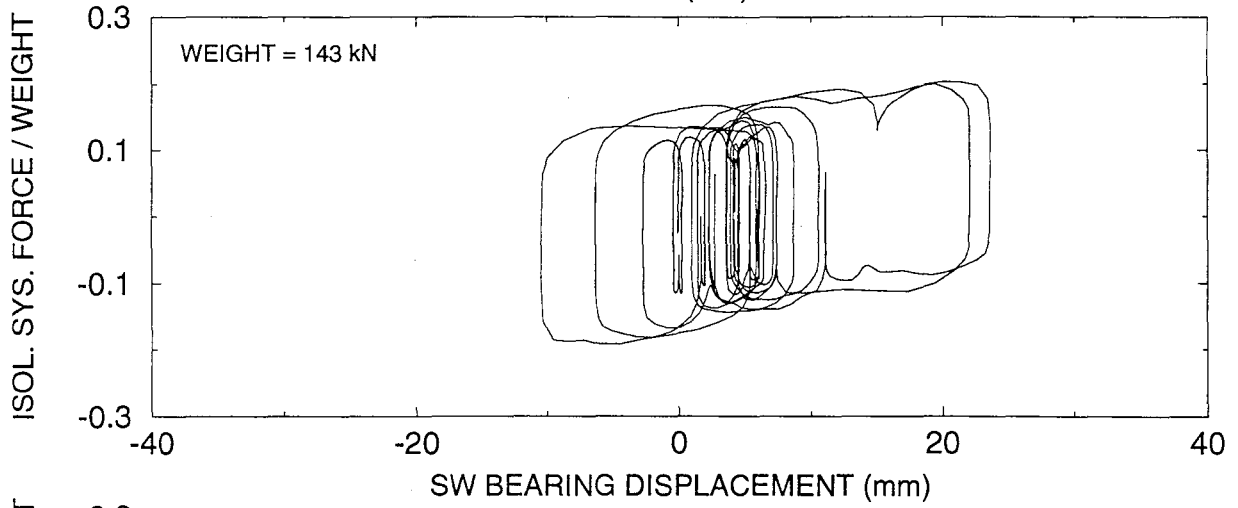
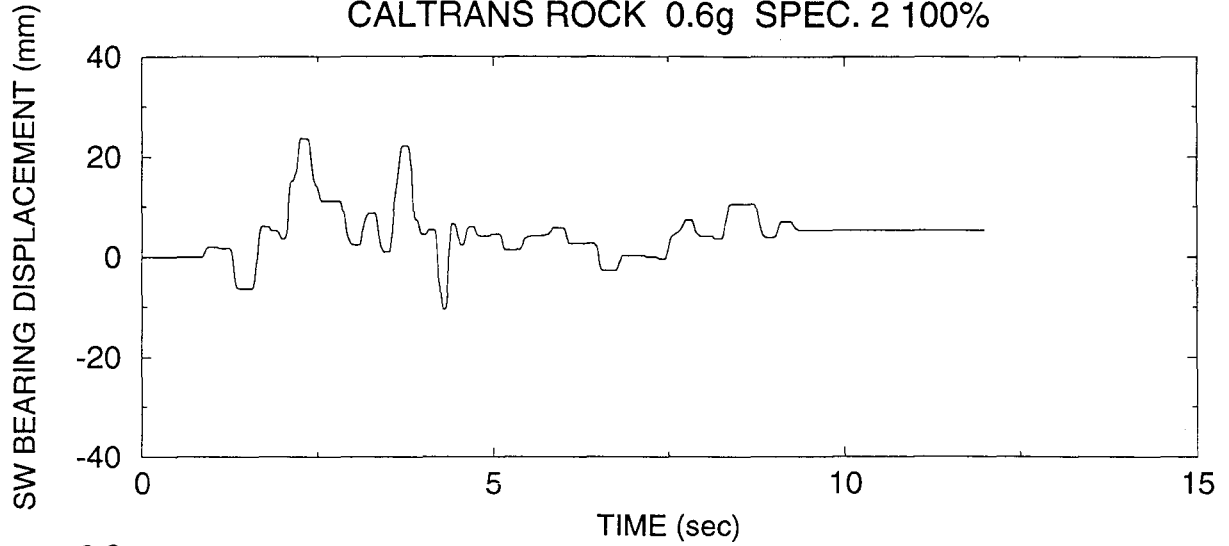
SYSTEM T1-No.2, TEST No. IRDRUN53  
PACOIMA S16E 75%



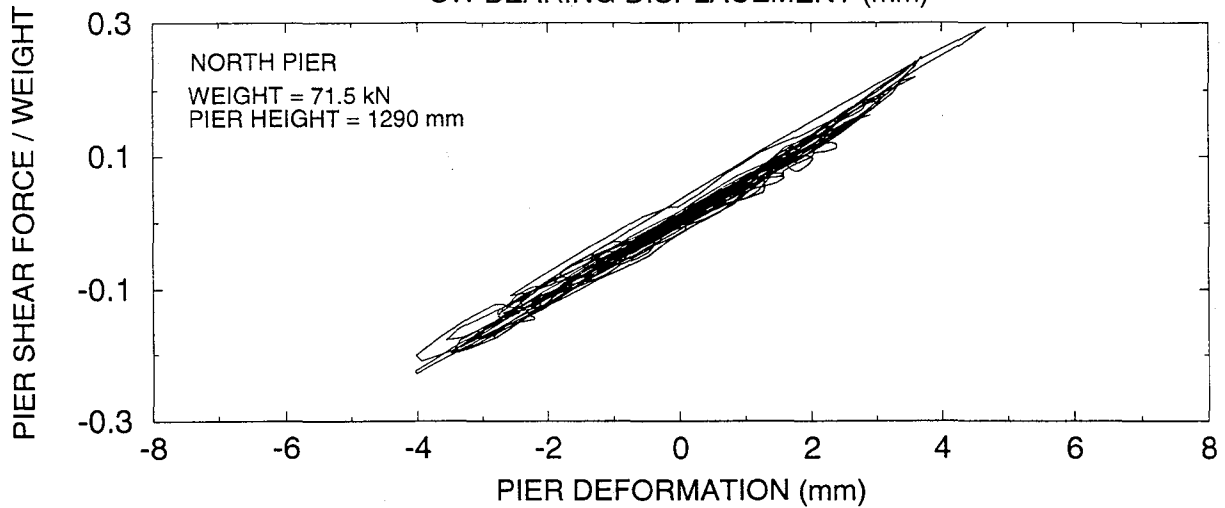
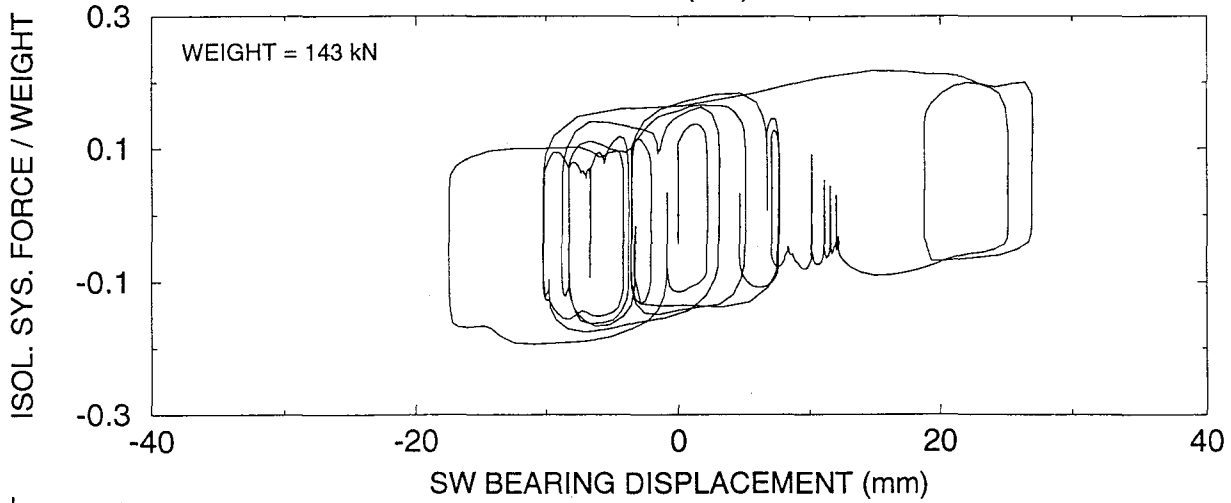
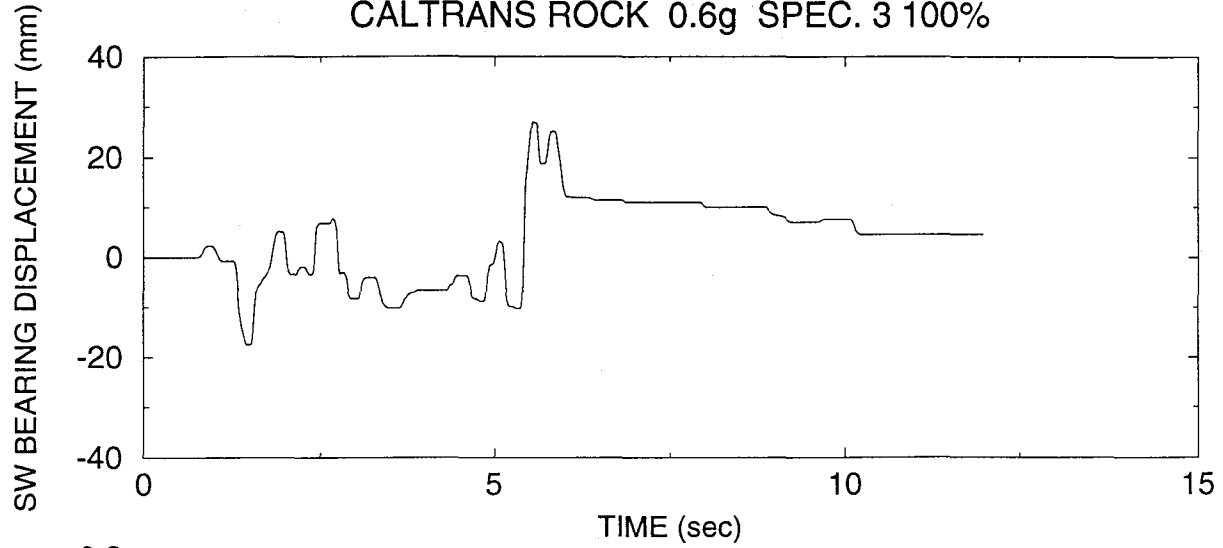
SYSTEM T1-No.2, TEST No. IRDRUN54  
CALTRANS ROCK 0.6g SPEC. 1 100%



SYSTEM T1-No.2, TEST No. IRDRUN55  
CALTRANS ROCK 0.6g SPEC. 2 100%

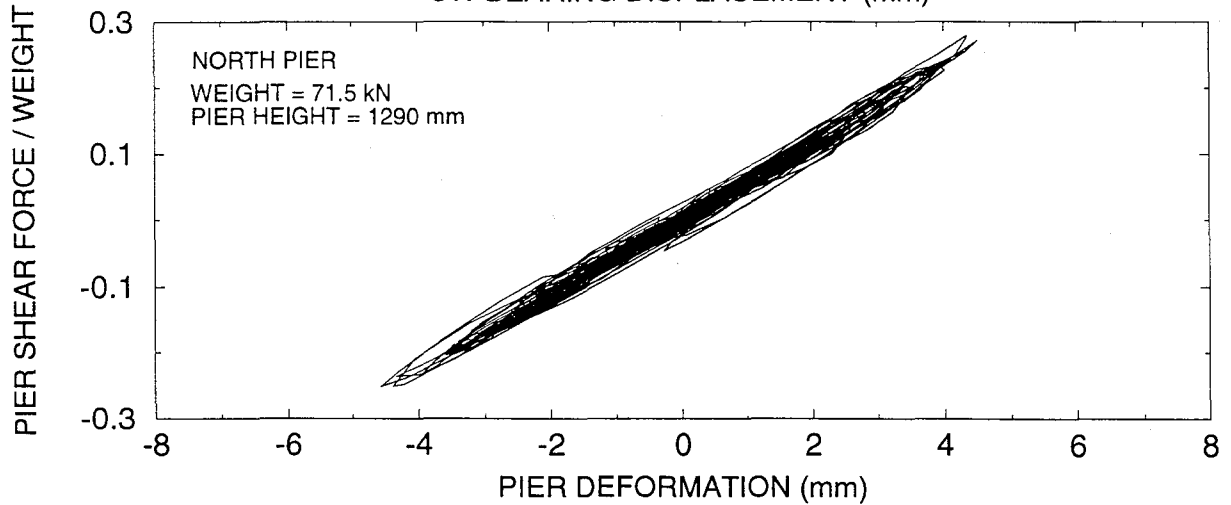
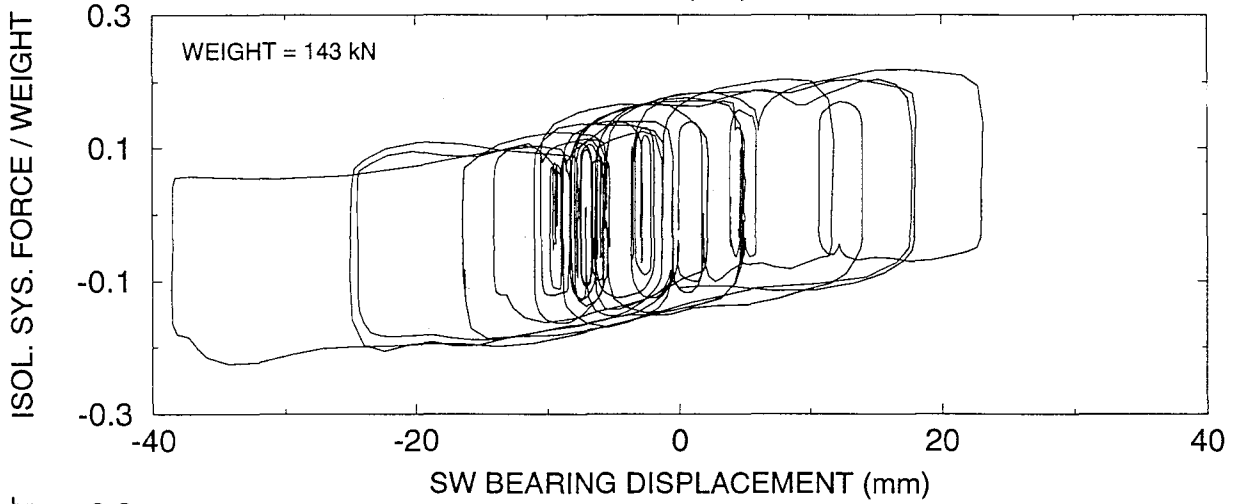
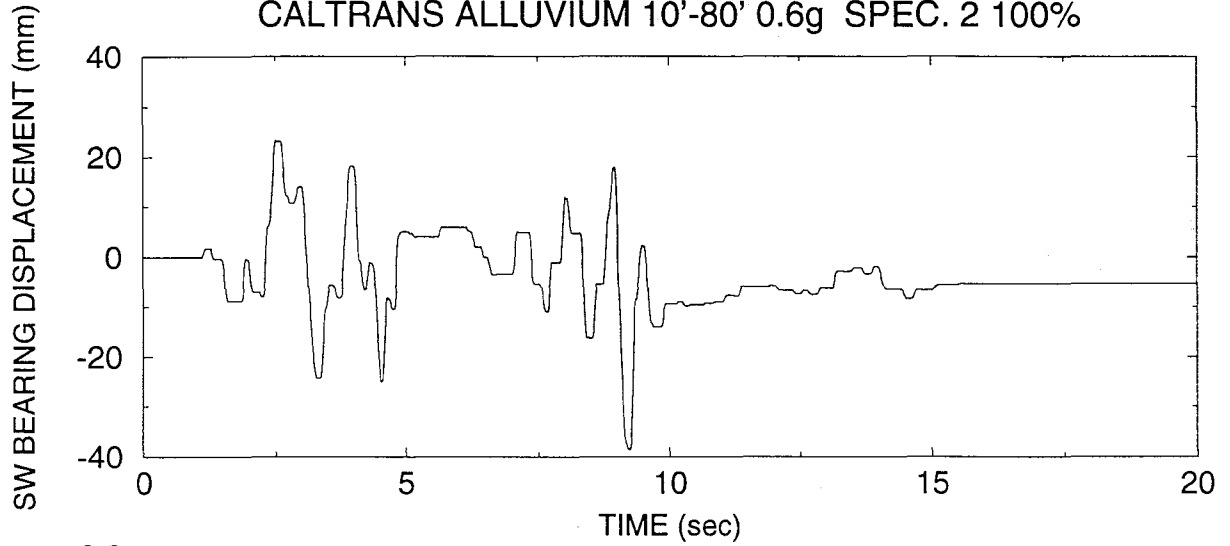


SYSTEM T1-No.2, TEST No. IRDRUN56  
CALTRANS ROCK 0.6g SPEC. 3 100%

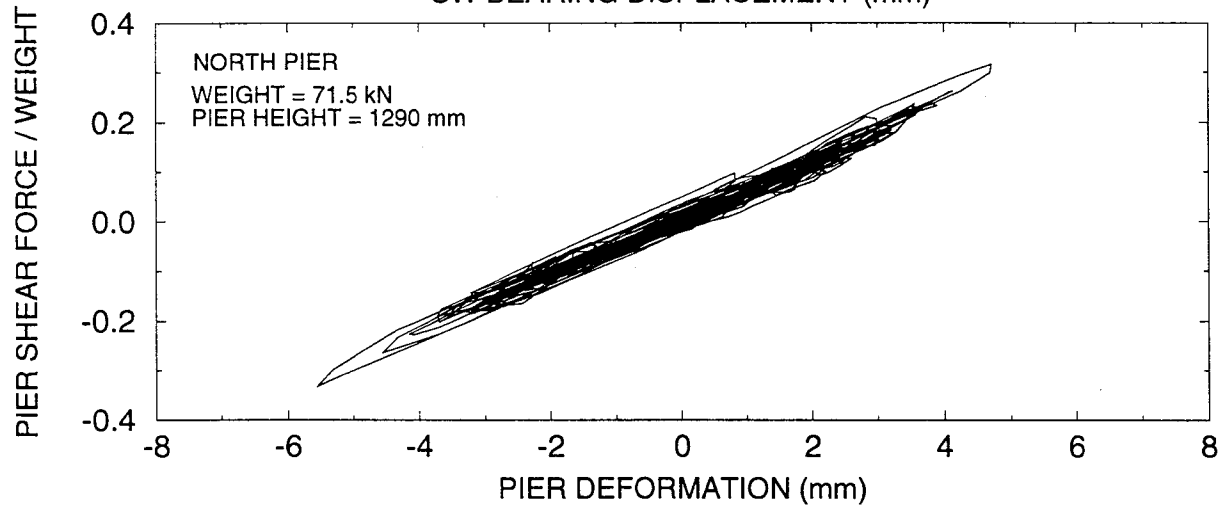
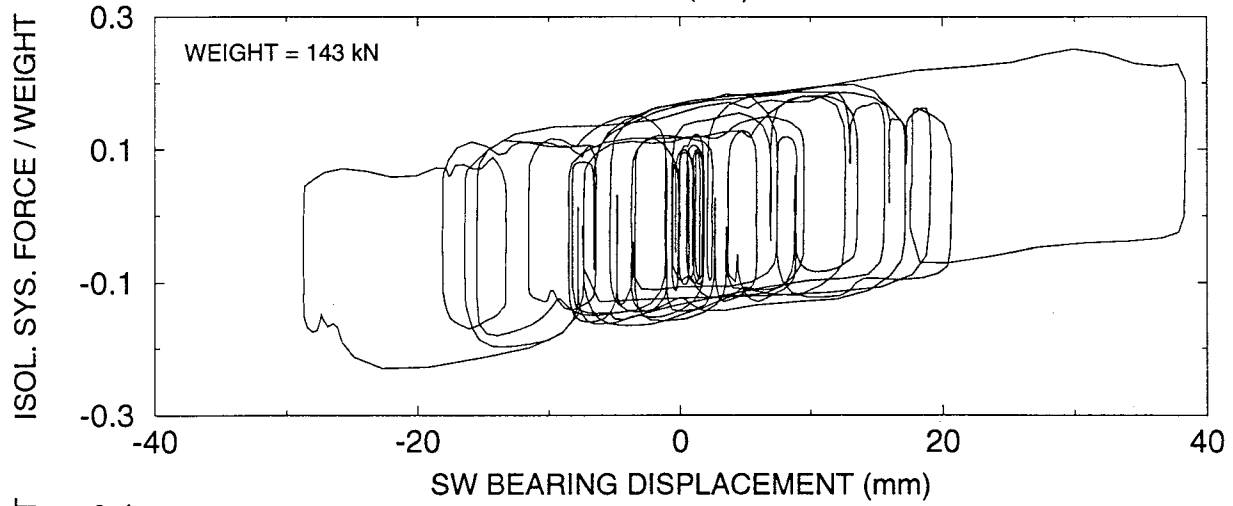
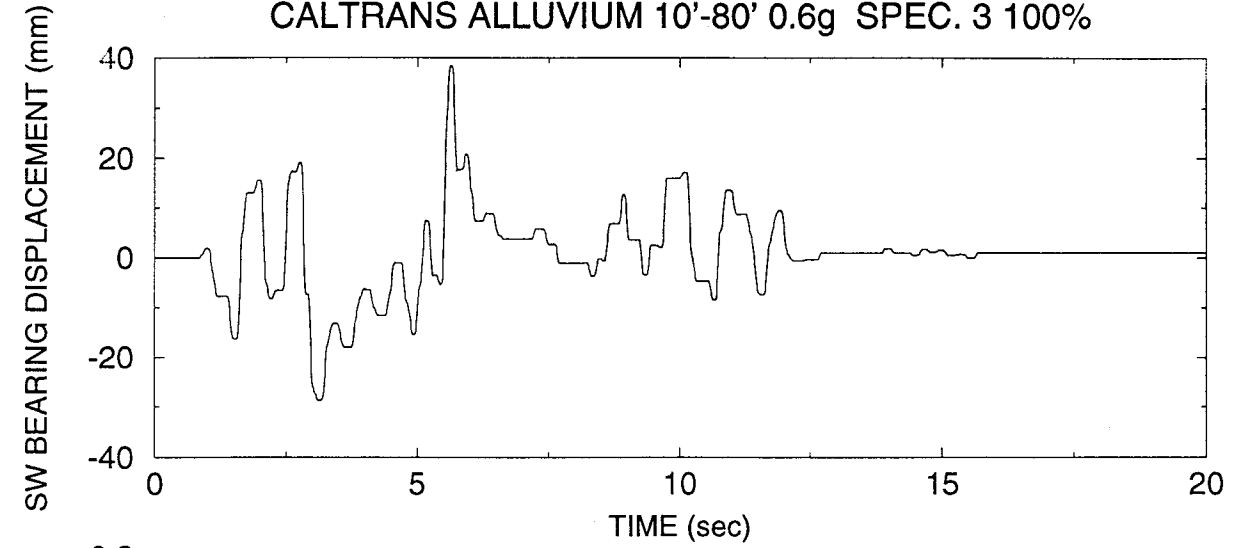




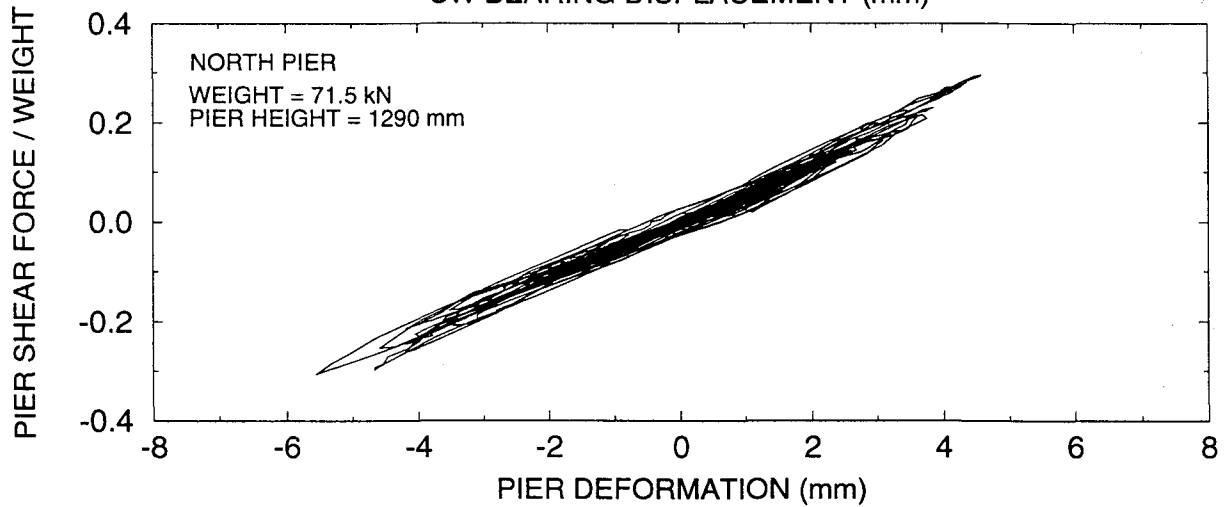
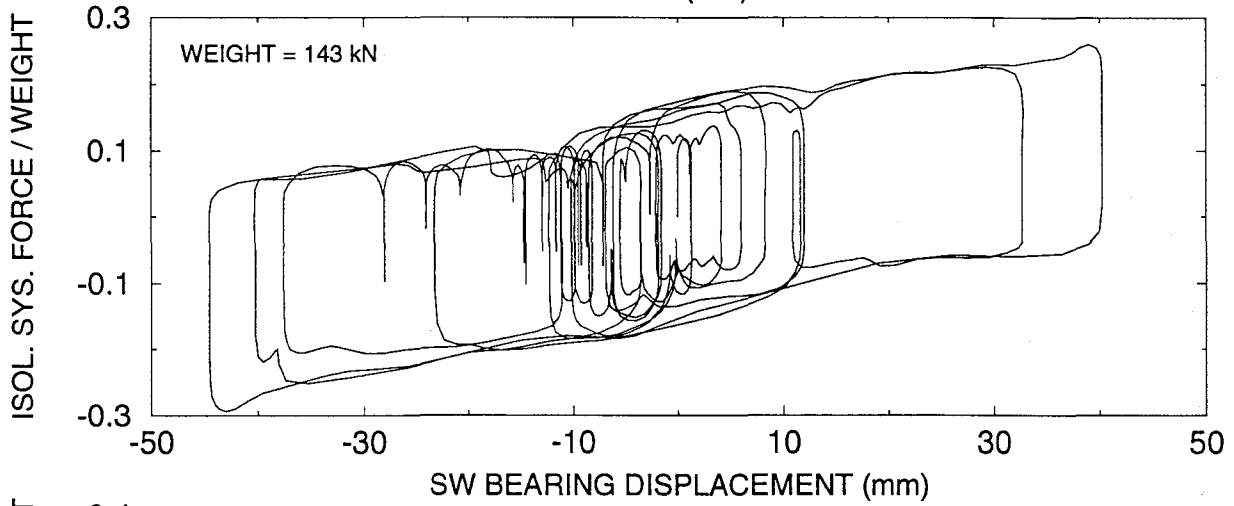
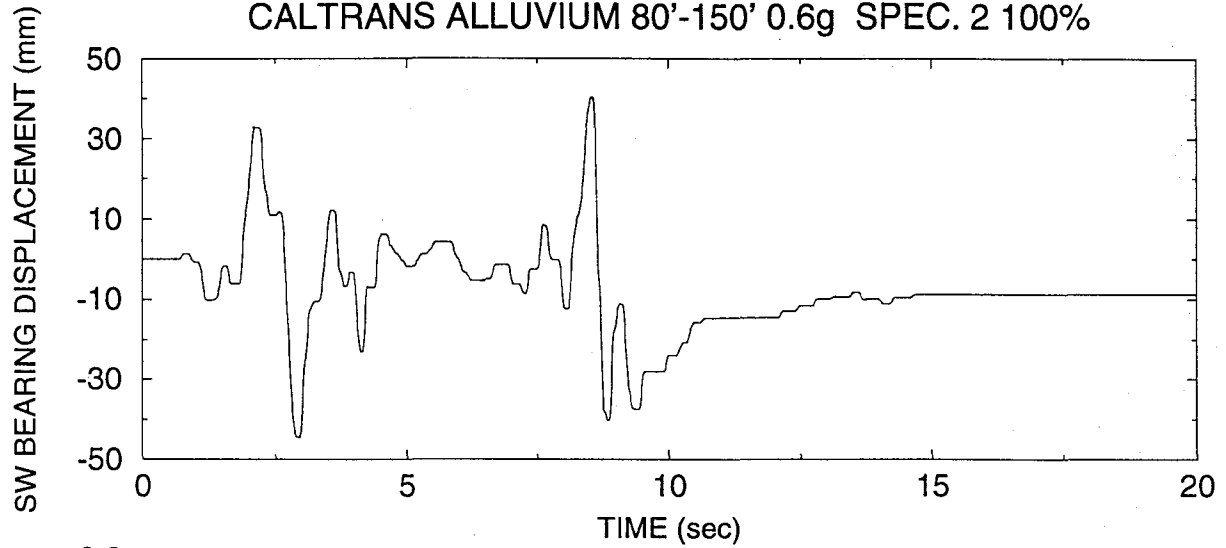
SYSTEM T1-No.2, TEST No. IRDRUN57  
CALTRANS ALLUVIUM 10'-80' 0.6g SPEC. 2 100%



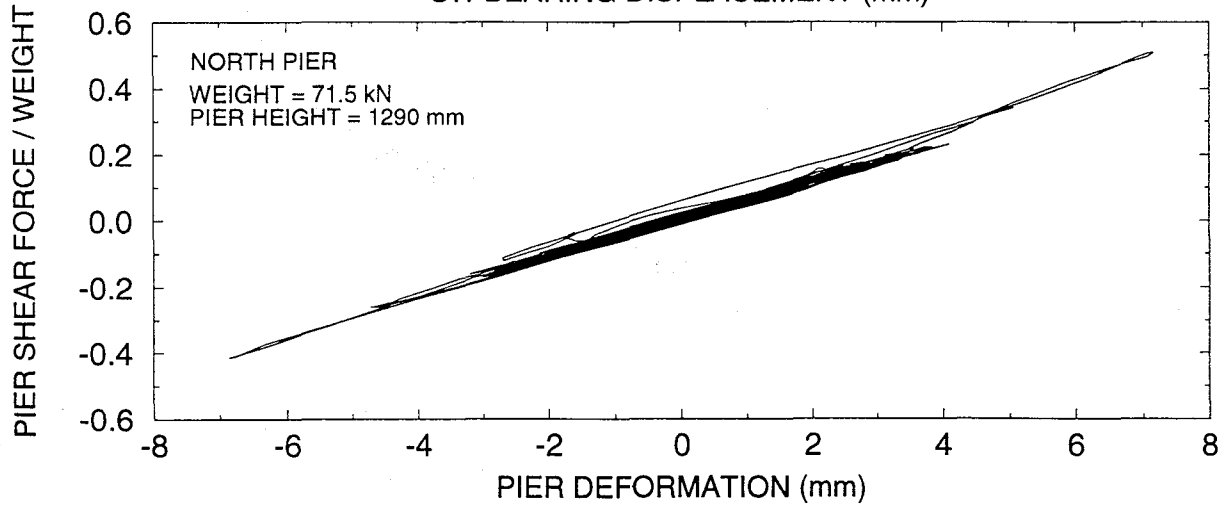
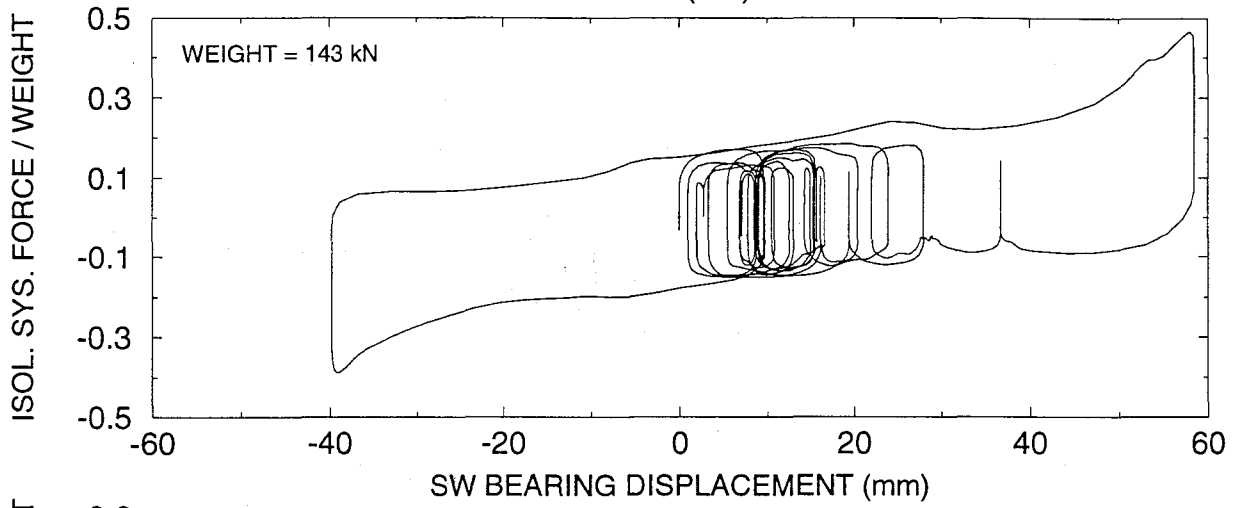
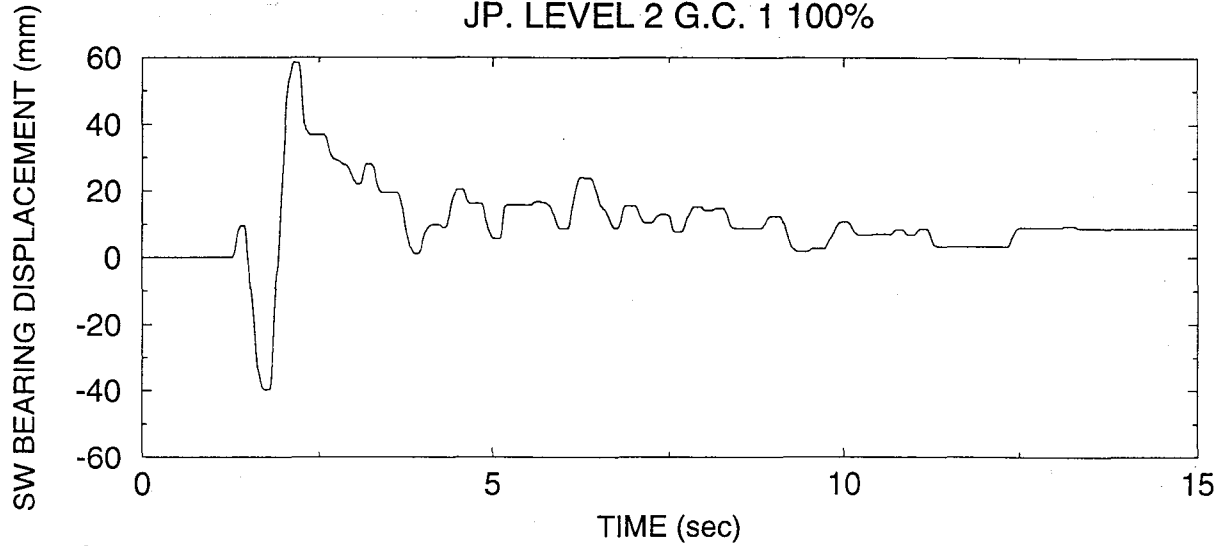
SYSTEM T1-No.2, TEST No. IRDRUN58  
CALTRANS ALLUVIUM 10'-80' 0.6g SPEC. 3 100%



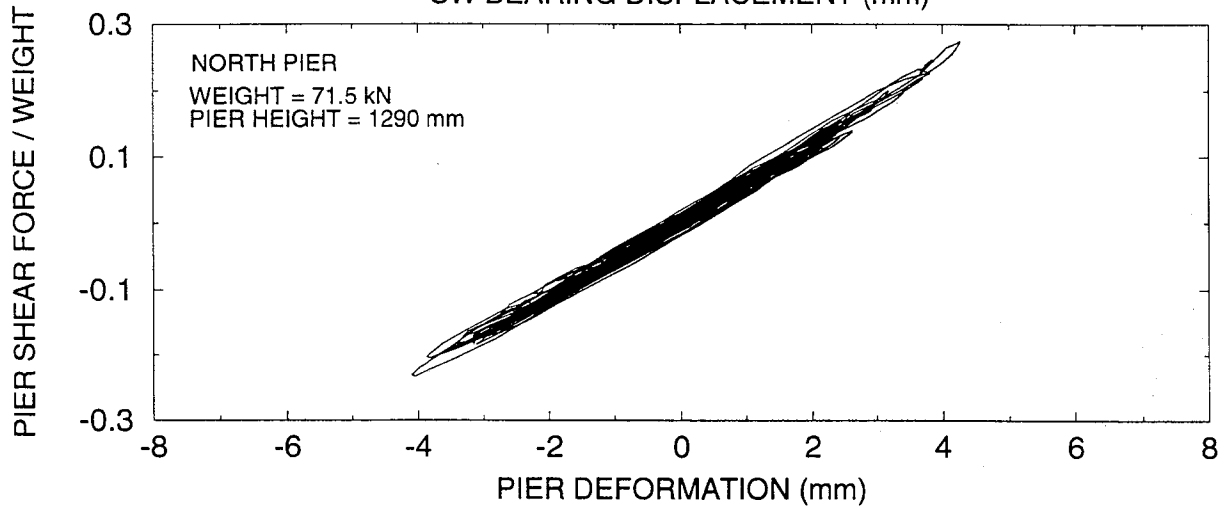
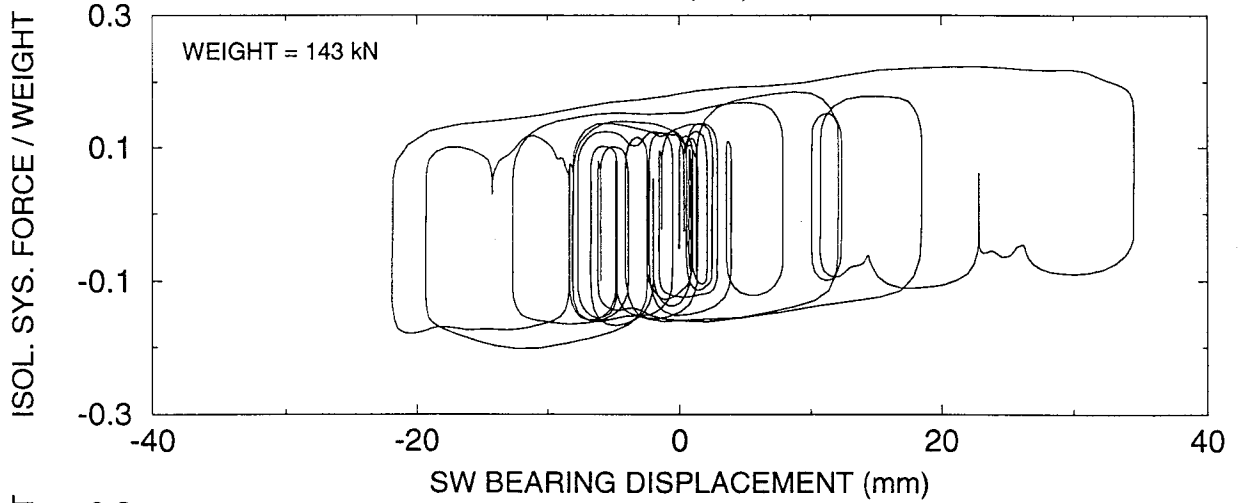
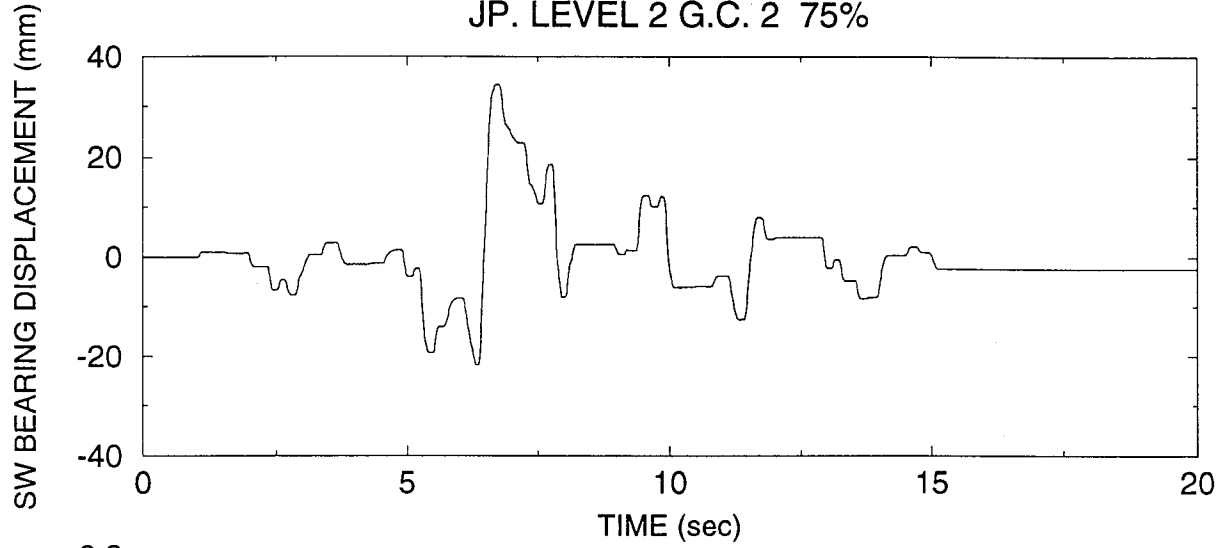
SYSTEM T1-No.2, TEST No. IRDRUN59  
CALTRANS ALLUVIUM 80'-150' 0.6g SPEC. 2 100%



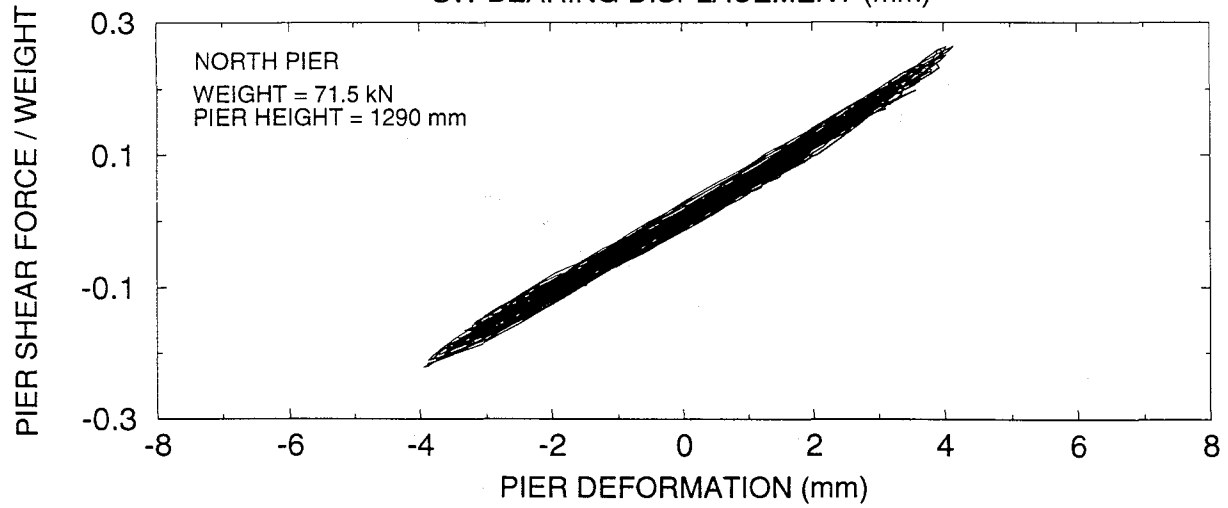
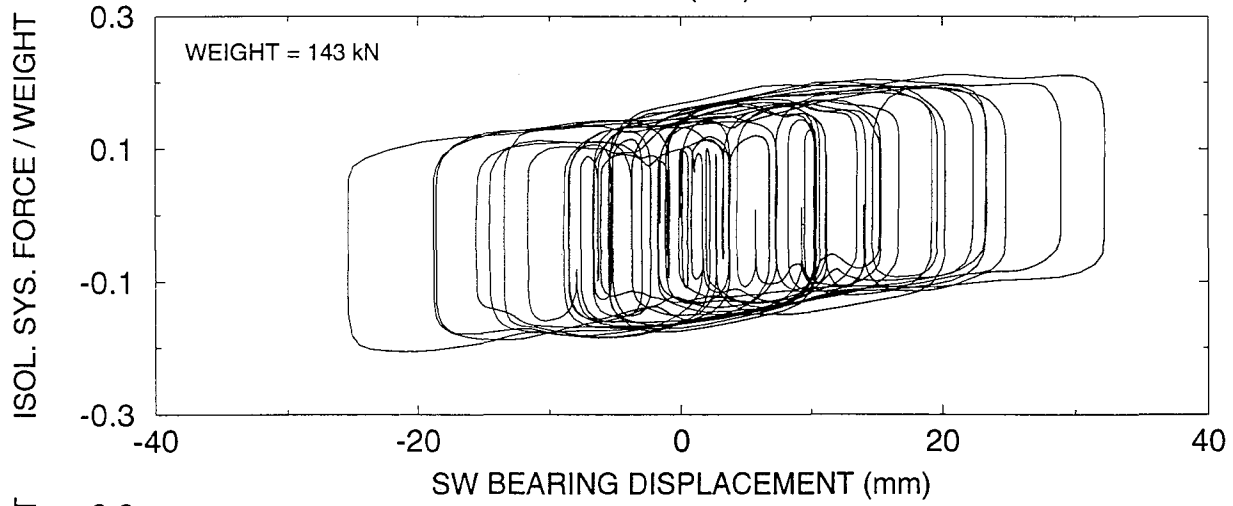
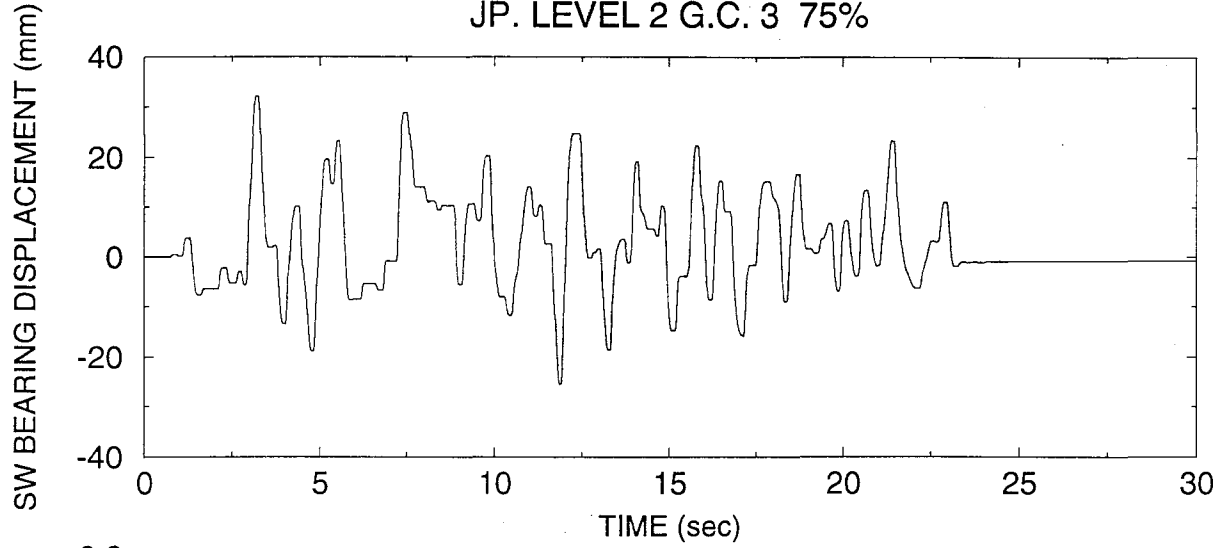
SYSTEM T1-No.2, TEST No. IRDRUN60  
JP. LEVEL 2 G.C. 1 100%



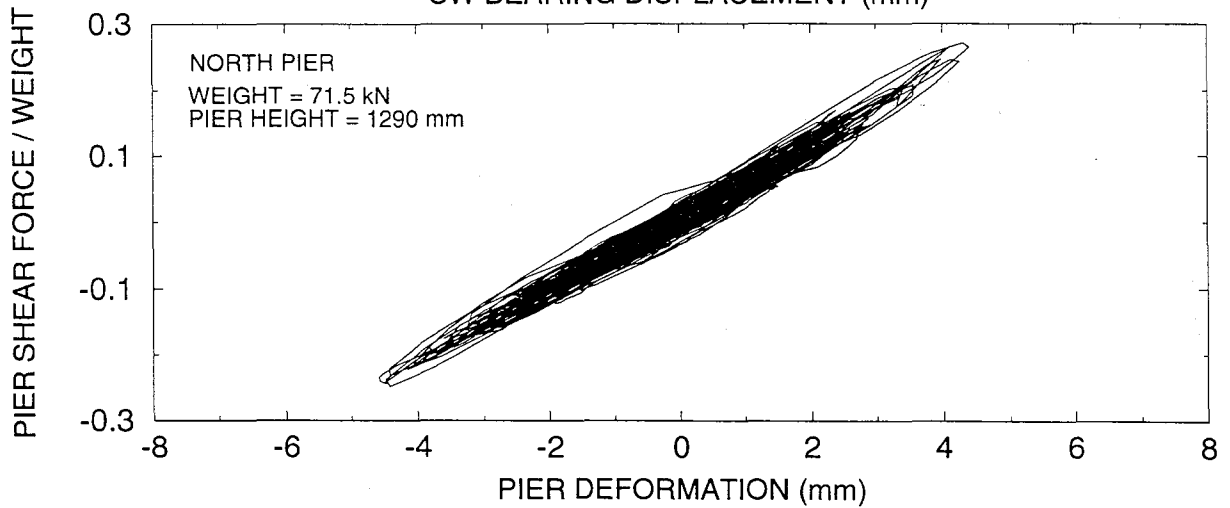
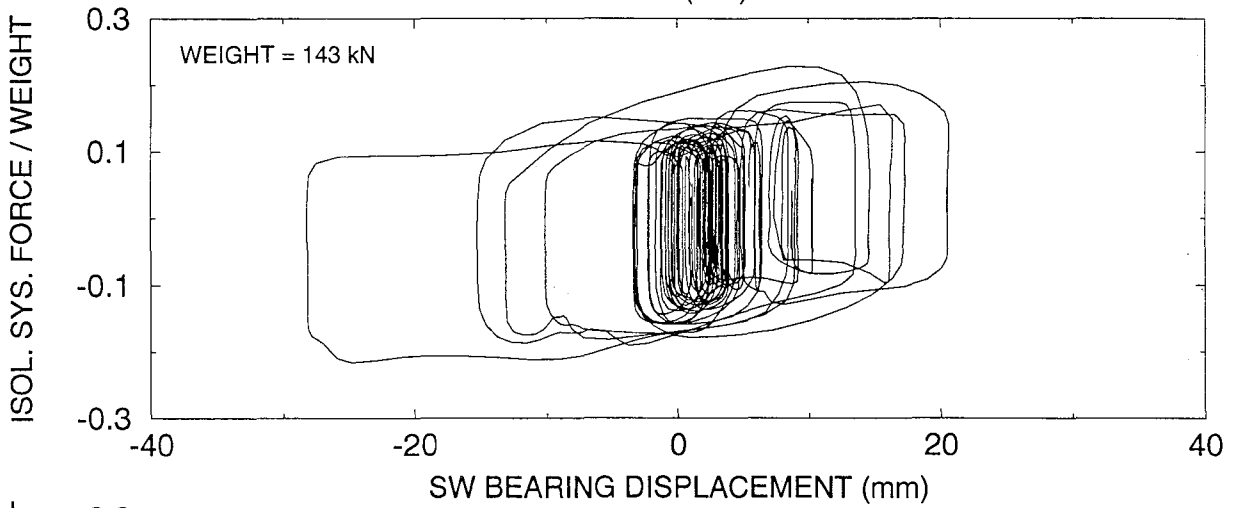
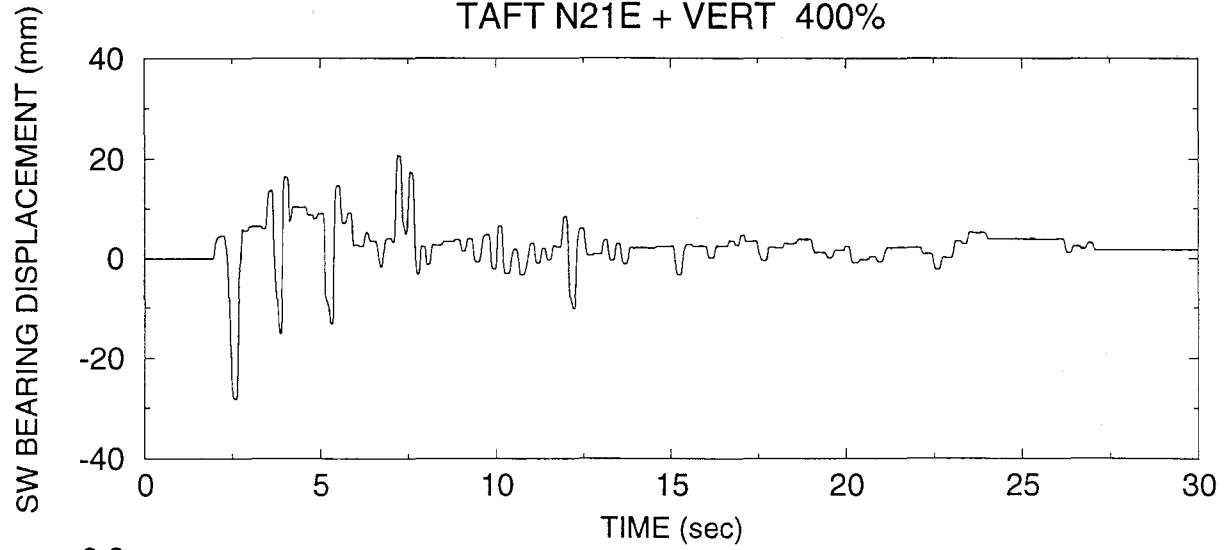
SYSTEM T1-No.2, TEST No. IRDRUN61  
JP. LEVEL 2 G.C. 2 75%



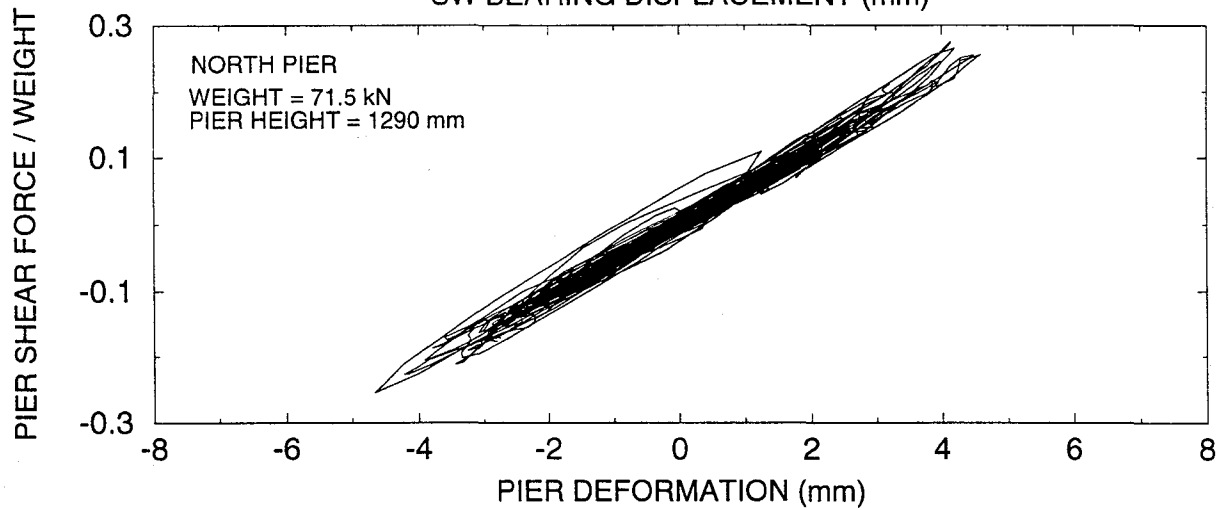
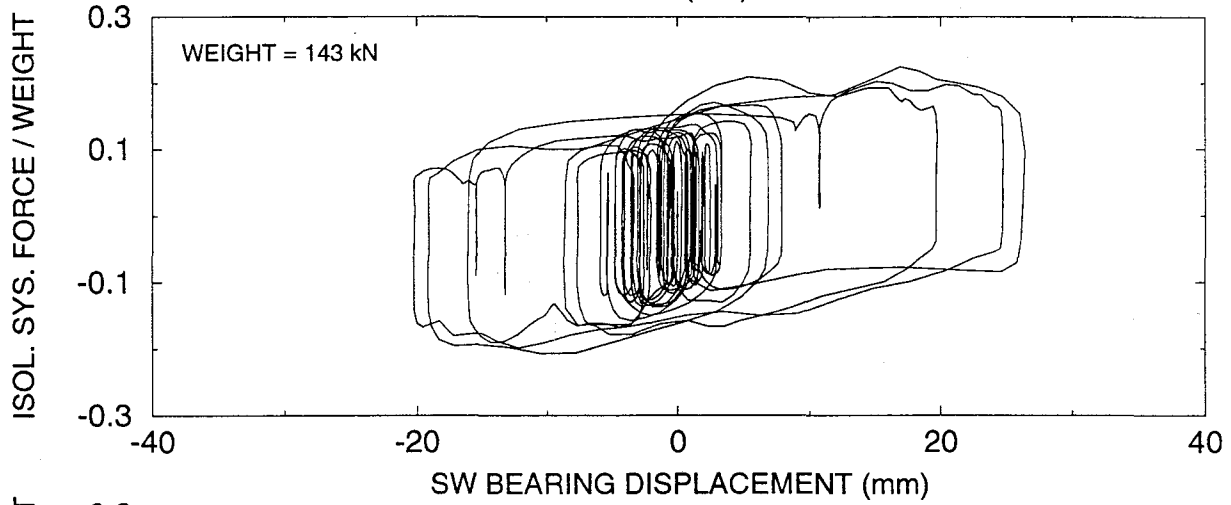
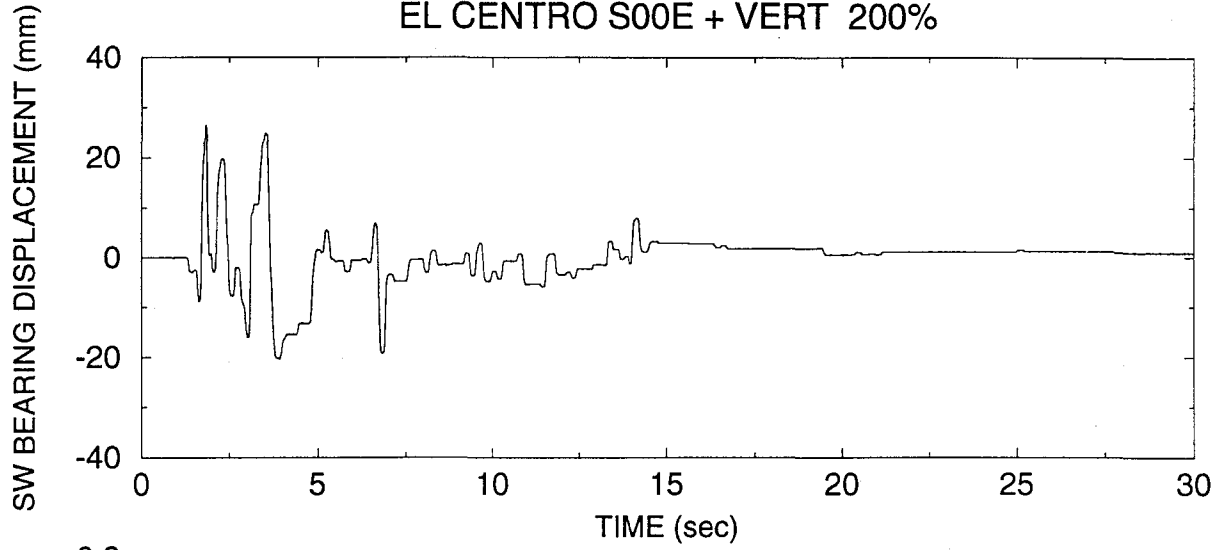
SYSTEM T1-No.2, TEST No. IRDRUN62  
JP. LEVEL 2 G.C. 3 75%



SYSTEM T1-No.2, TEST No. IRDRUN63  
TAFT N21E + VERT 400%

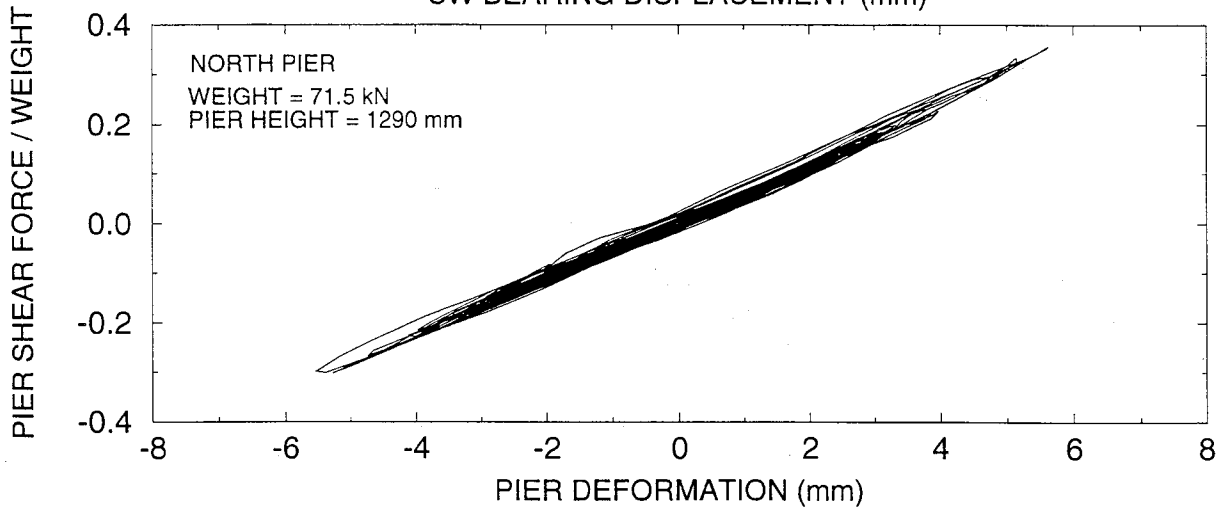
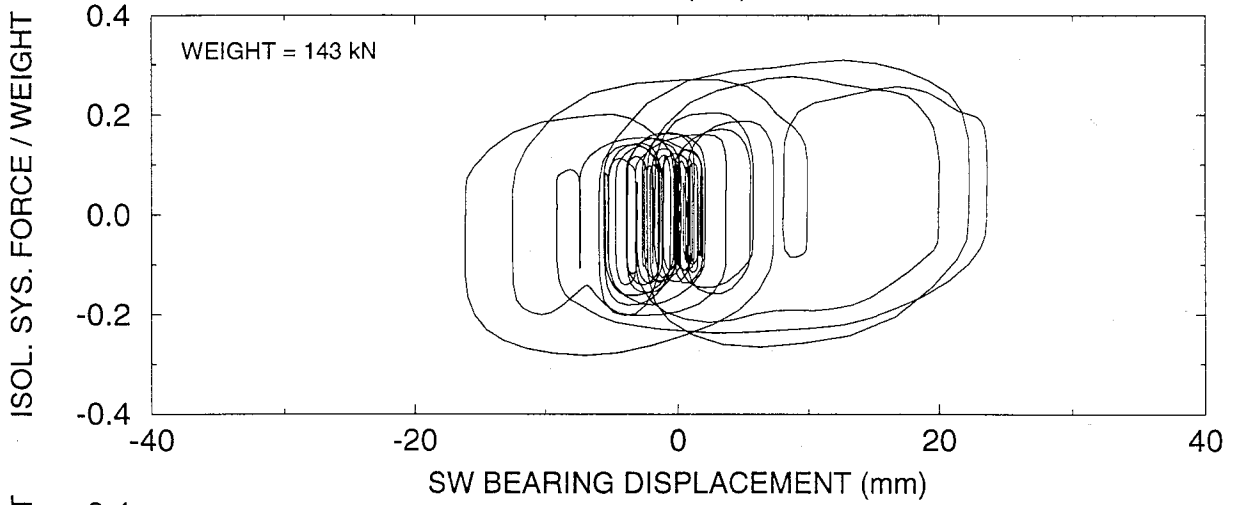
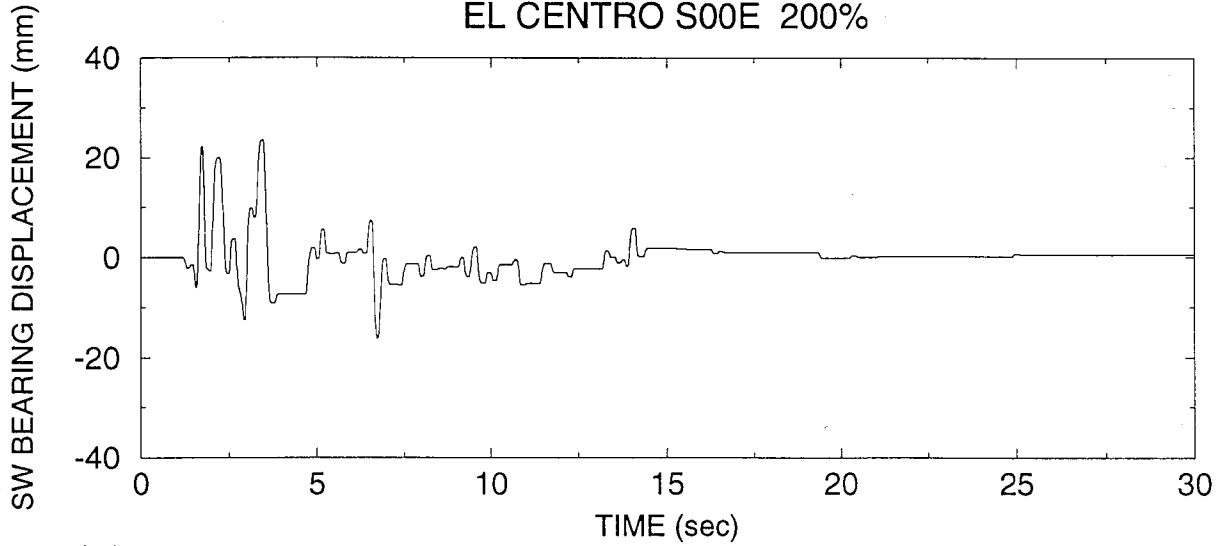


SYSTEM T1-No.2, TEST No. IRDRUN65  
EL CENTRO S00E + VERT 200%

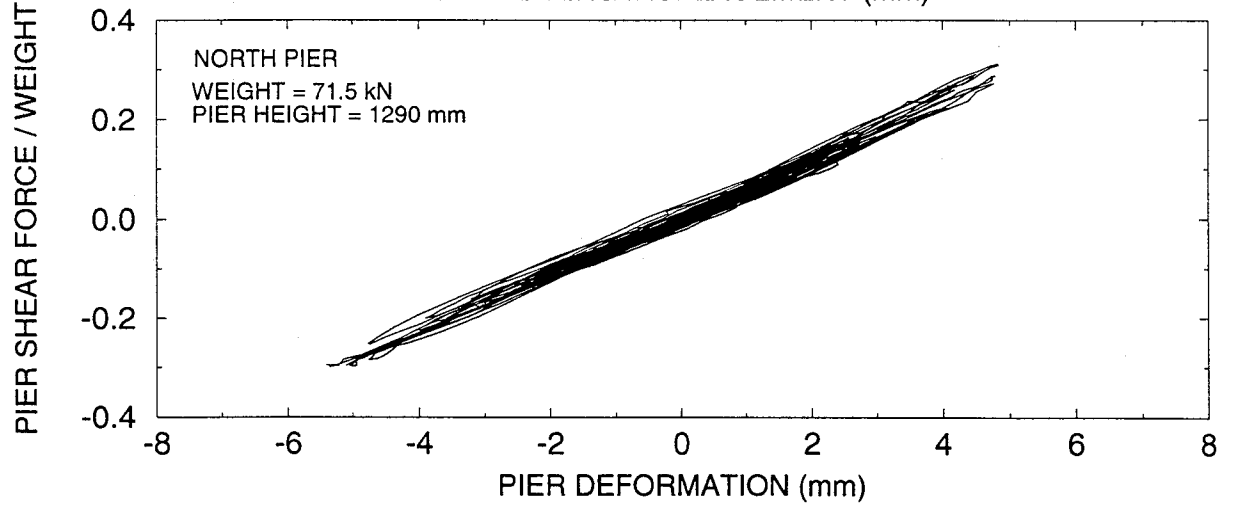
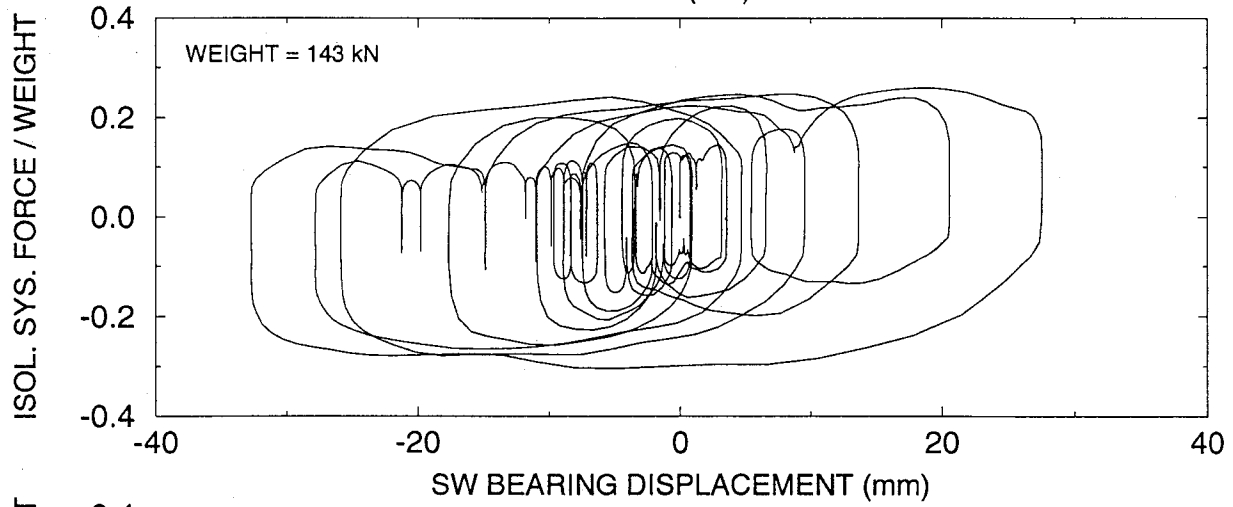
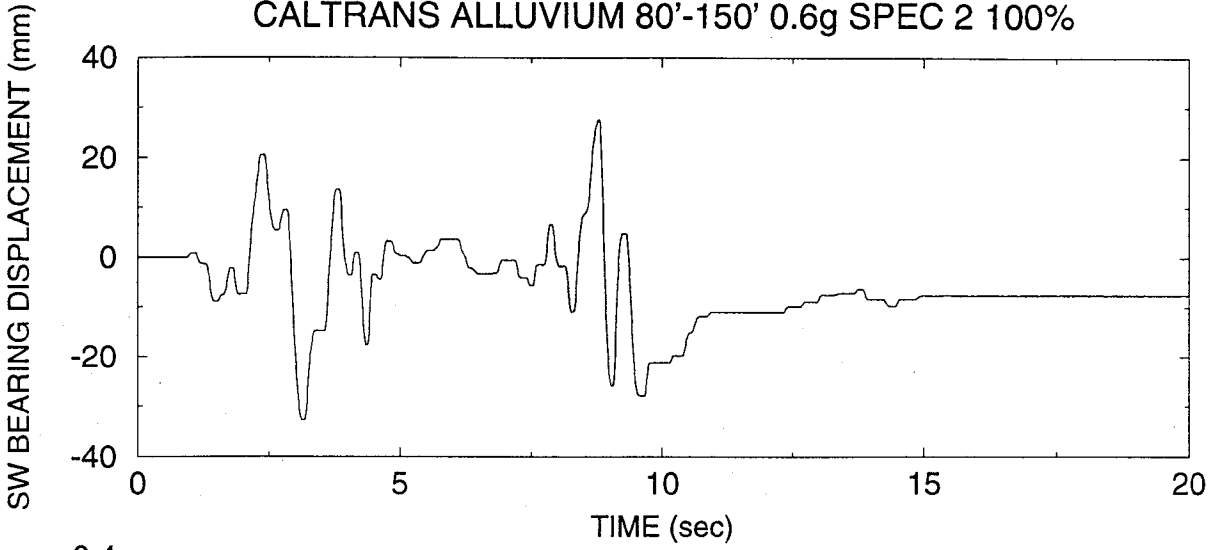




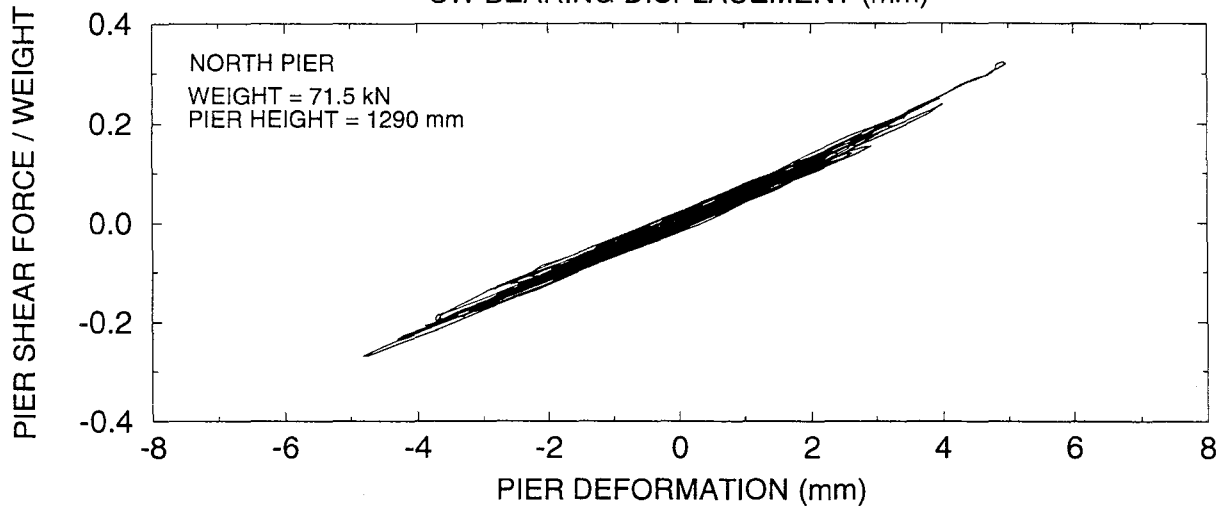
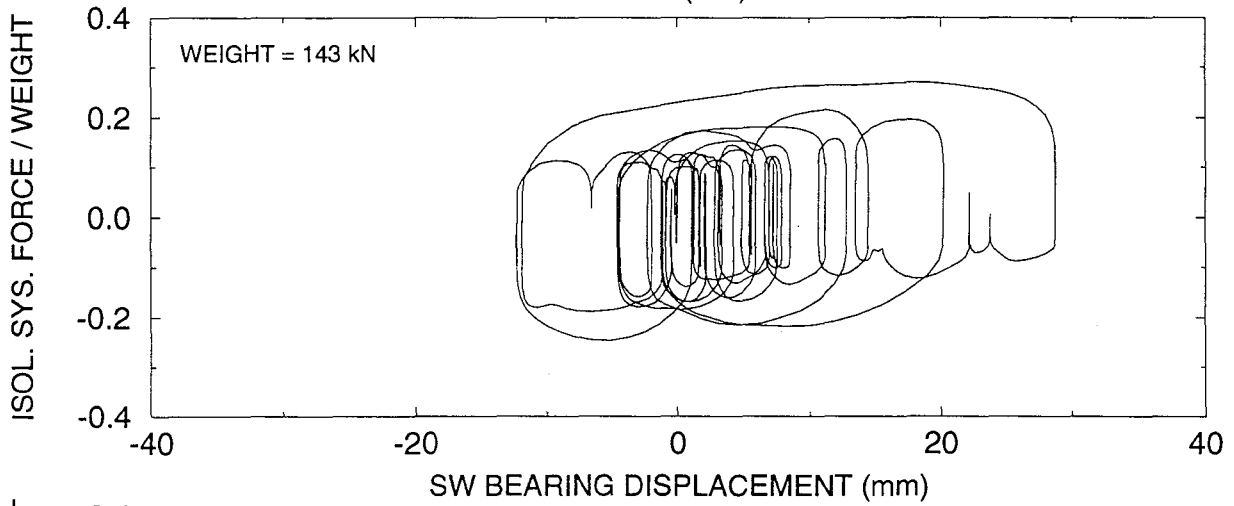
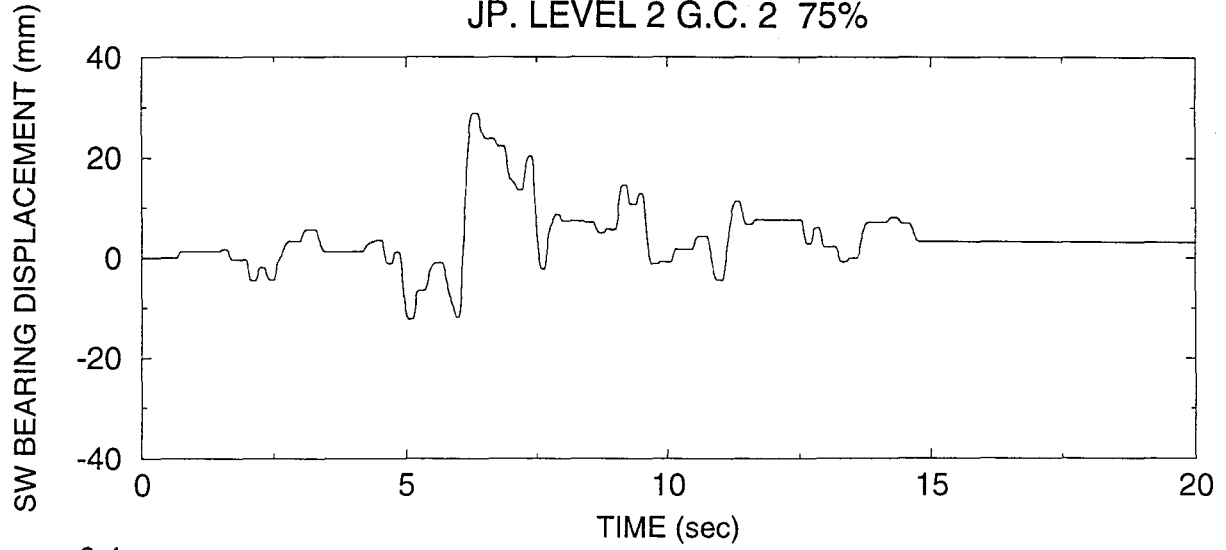
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN01  
EL CENTRO S00E 200%



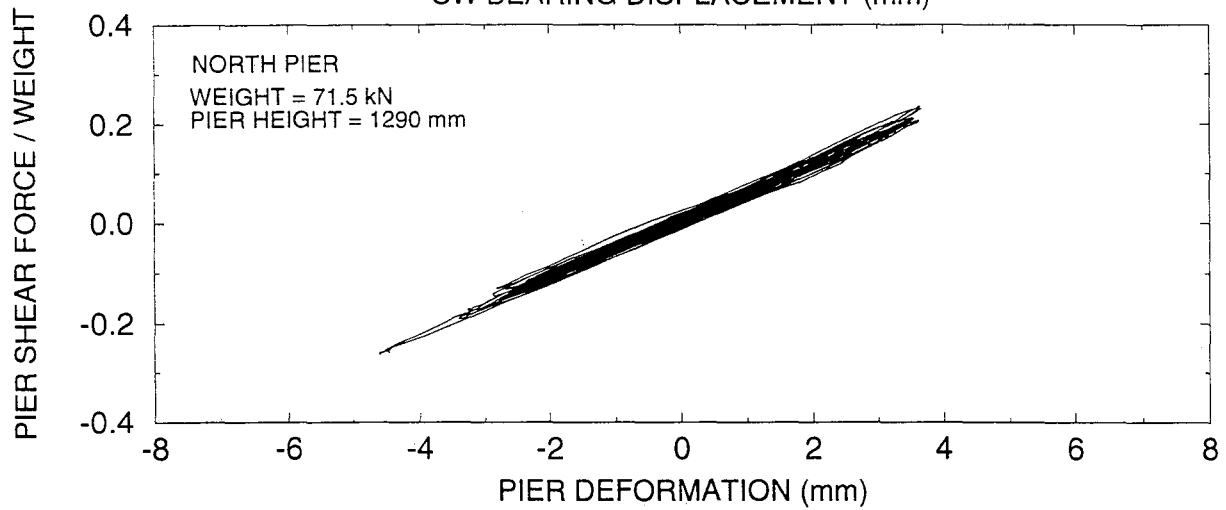
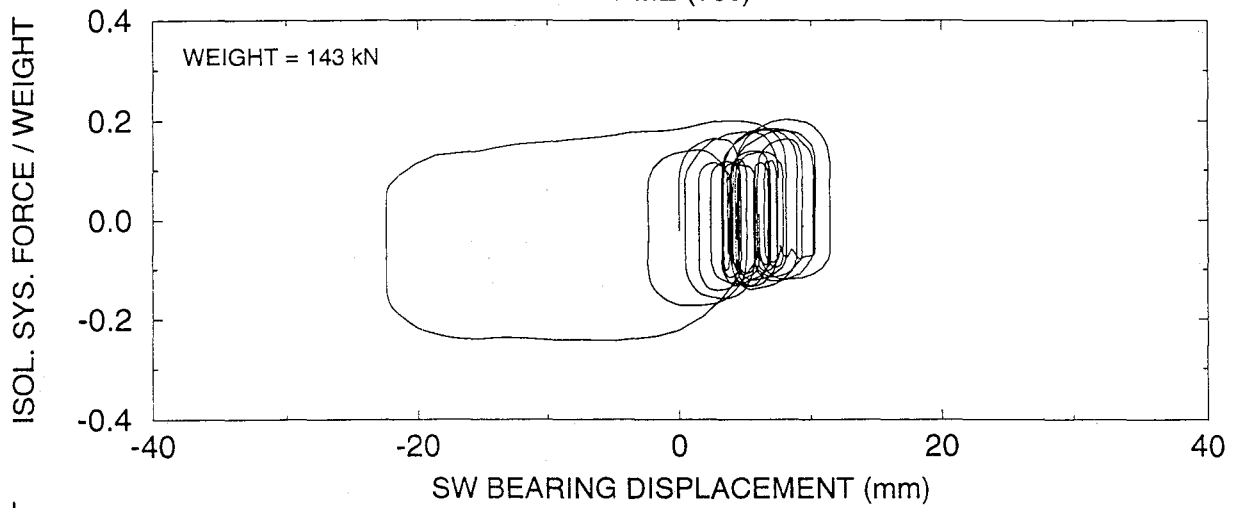
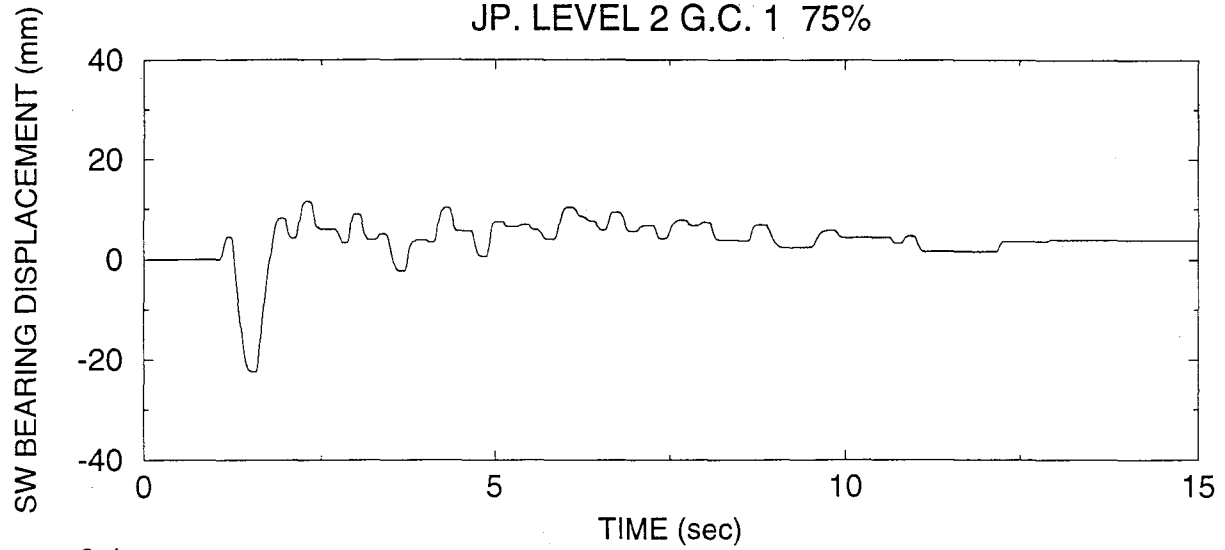
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN02  
CALTRANS ALLUVIUM 80'-150' 0.6g SPEC 2 100%



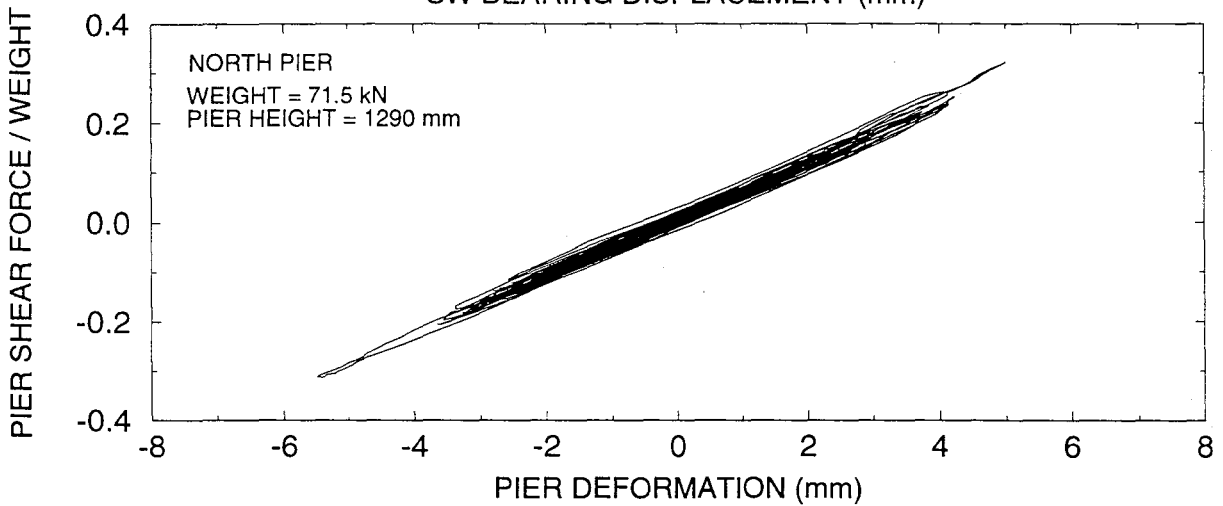
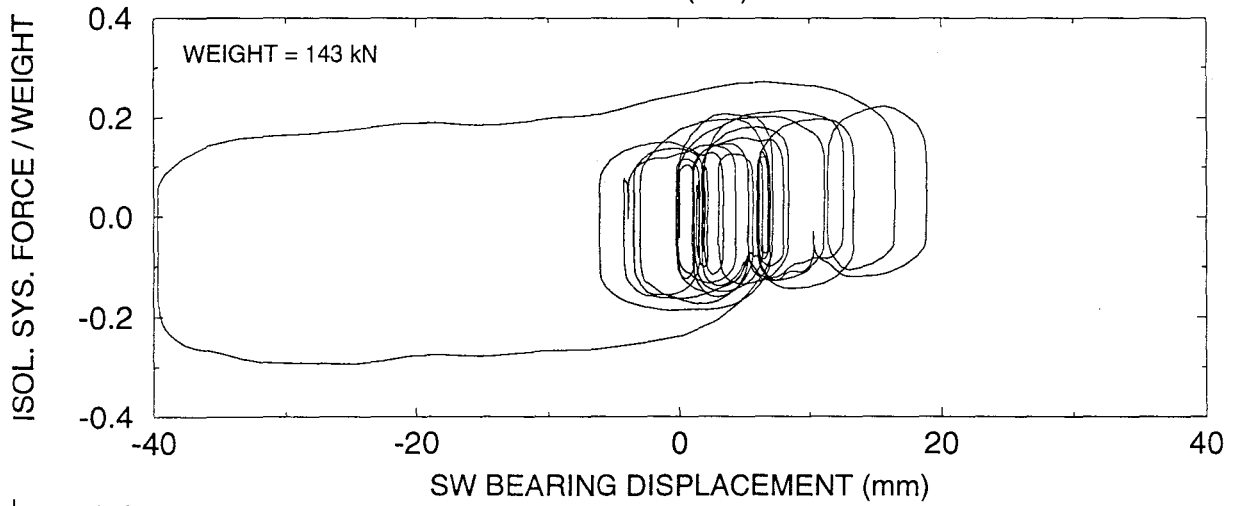
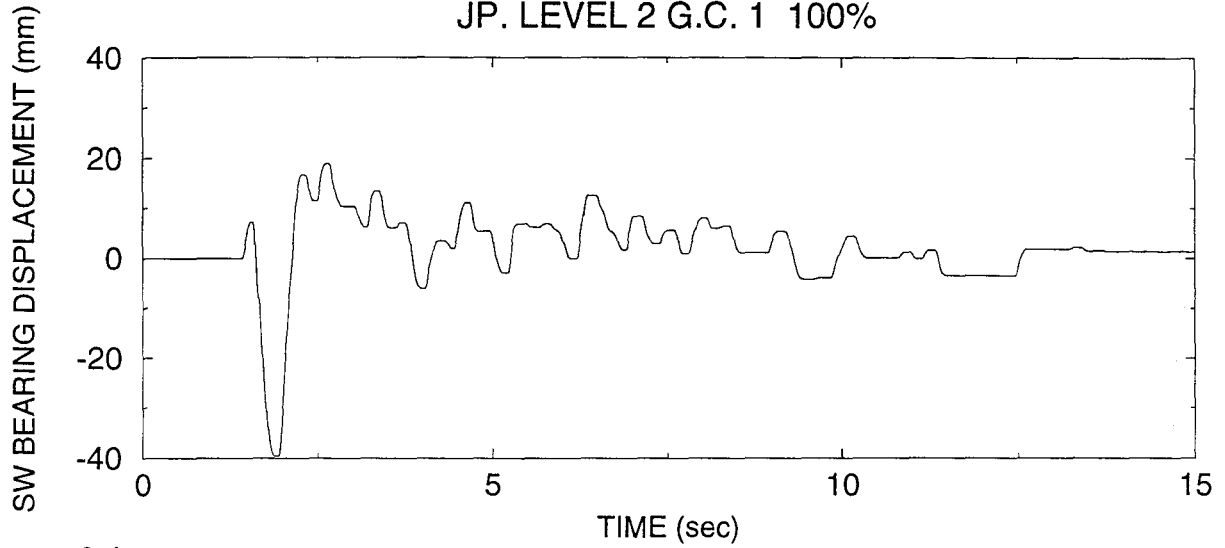
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN03  
JP. LEVEL 2 G.C. 2 75%



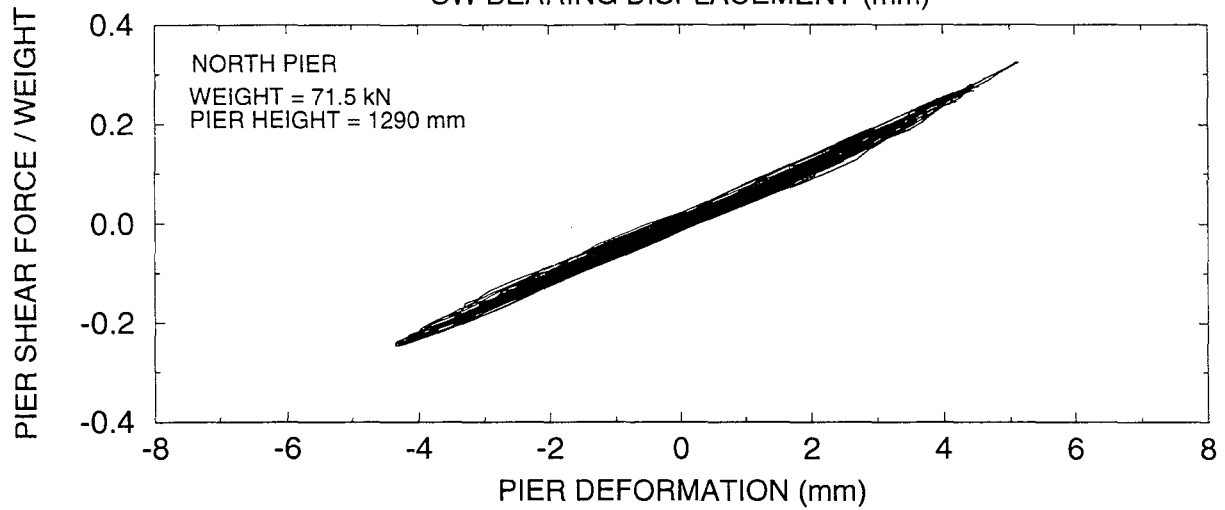
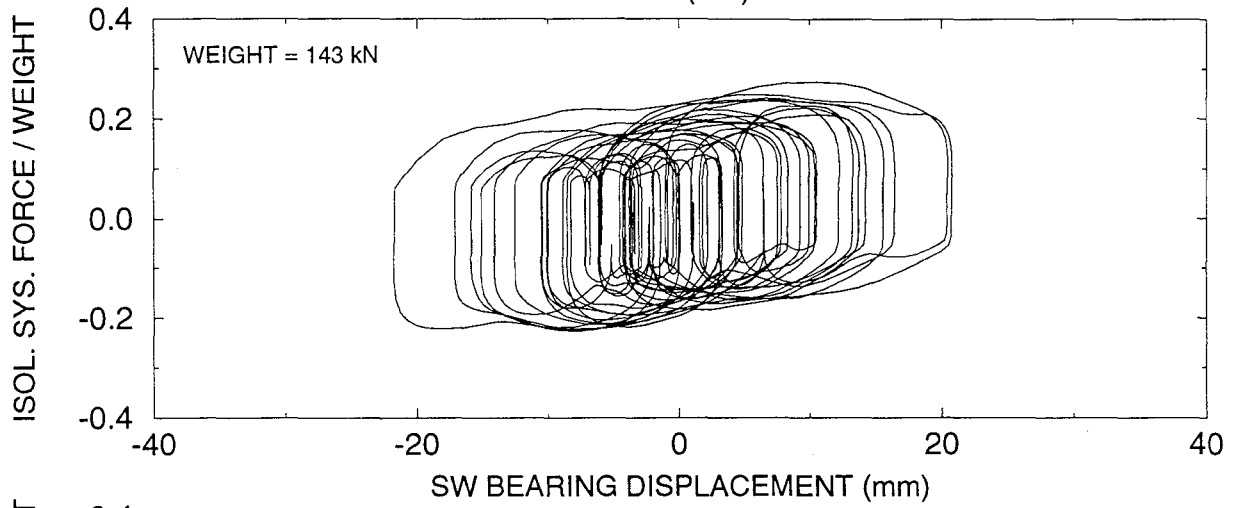
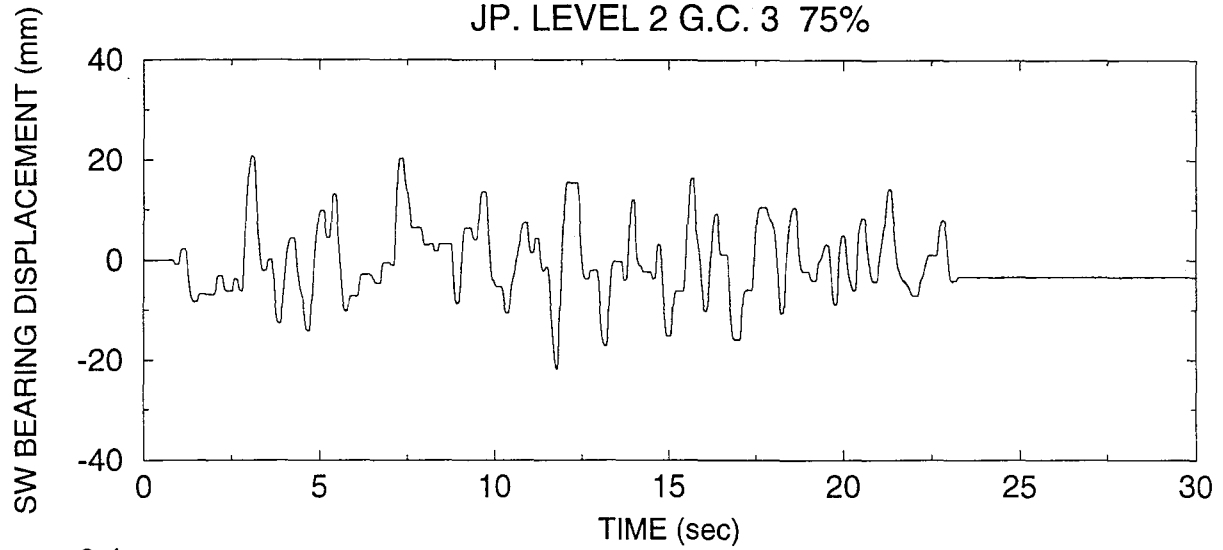
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN04  
JP. LEVEL 2 G.C. 1 75%



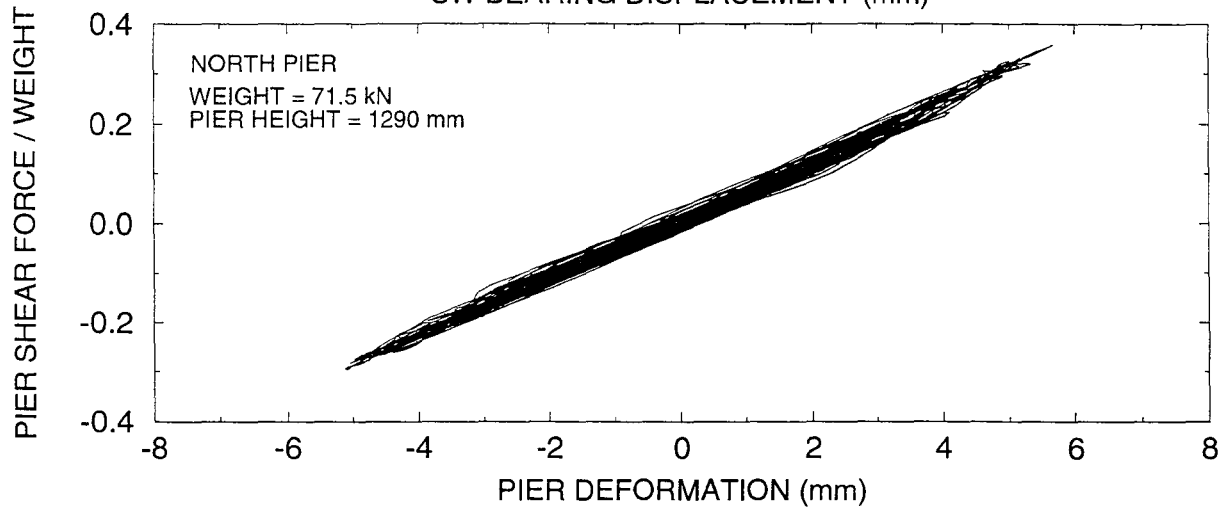
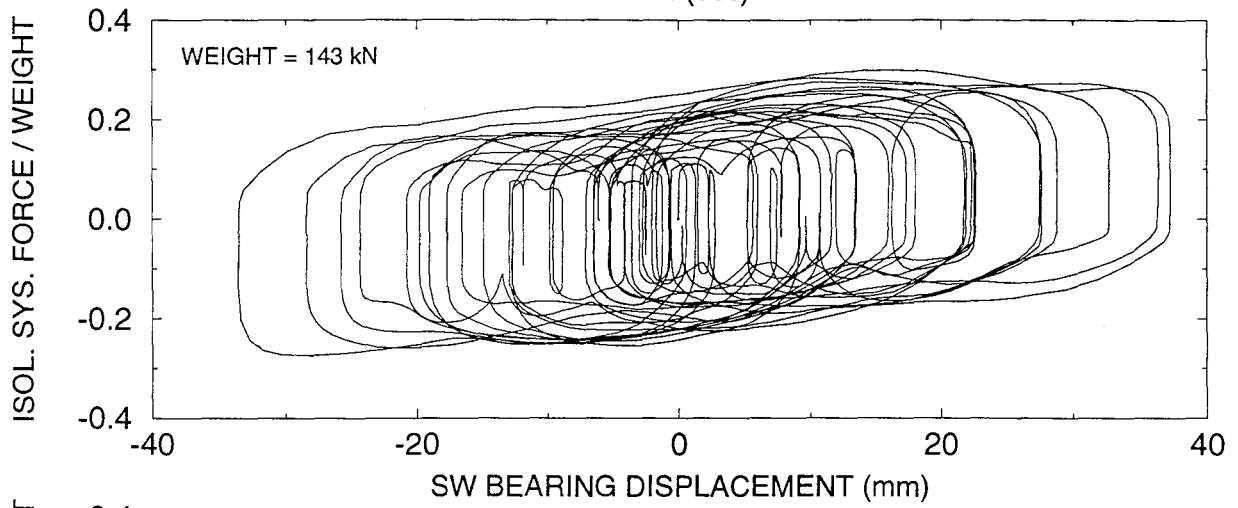
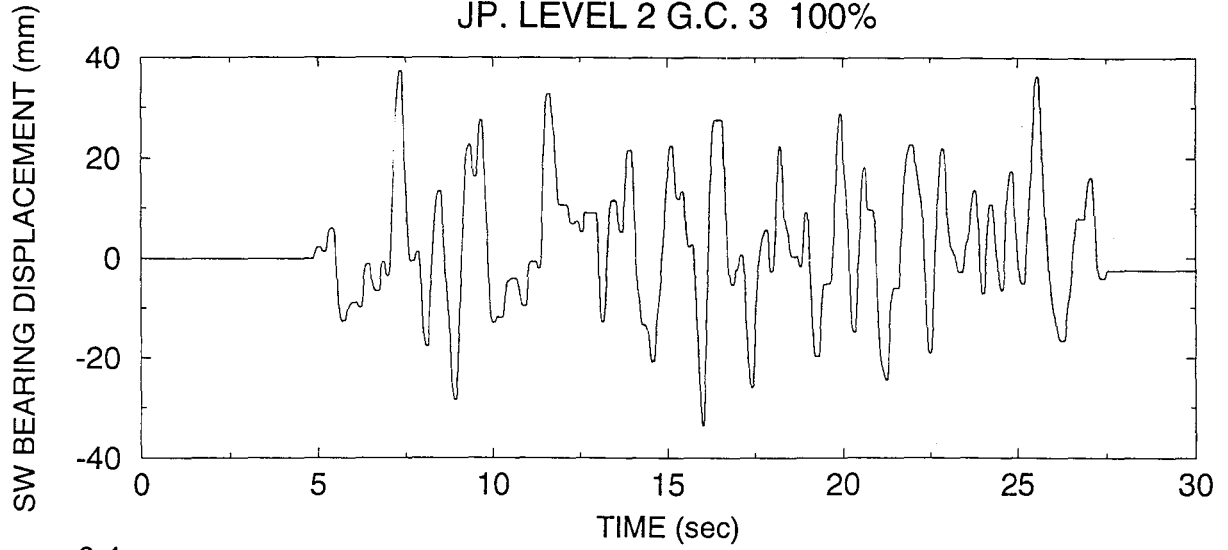
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN05  
JP. LEVEL 2 G.C. 1 100%



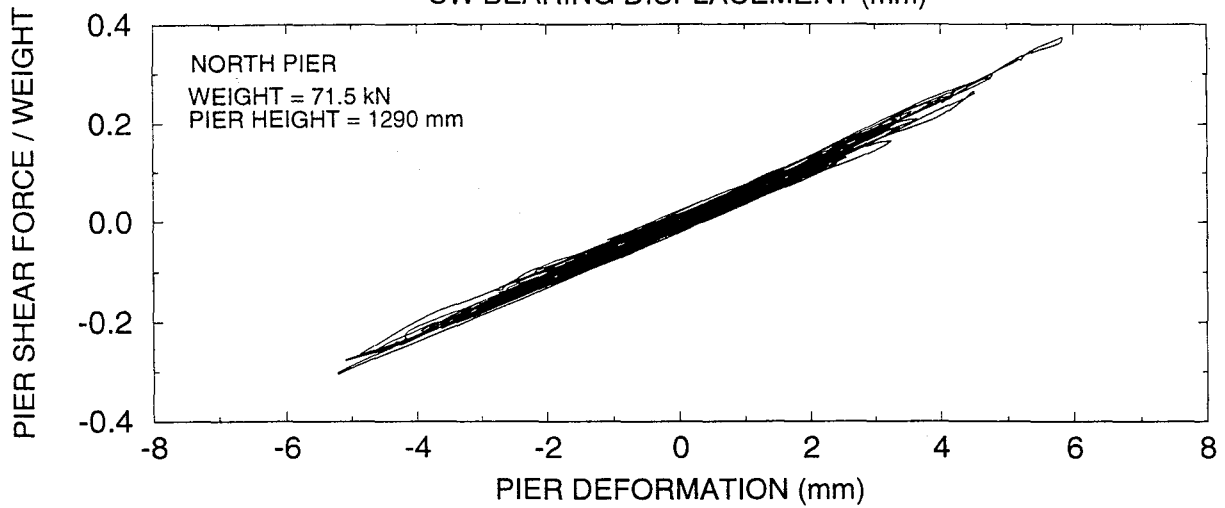
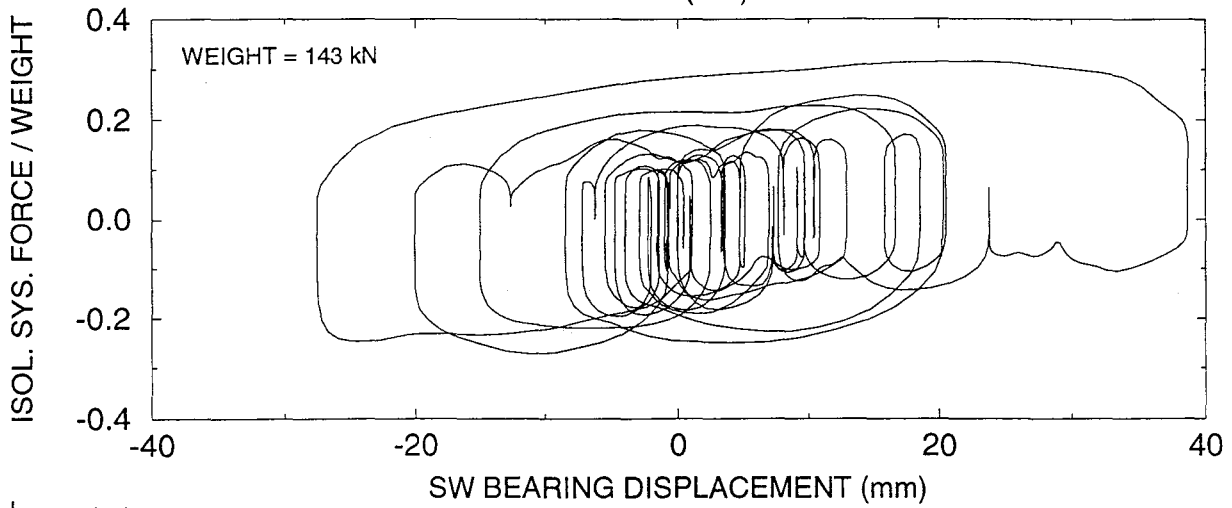
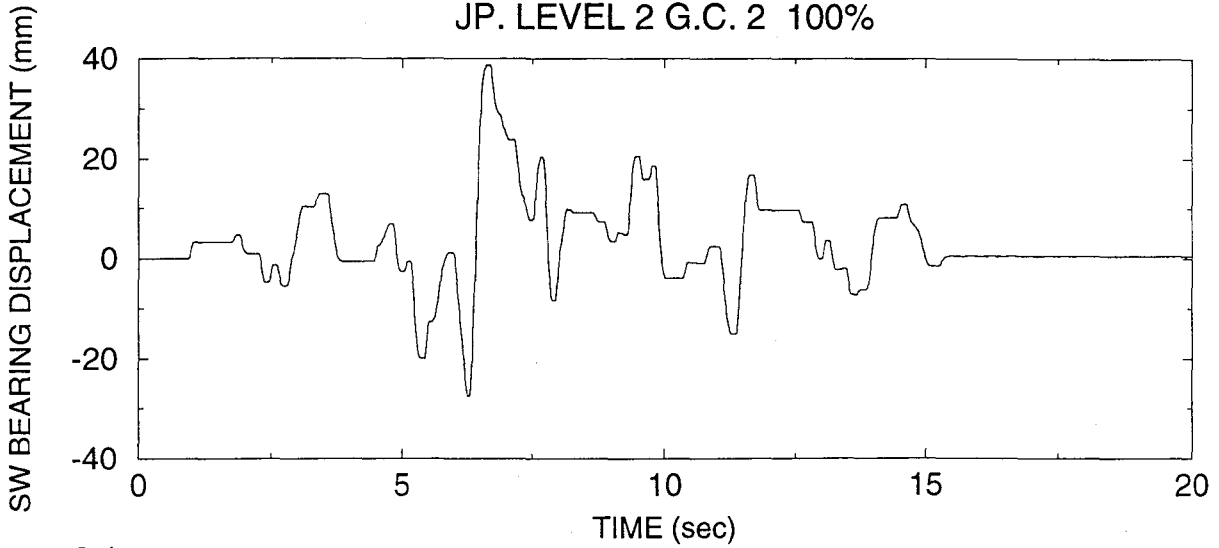
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN06  
JP. LEVEL 2 G.C. 3 75%



SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN07  
JP. LEVEL 2 G.C. 3 100%

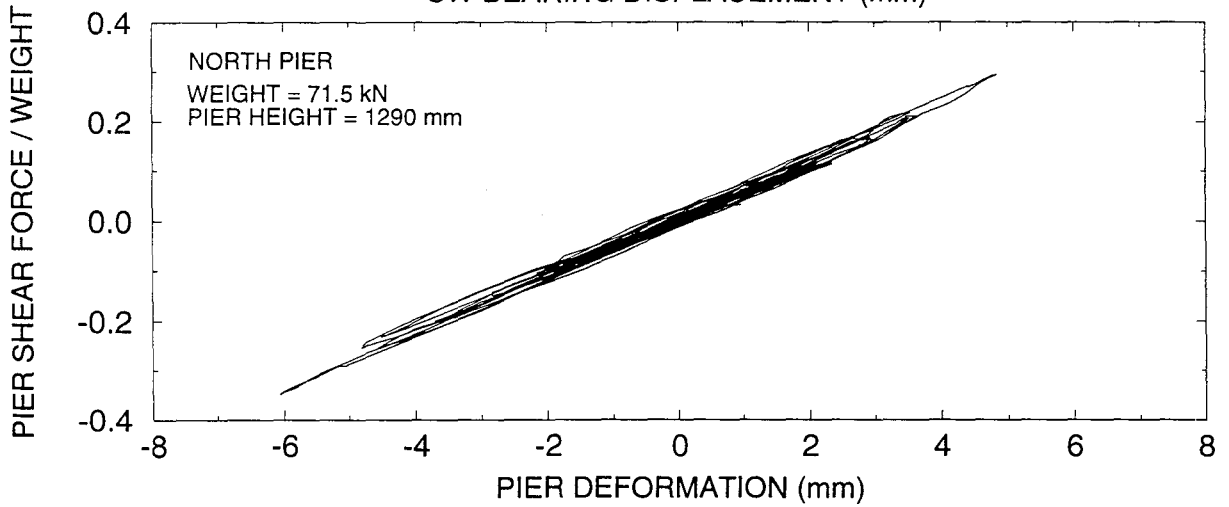
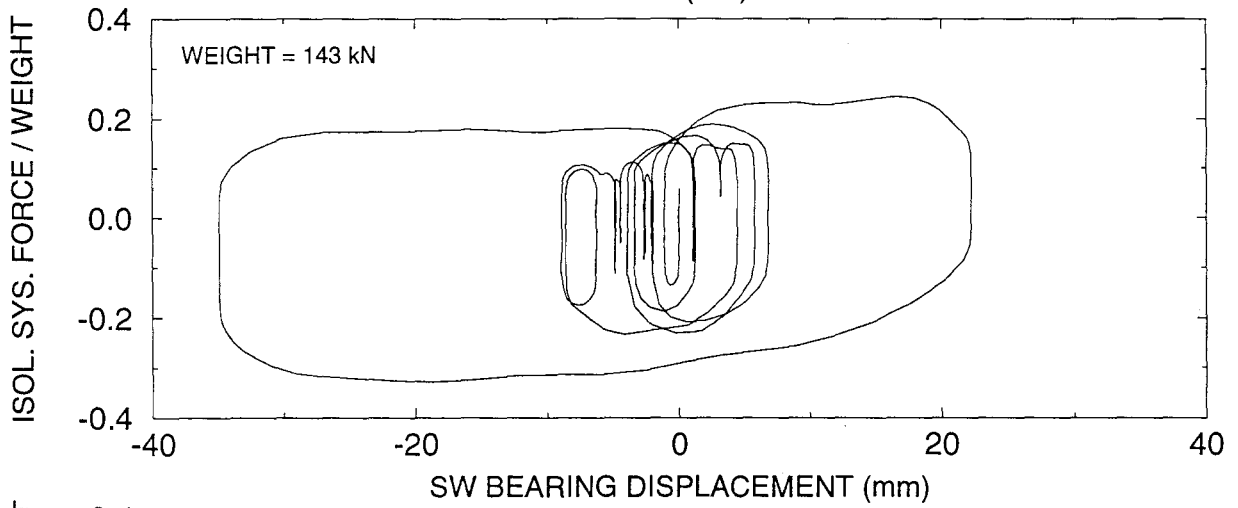
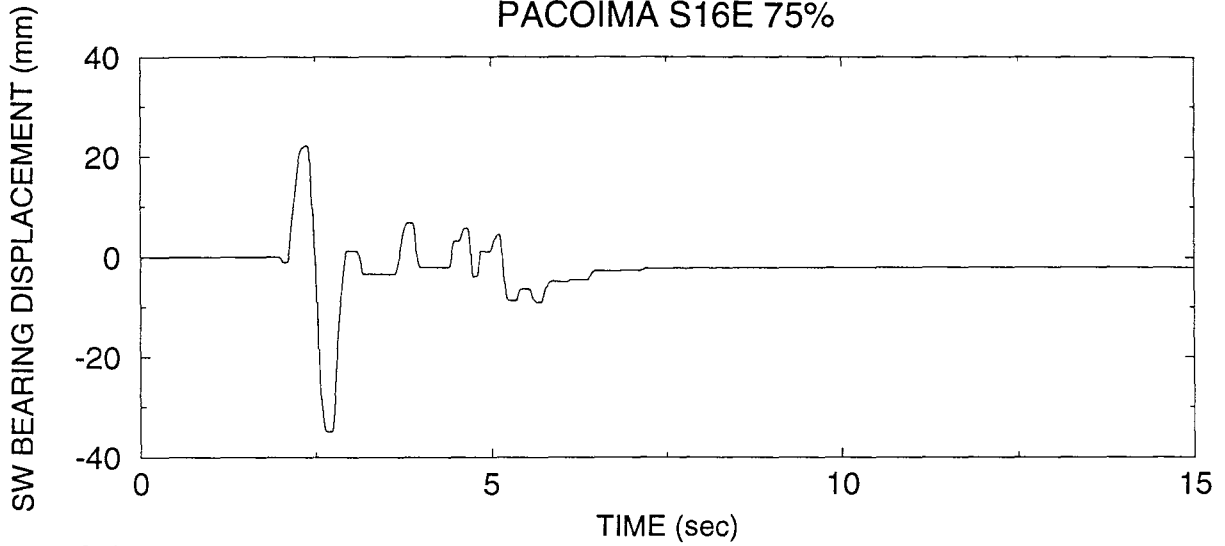


SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN08  
JP. LEVEL 2 G.C. 2 100%

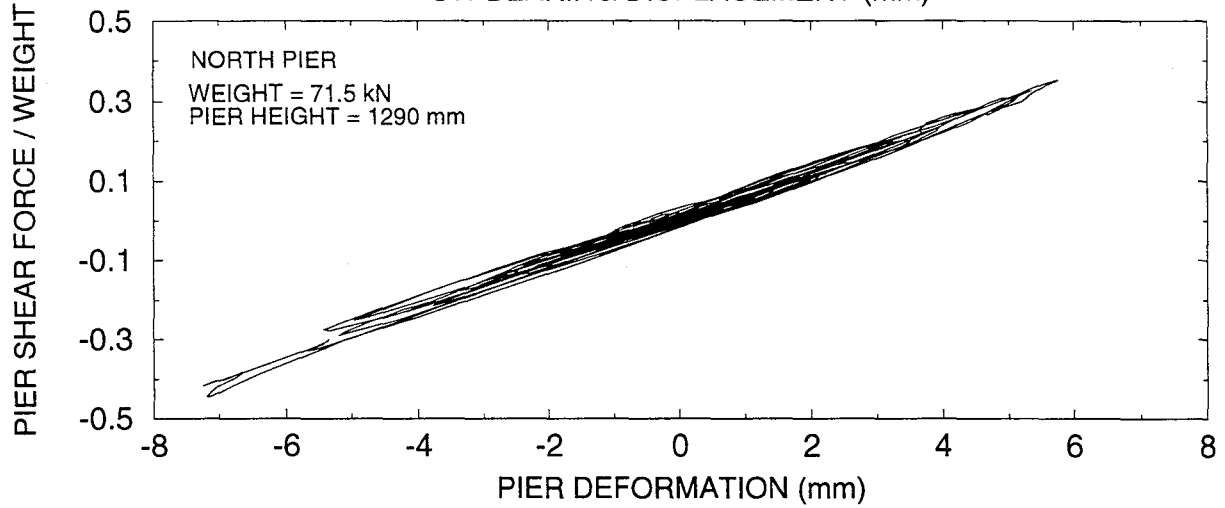
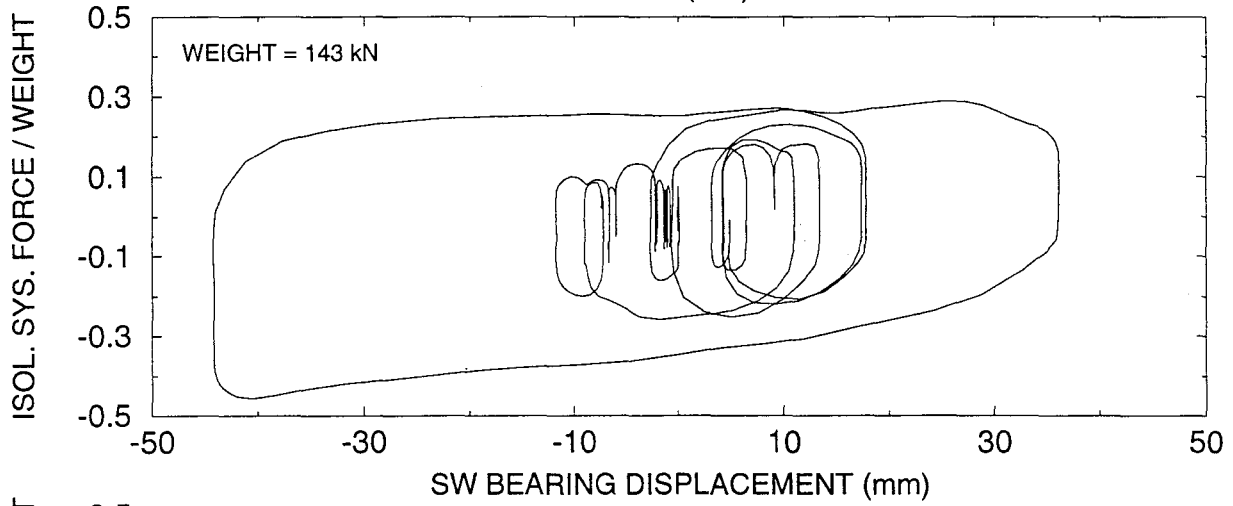
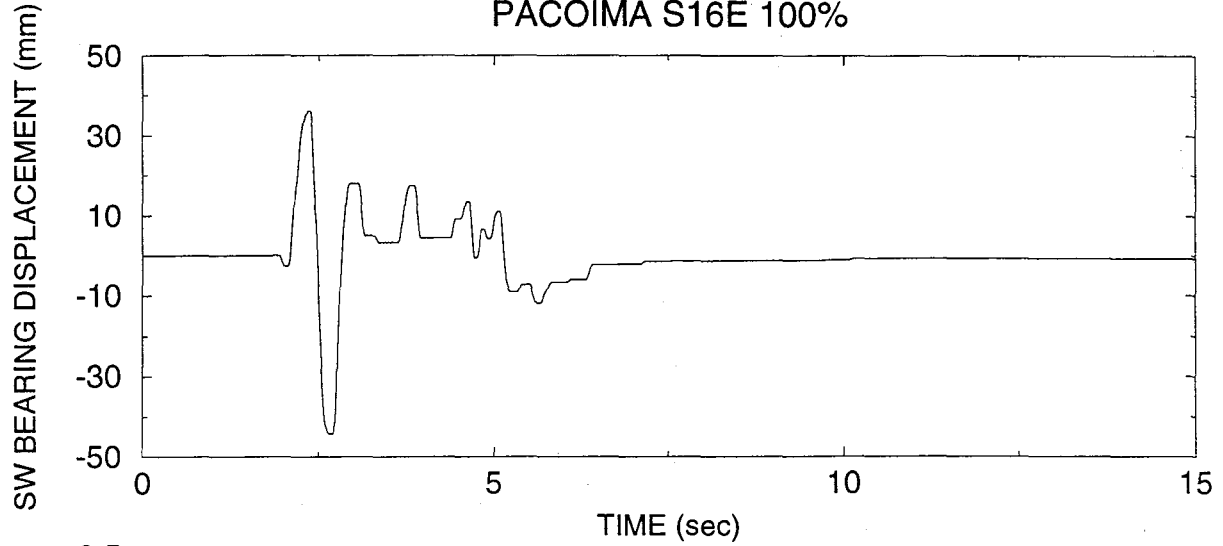




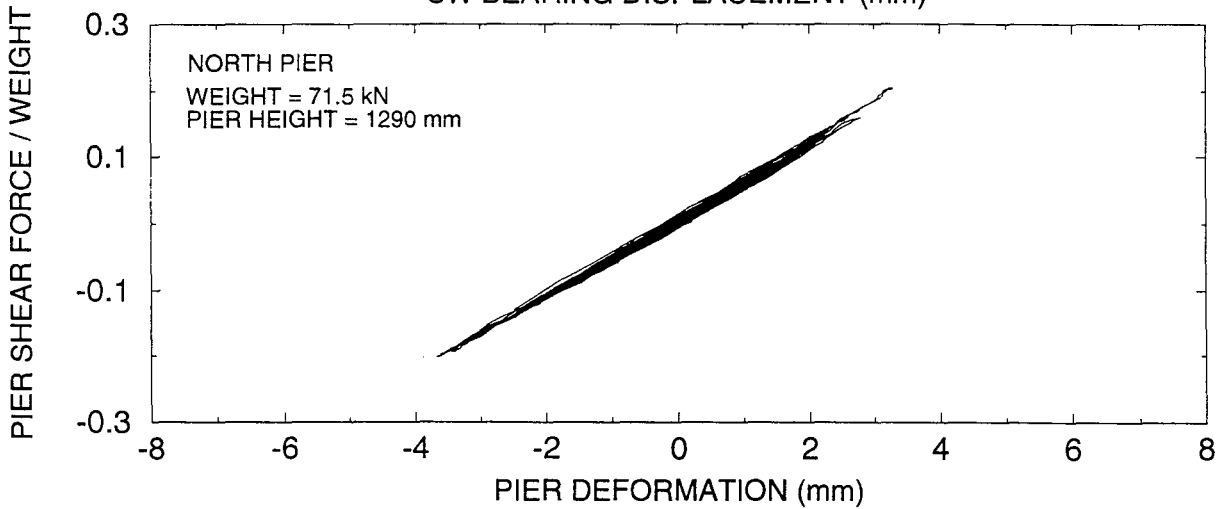
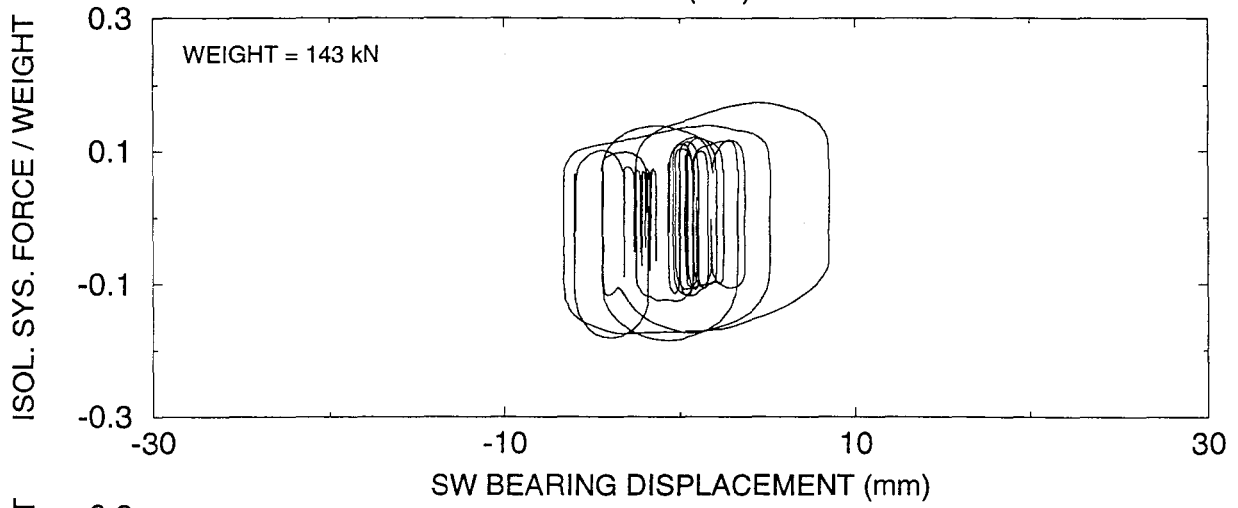
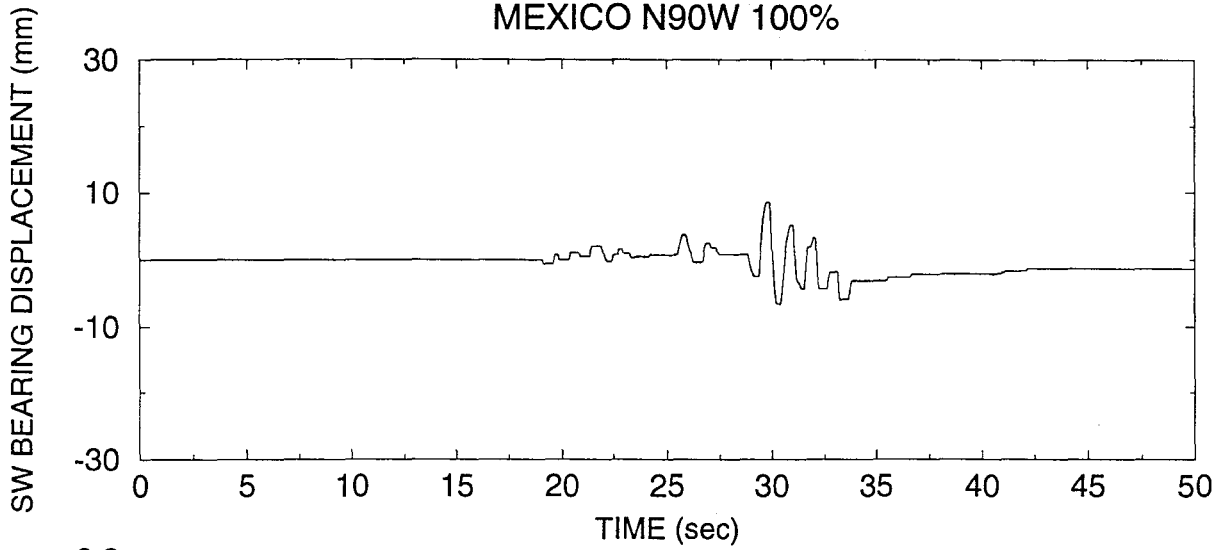
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN09  
PACOIMA S16E 75%



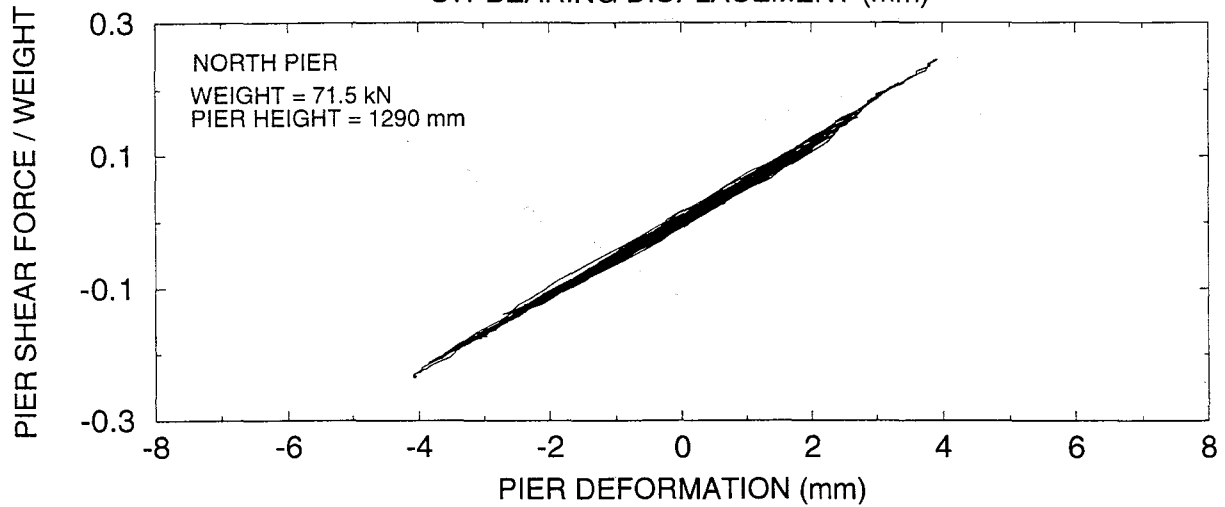
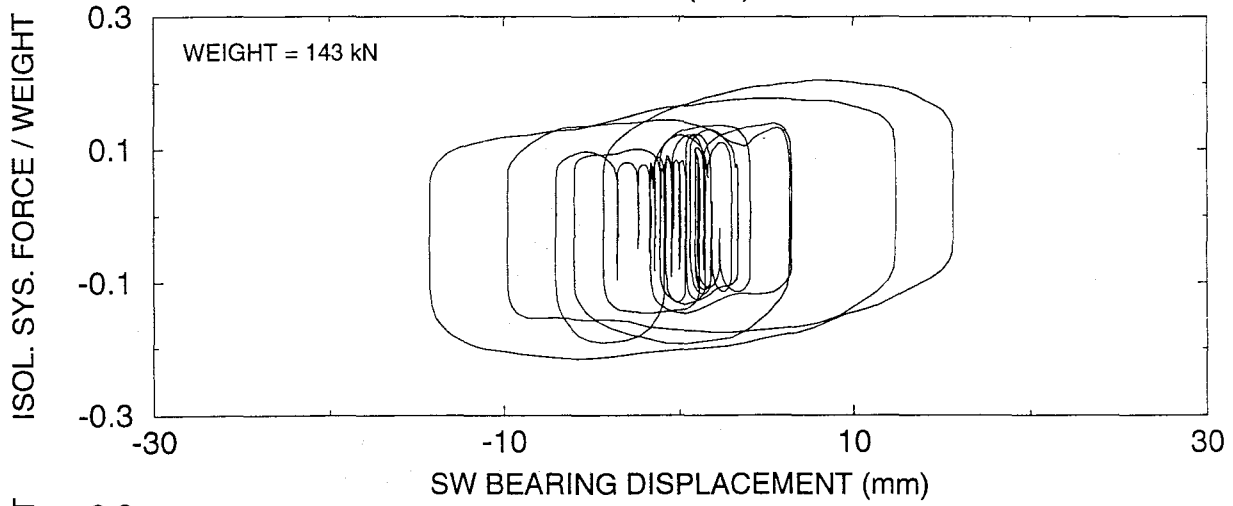
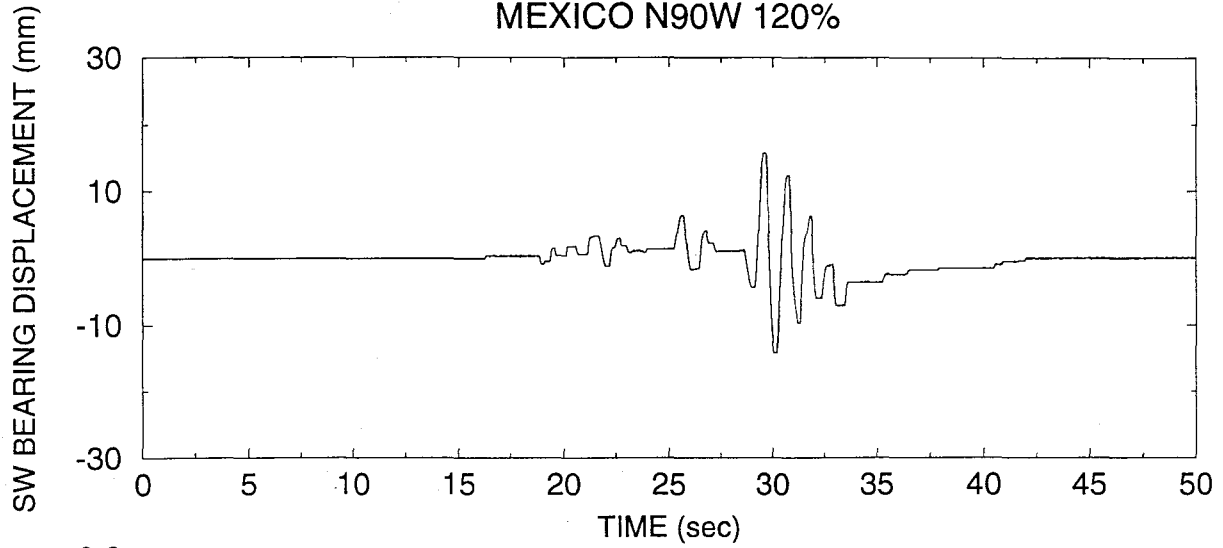
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN10  
PACOIMA S16E 100%



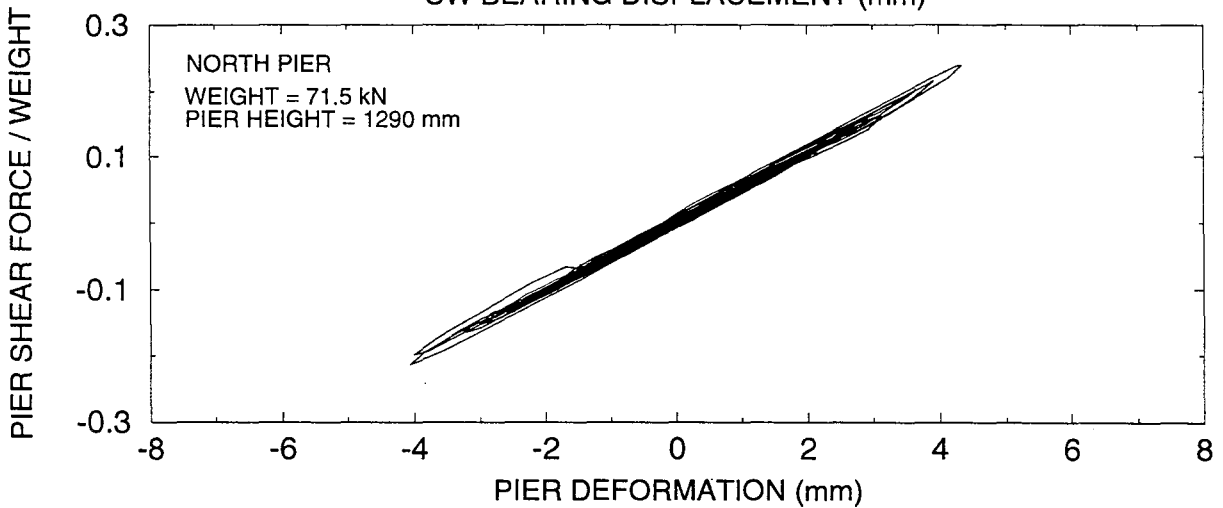
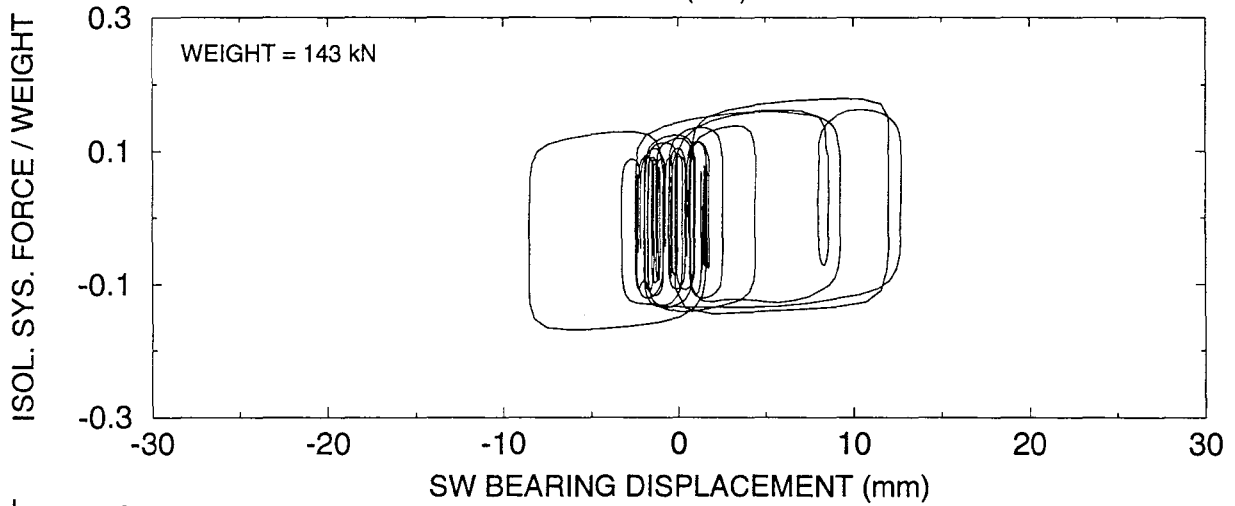
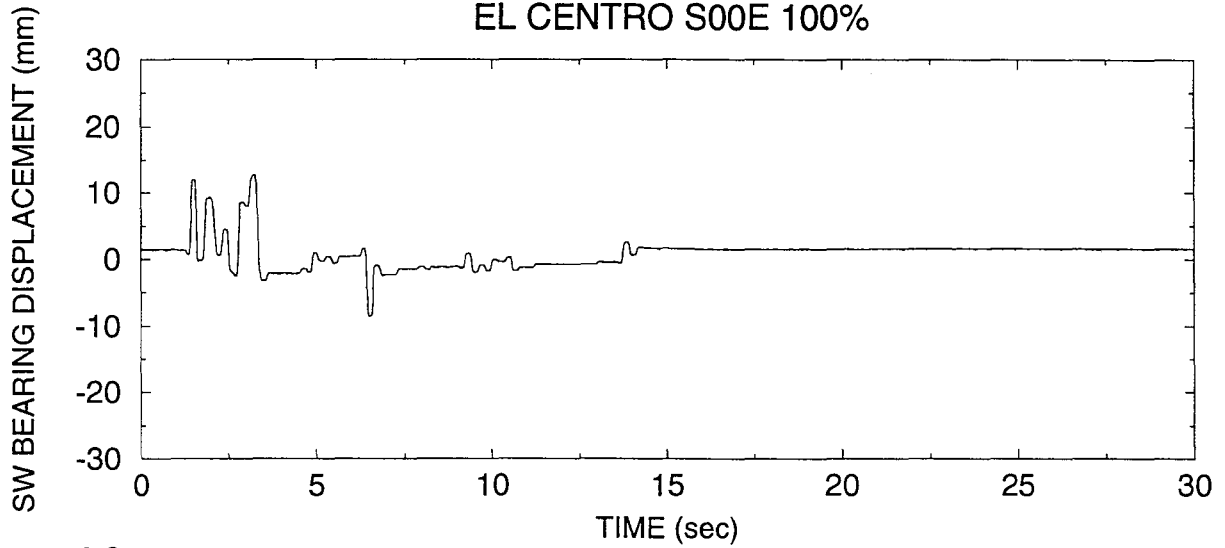
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN13  
MEXICO N90W 100%



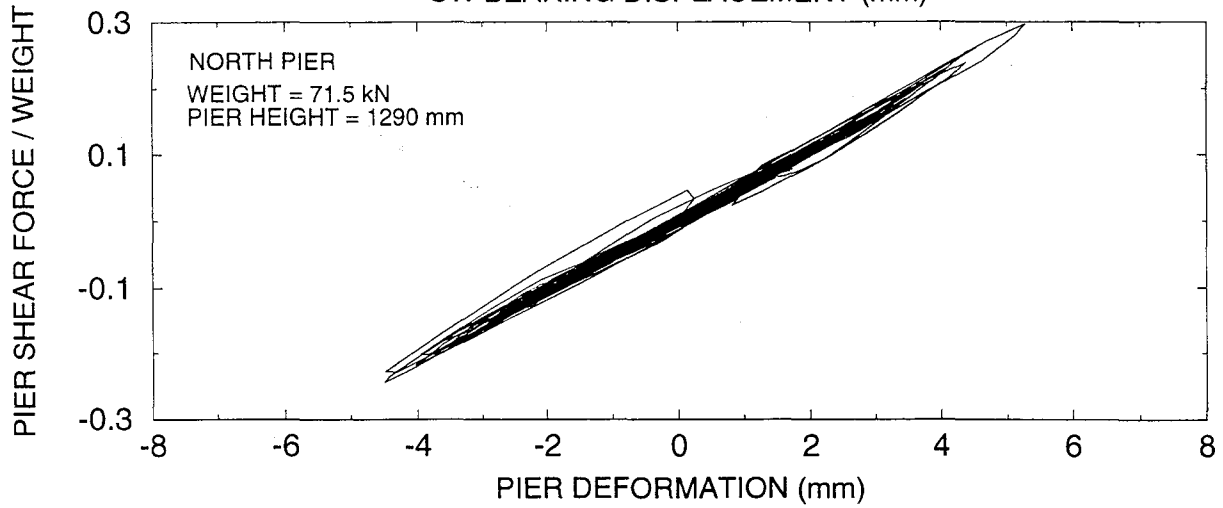
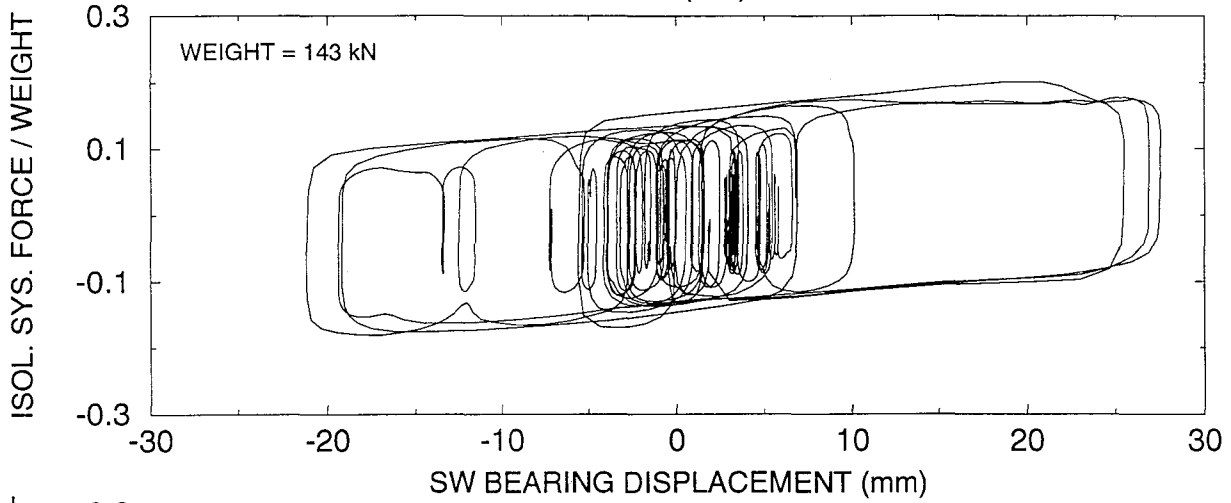
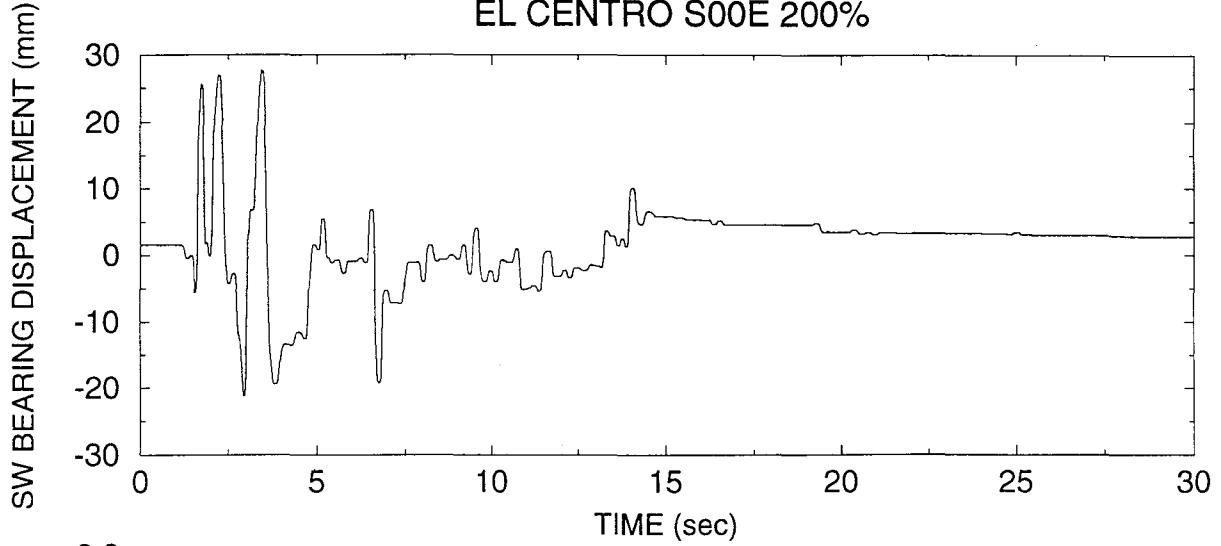
SYSTEM T1-No.2/VISCOUS DAMPERS, TEST No. DRDRUN14  
MEXICO N90W 120%



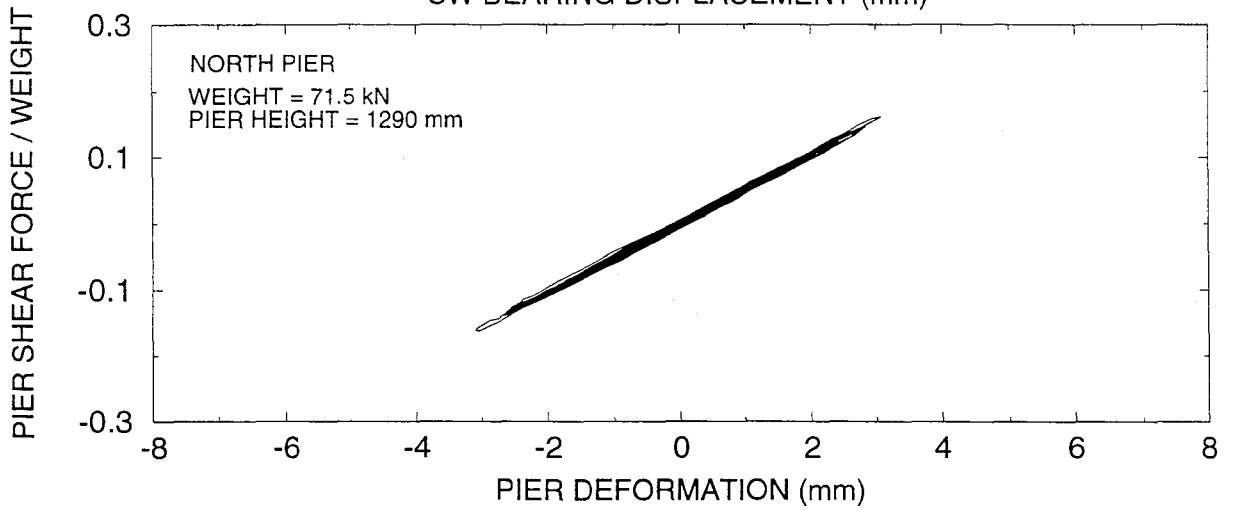
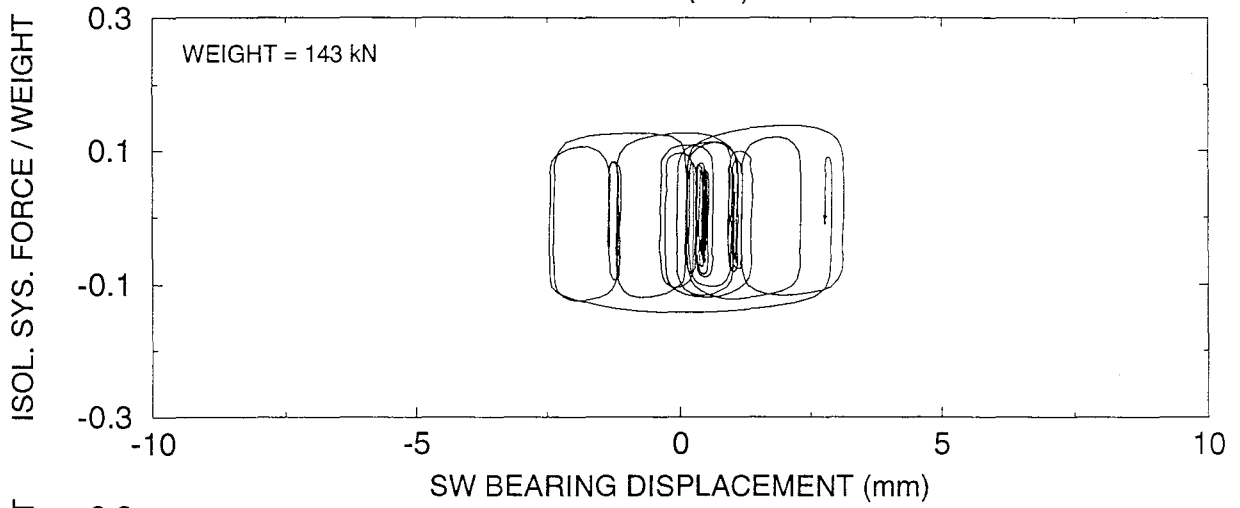
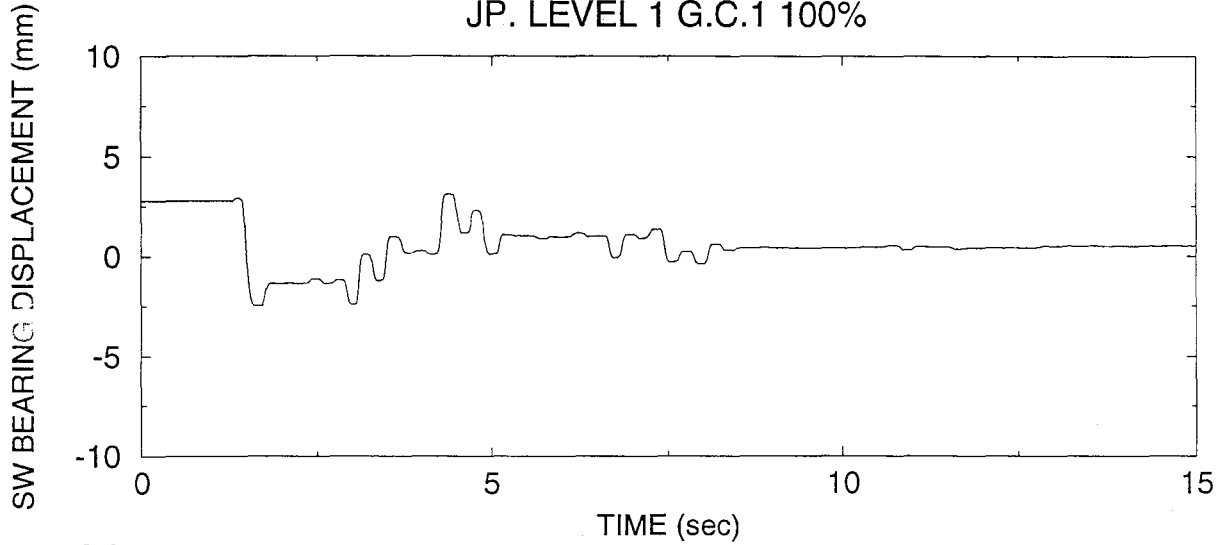
SYSTEM T2-No.2, TEST No. RD2RUN35  
EL CENTRO S00E 100%



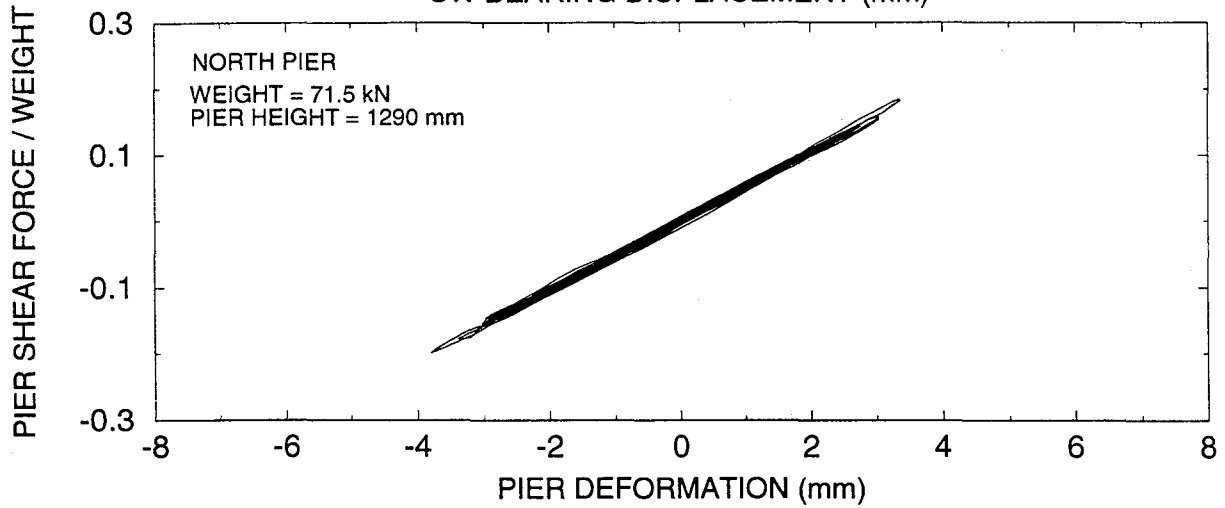
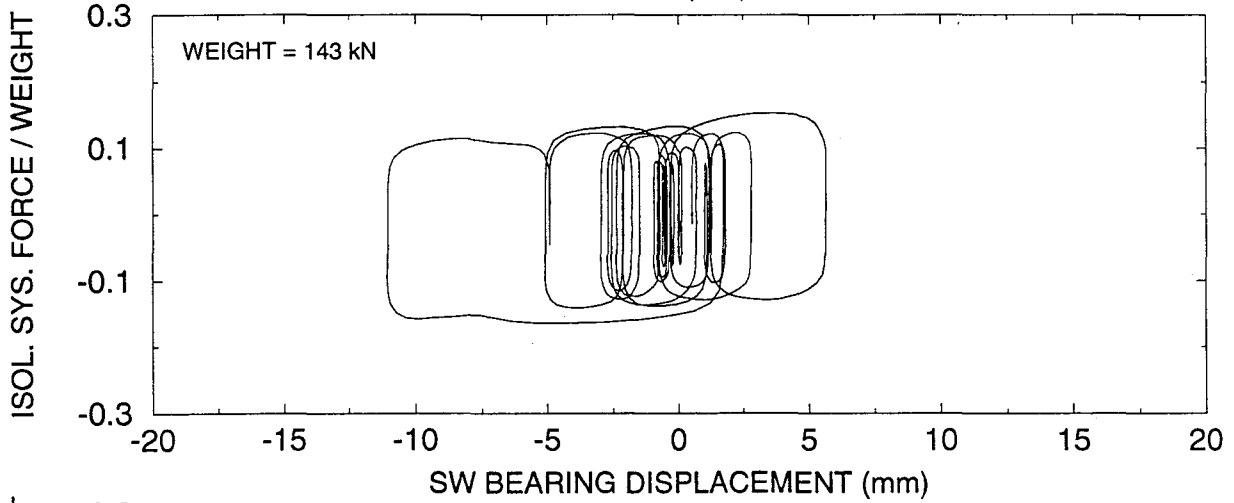
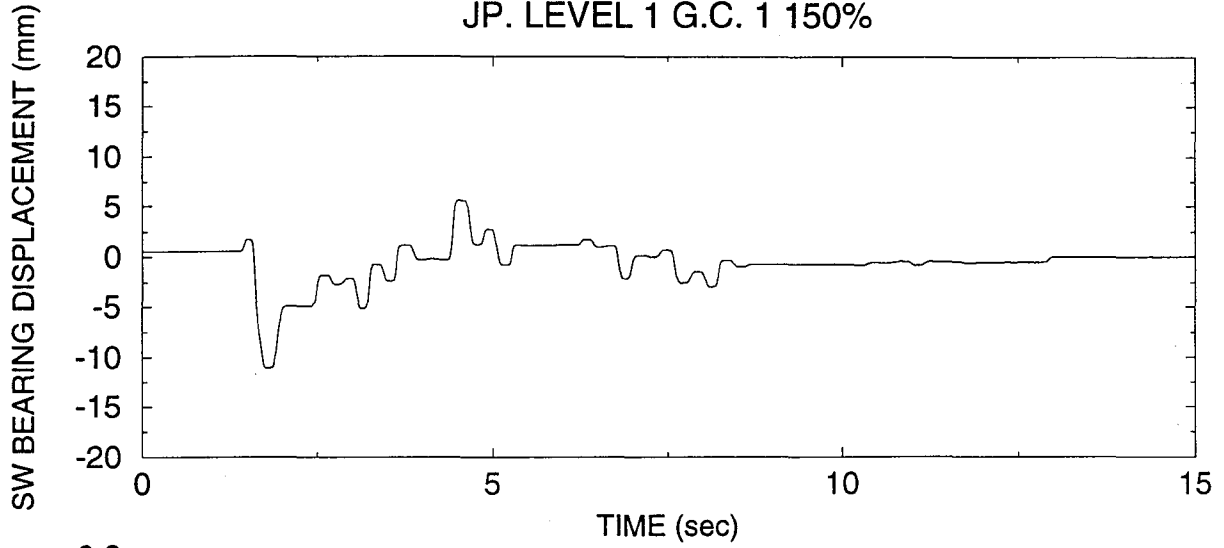
SYSTEM T2-No.2, TEST No. RD2RUN36  
EL CENTRO S00E 200%



SYSTEM T2-No.2, TEST No. RD2RUN37  
JP. LEVEL 1 G.C.1 100%

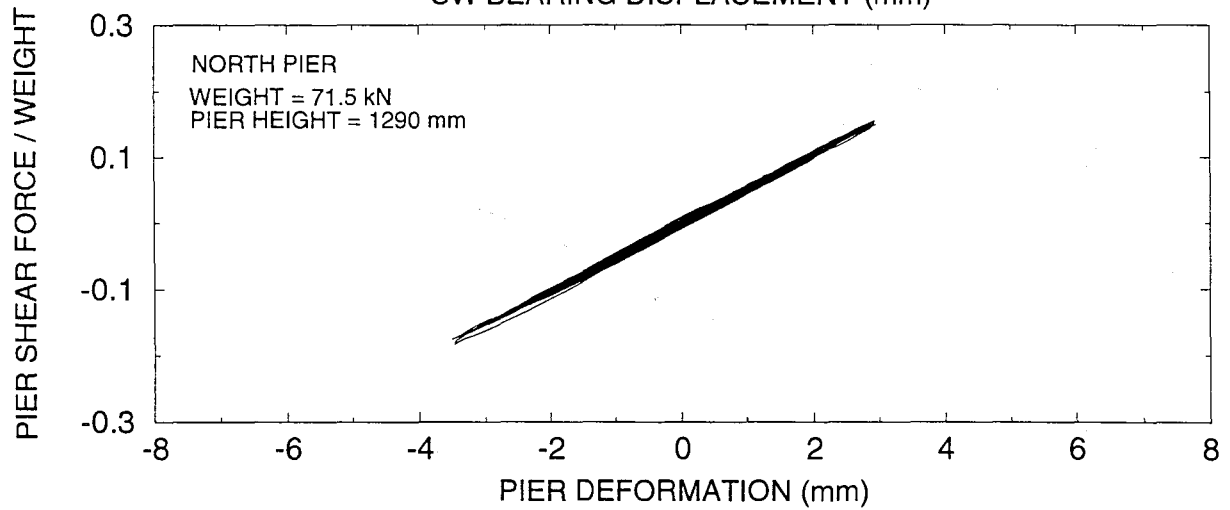
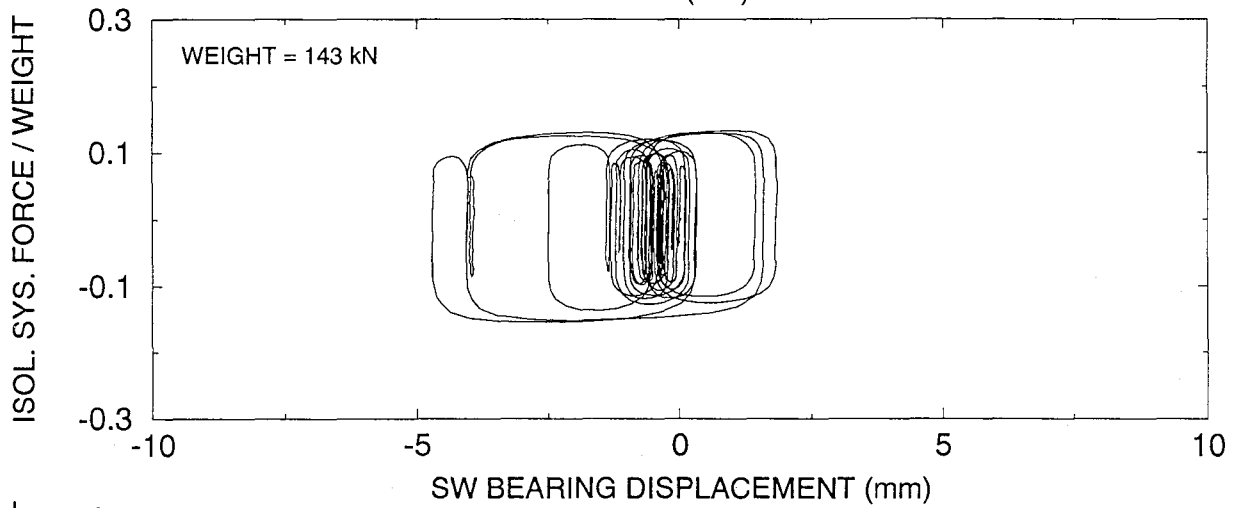
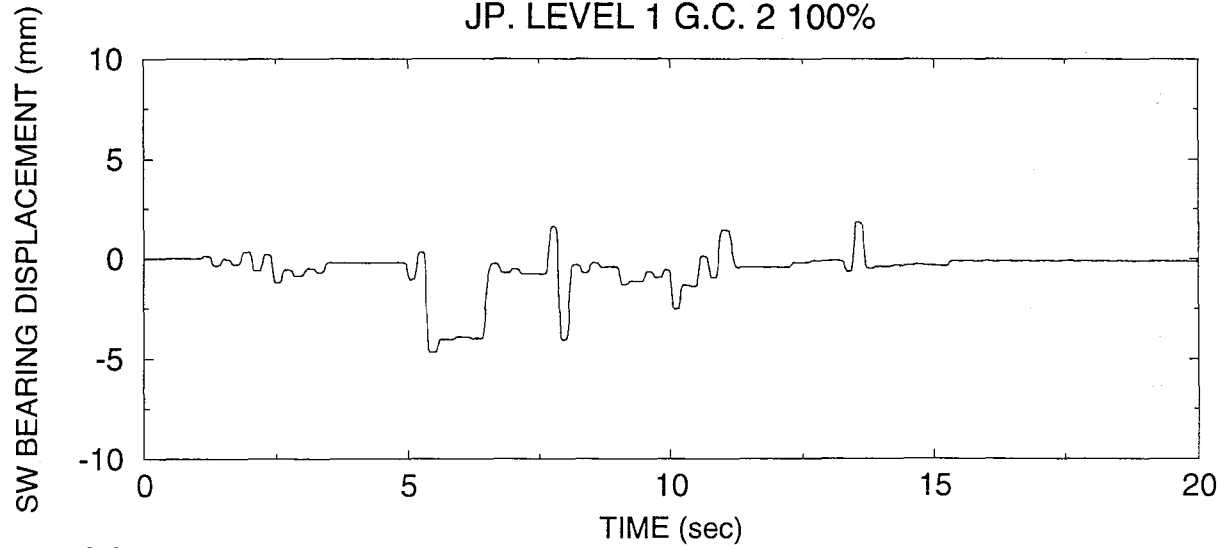


SYSTEM T2-No.2, TEST No. RD2RUN38  
JP. LEVEL 1 G.C. 1 150%

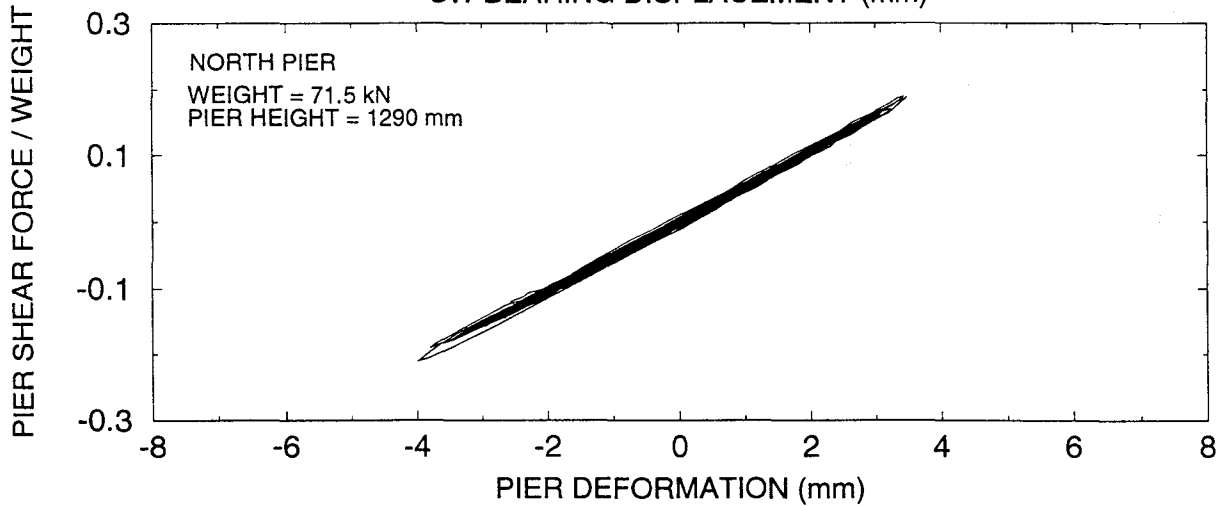
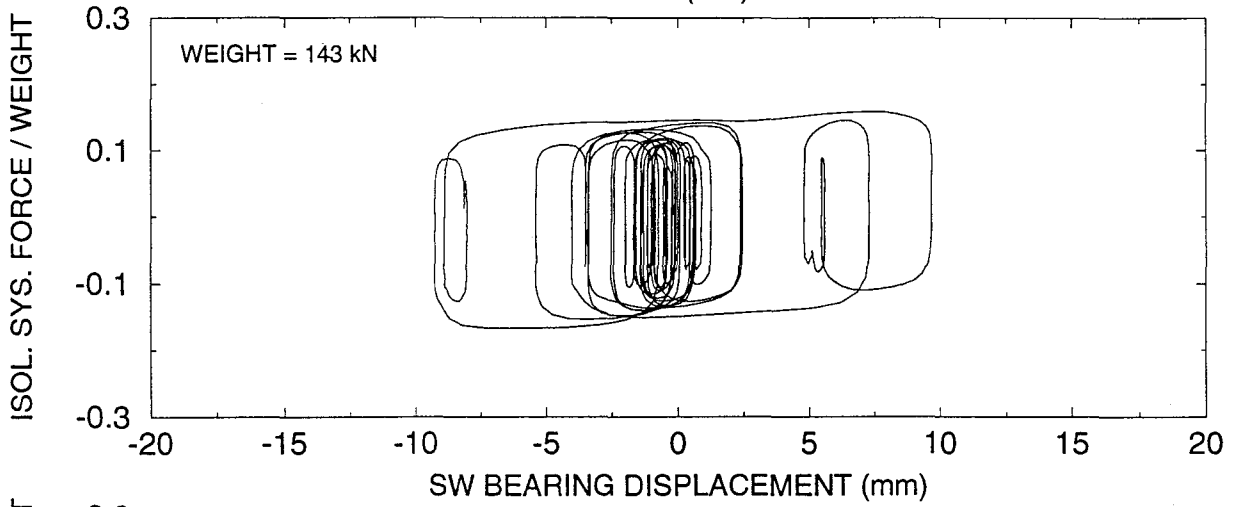
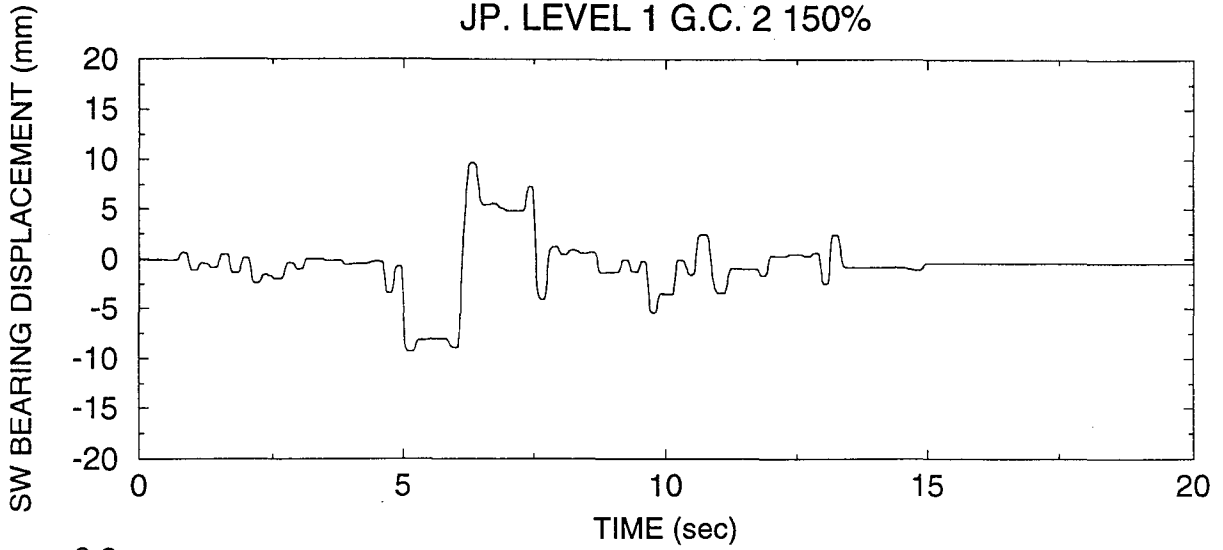




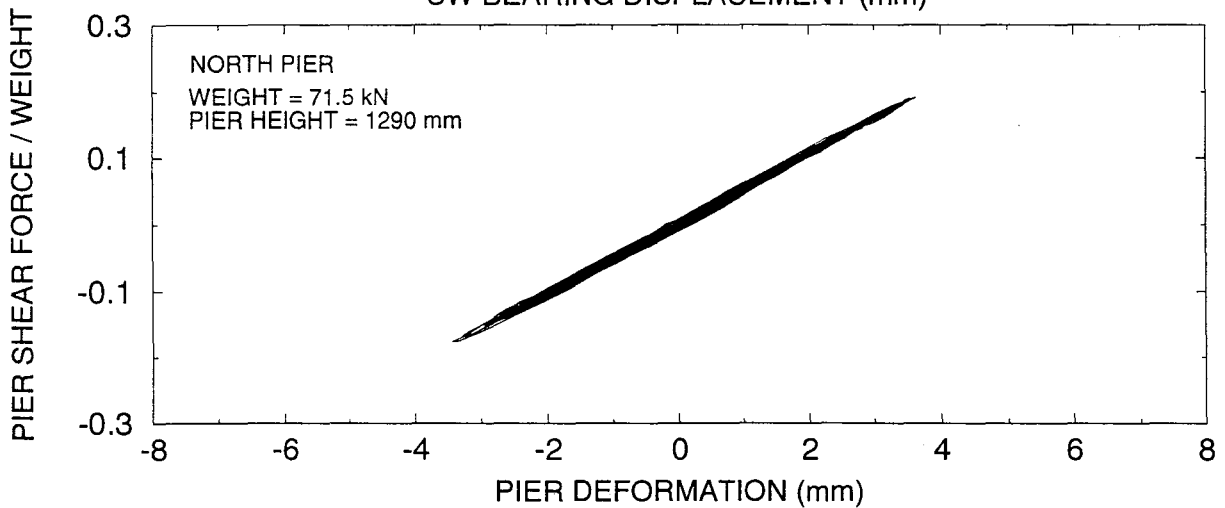
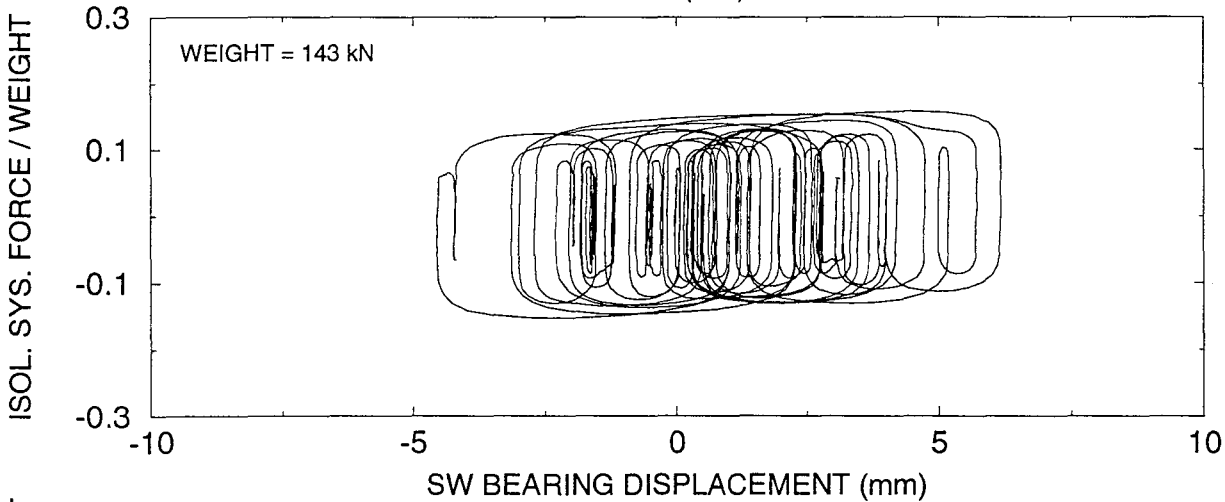
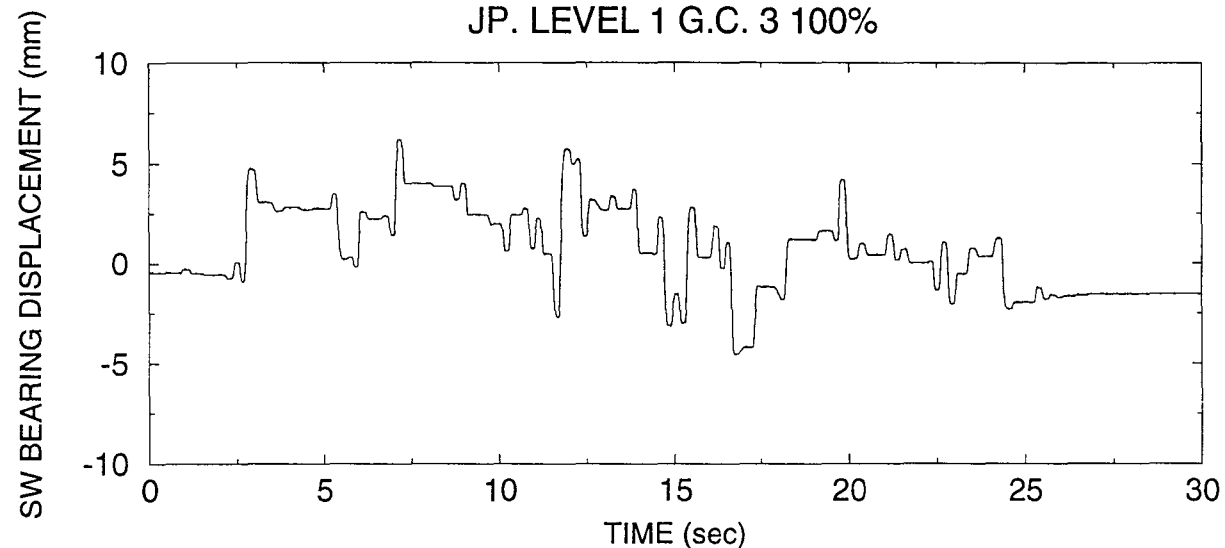
SYSTEM T2-No.2, TEST No. RD2RUN39  
JP. LEVEL 1 G.C. 2 100%



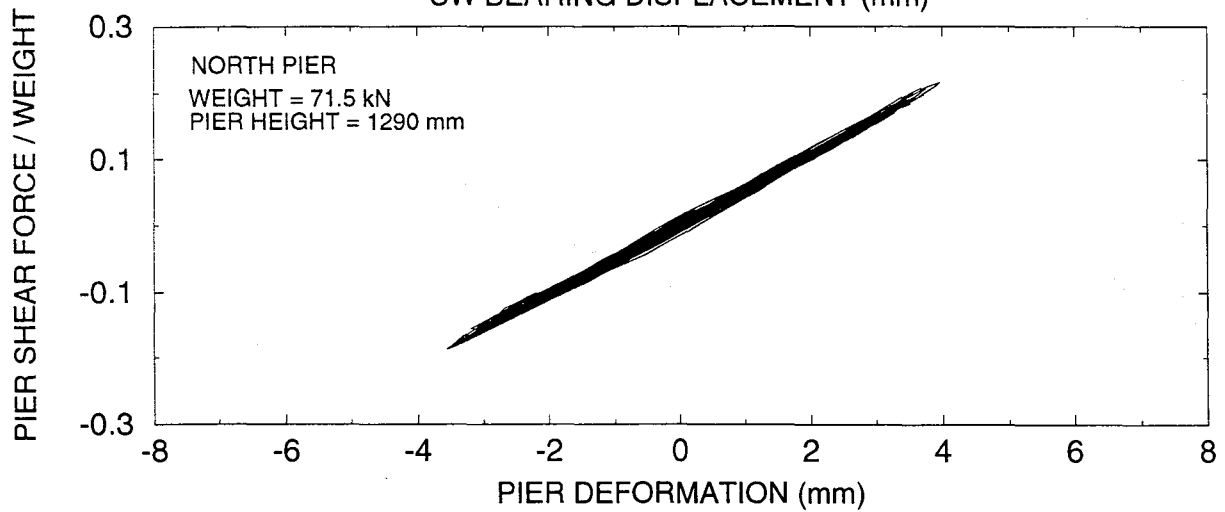
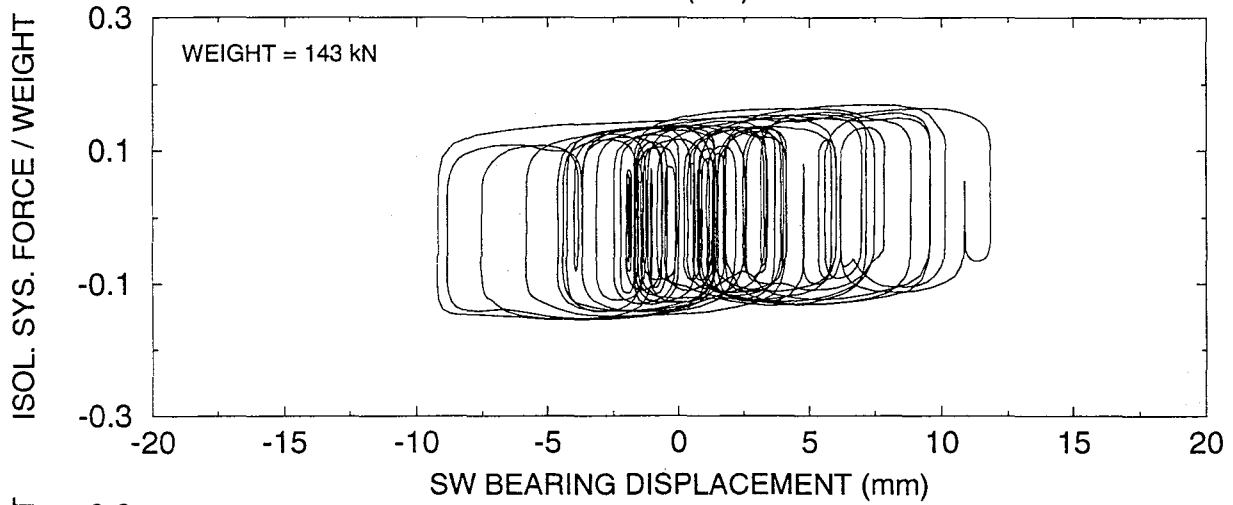
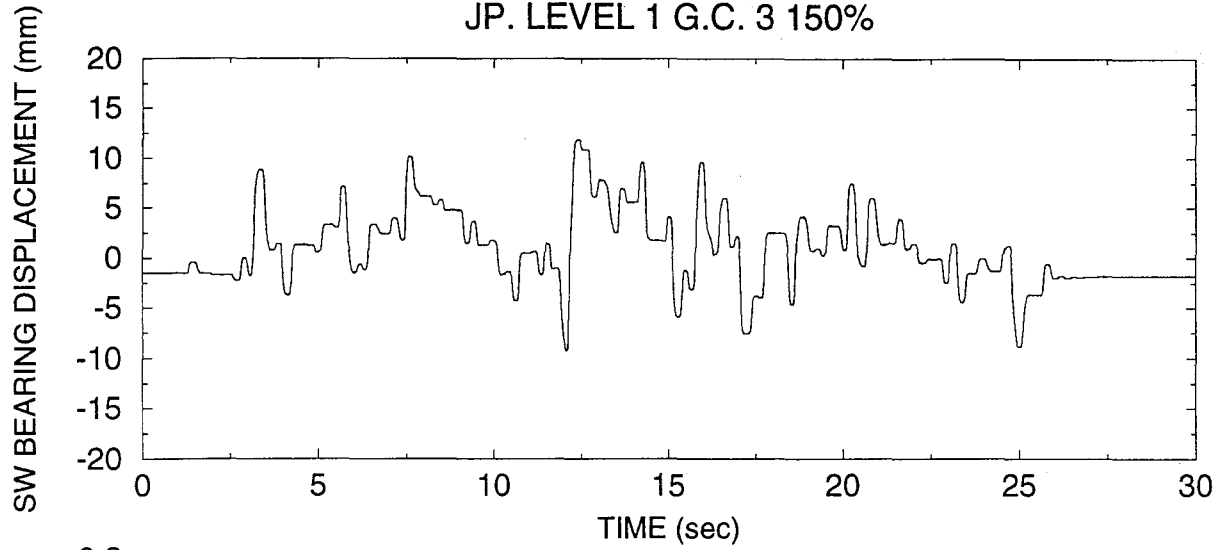
SYSTEM T2-No.2, TEST No. RD2RUN40  
JP. LEVEL 1 G.C. 2 150%



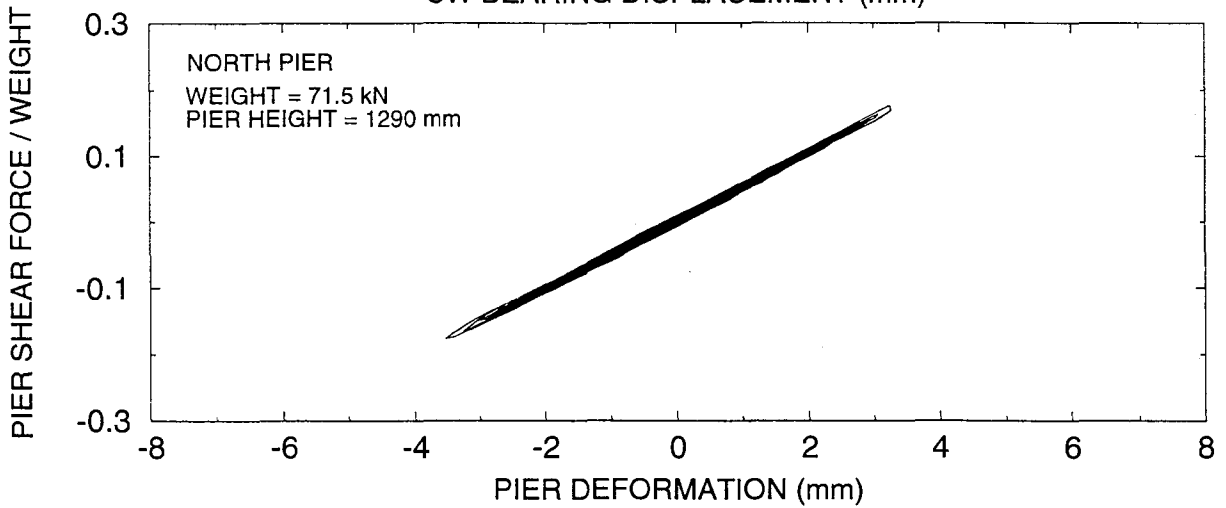
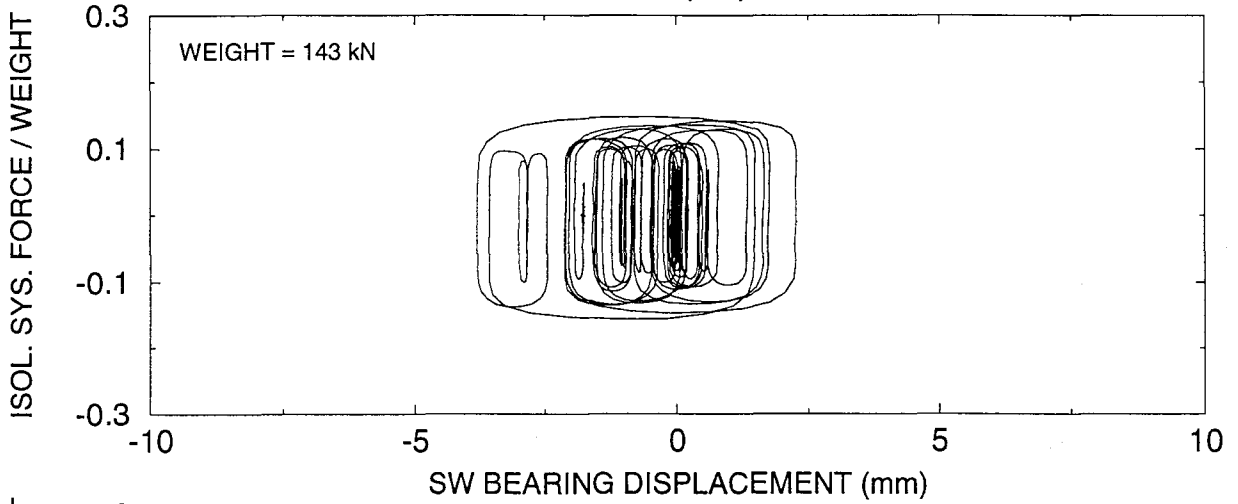
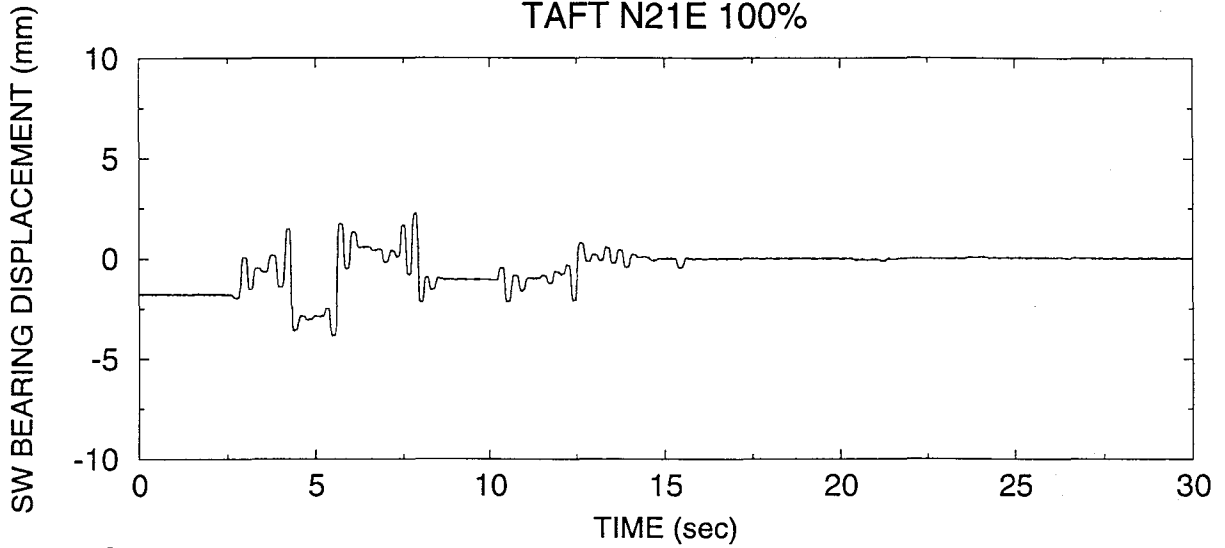
SYSTEM T2-No.2, TEST No. RD2RUN41  
JP. LEVEL 1 G.C. 3 100%



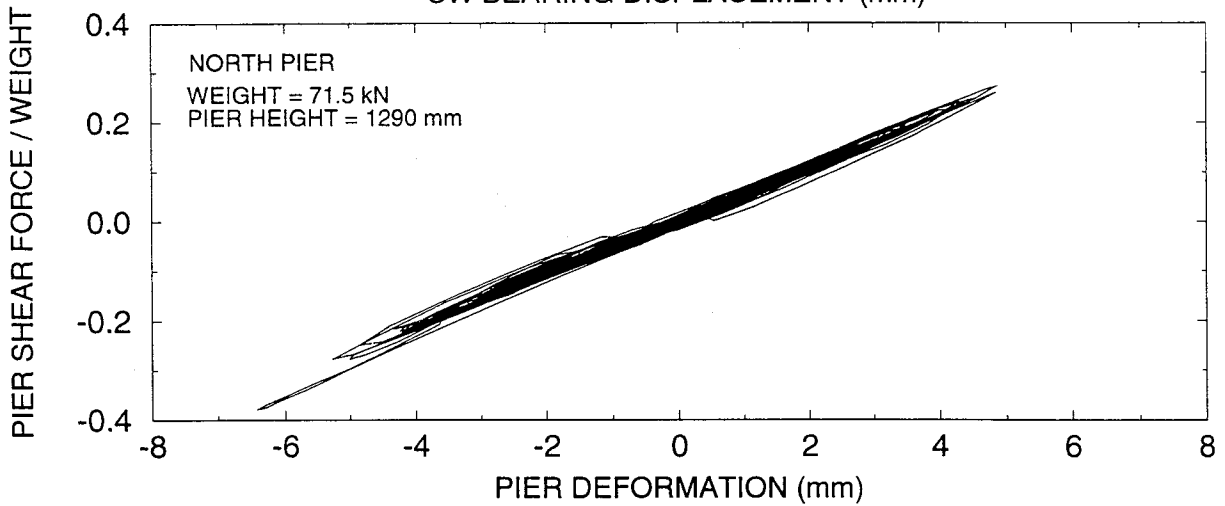
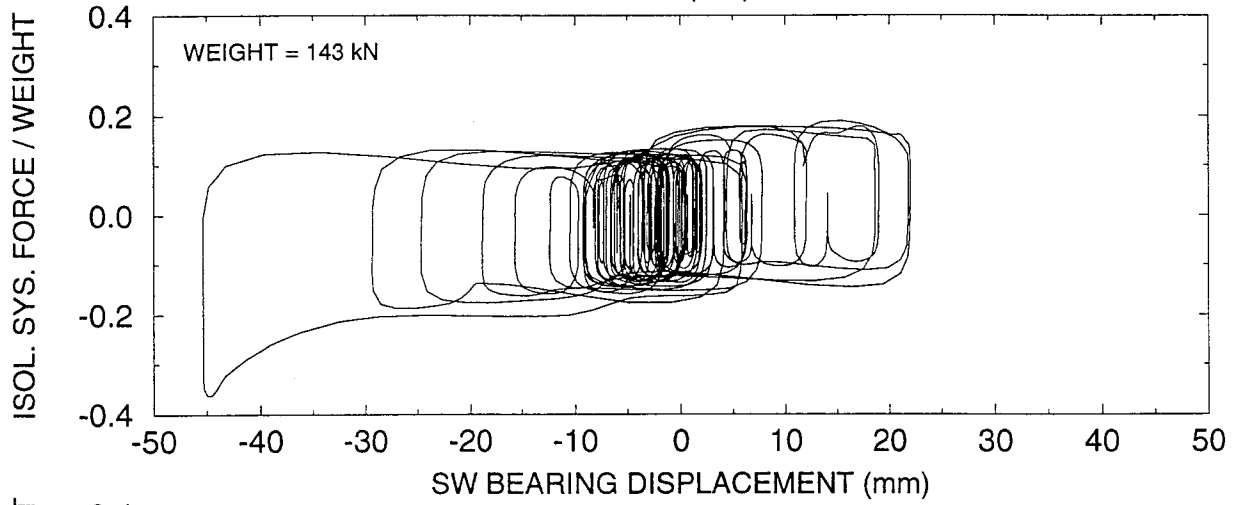
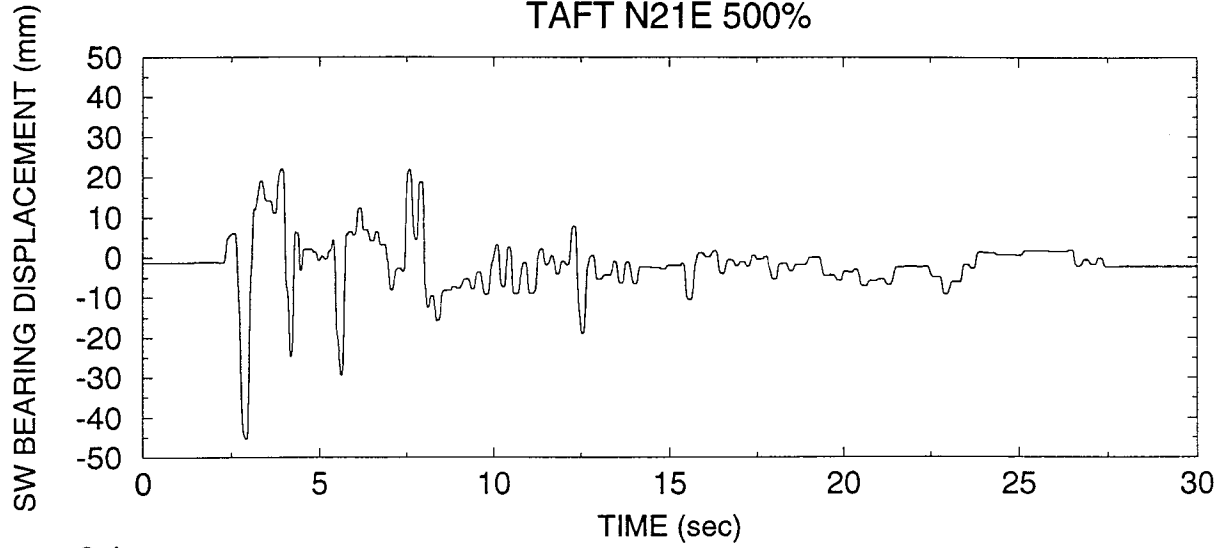
SYSTEM T2-No.2, TEST No. RD2RUN42  
JP. LEVEL 1 G.C. 3 150%



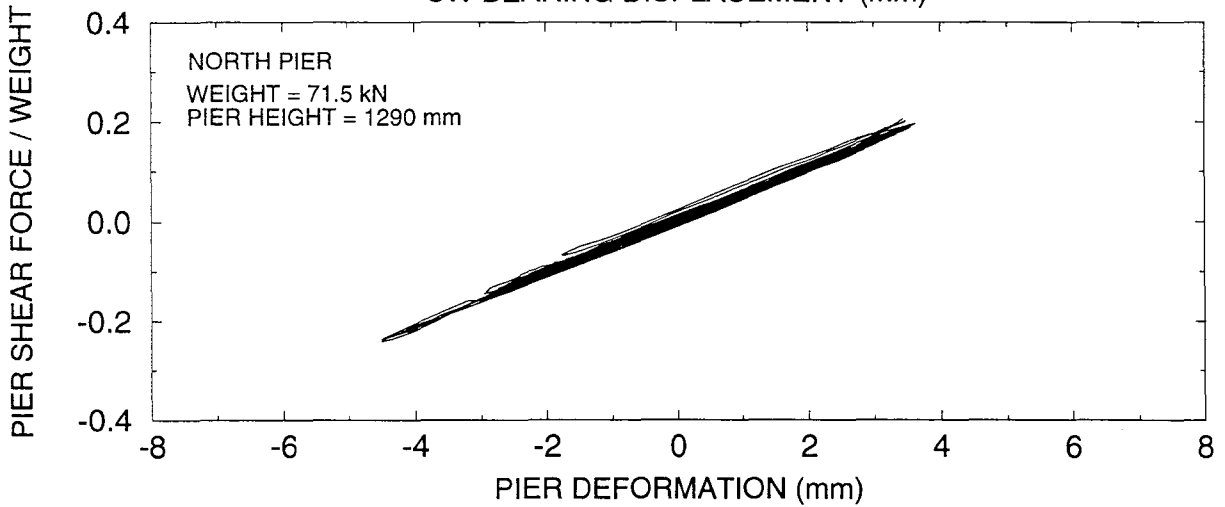
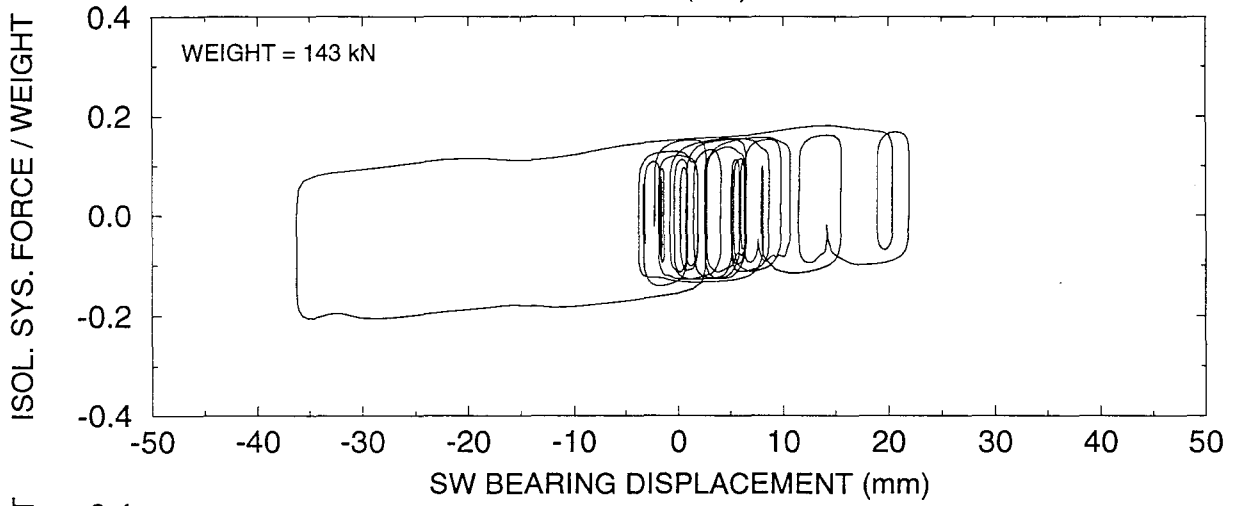
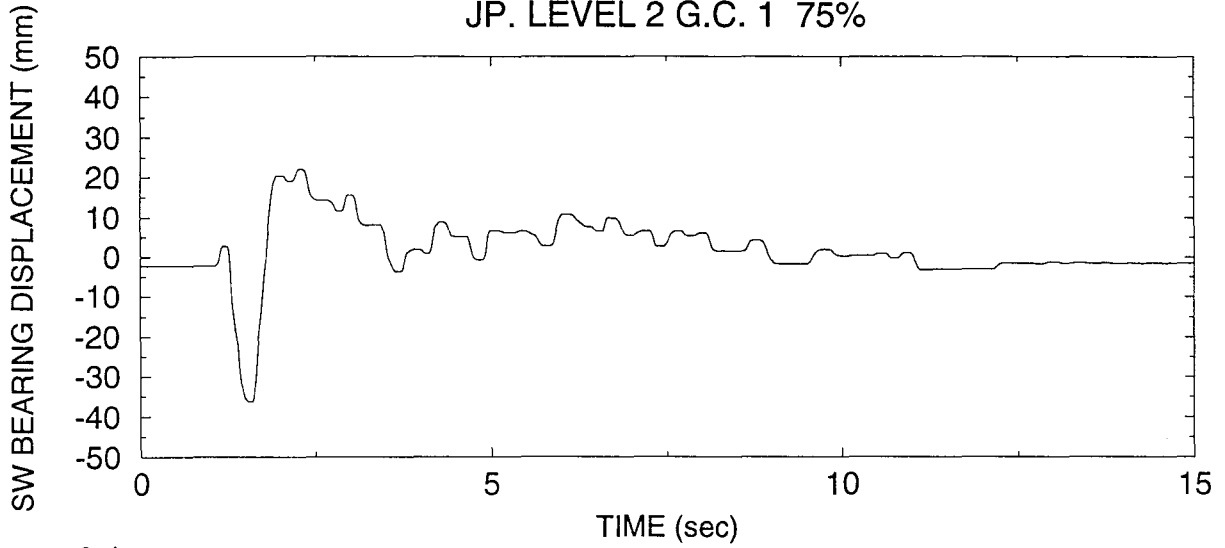
SYSTEM T2-No.2, TEST No. RD2RUN43  
TAFT N21E 100%



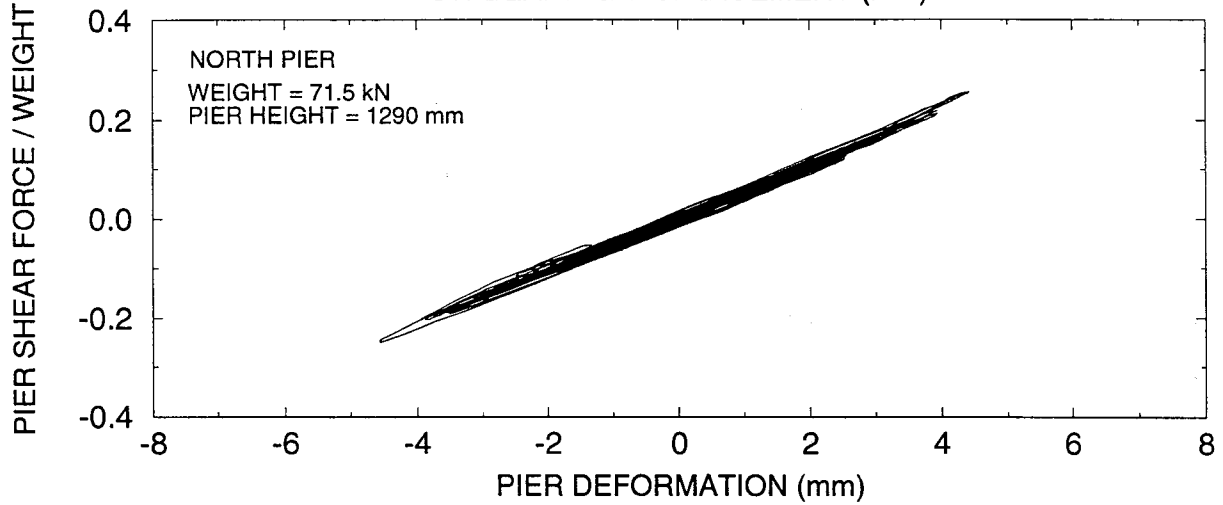
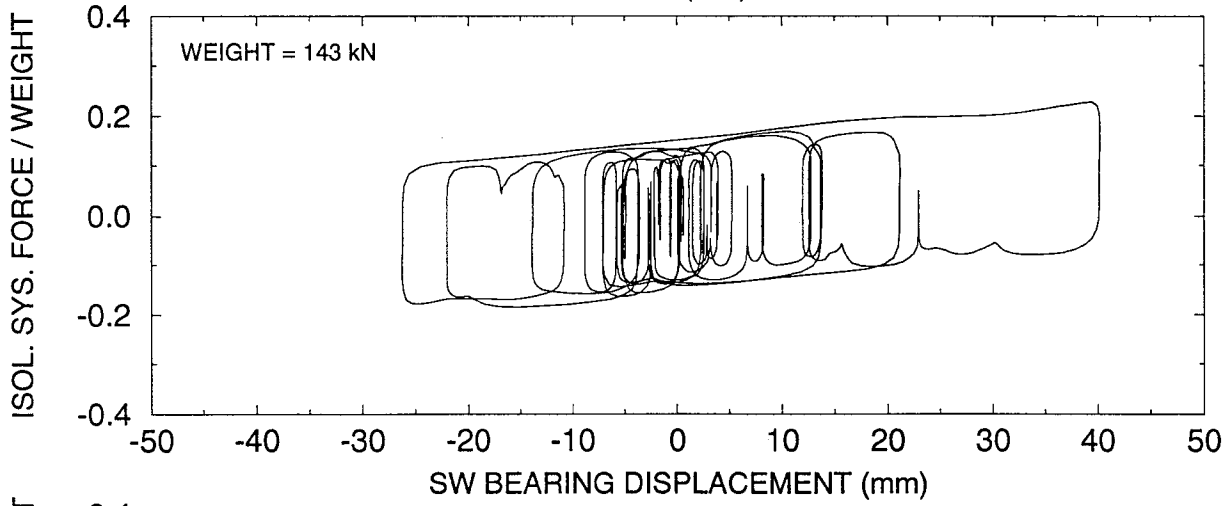
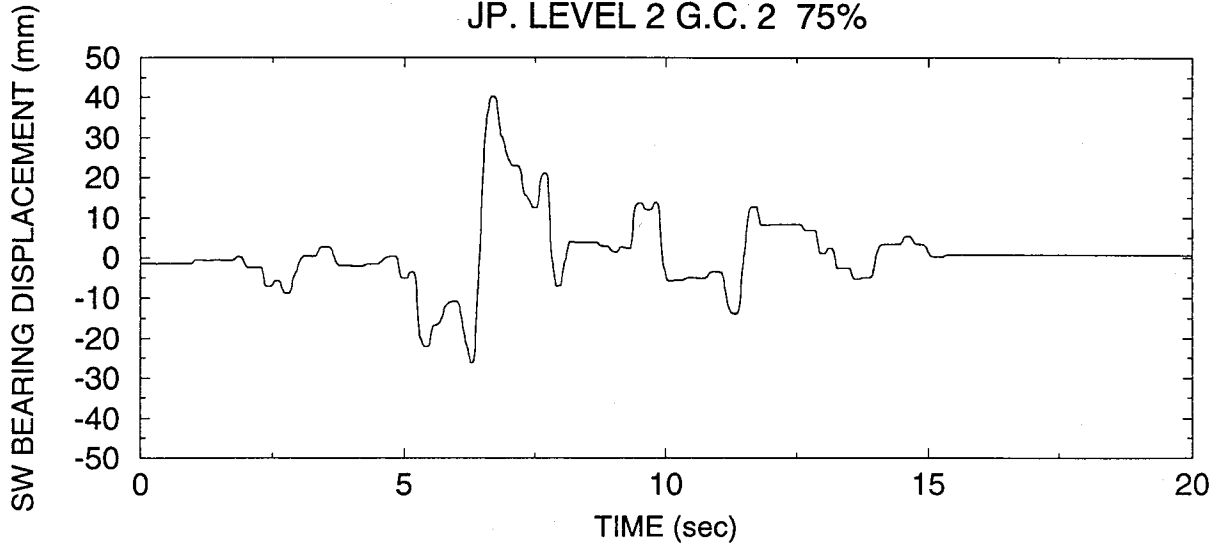
SYSTEM T2-No.2, TEST No. RD2RUN46  
TAFT N21E 500%



SYSTEM T2-No.2, TEST No. RD2RUN47  
JP. LEVEL 2 G.C. 1 75%

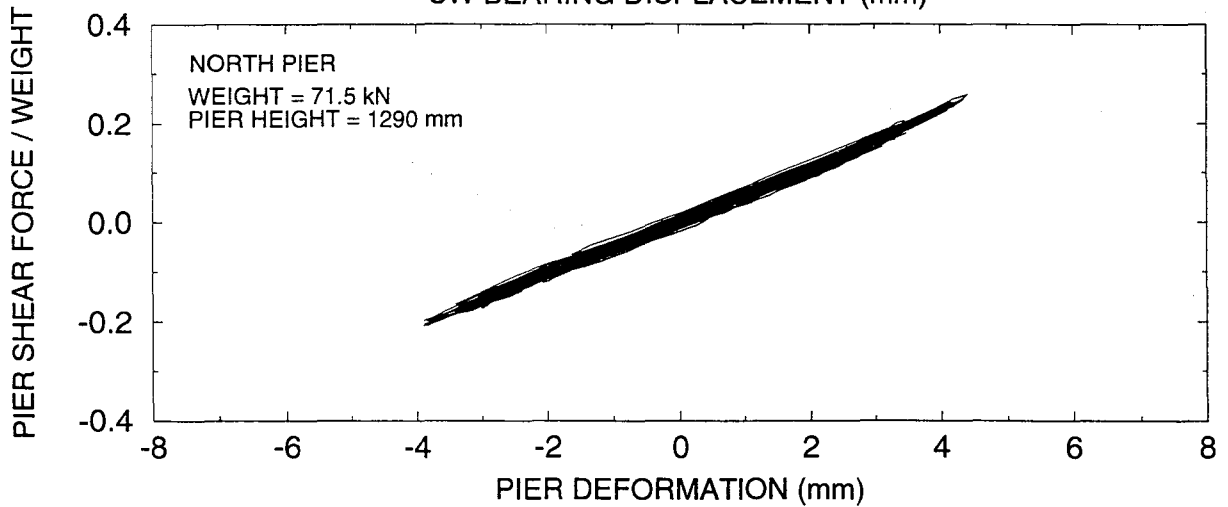
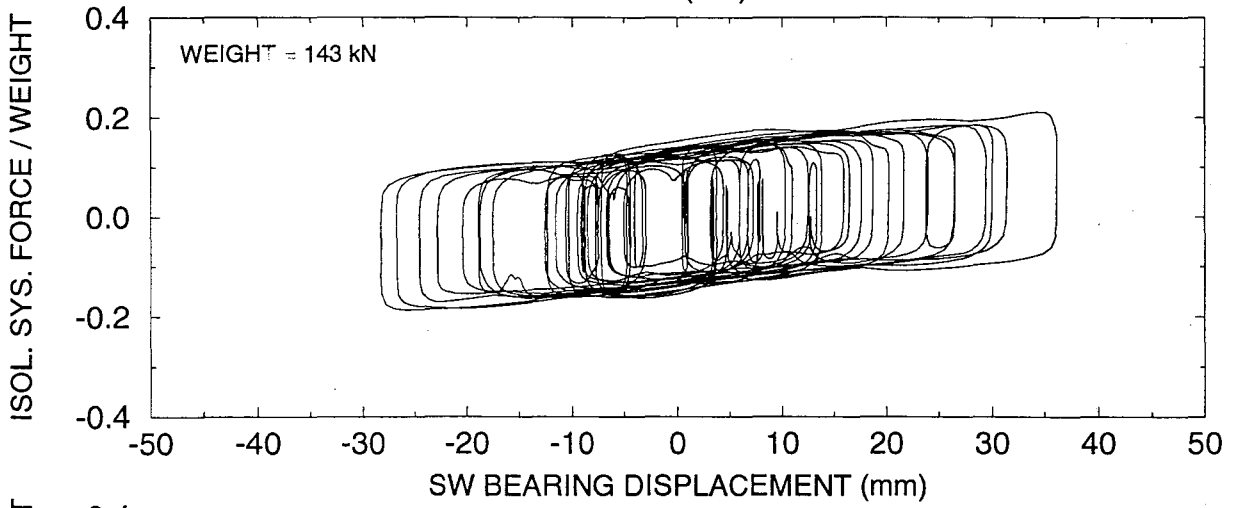
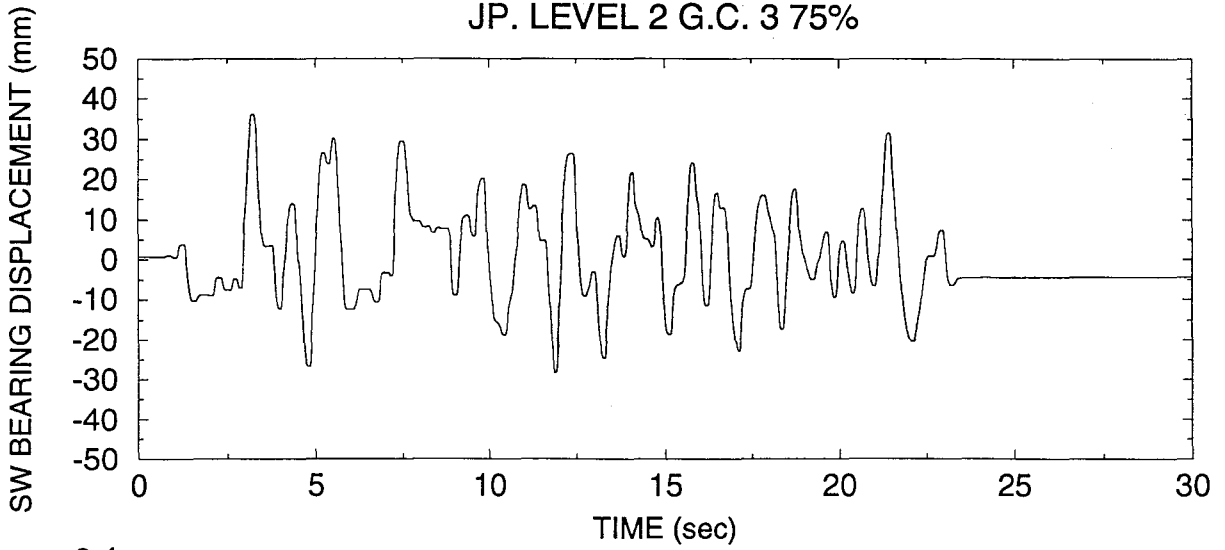


SYSTEM T2-No.2, TEST No. RD2RUN48  
JP. LEVEL 2 G.C. 2 75%

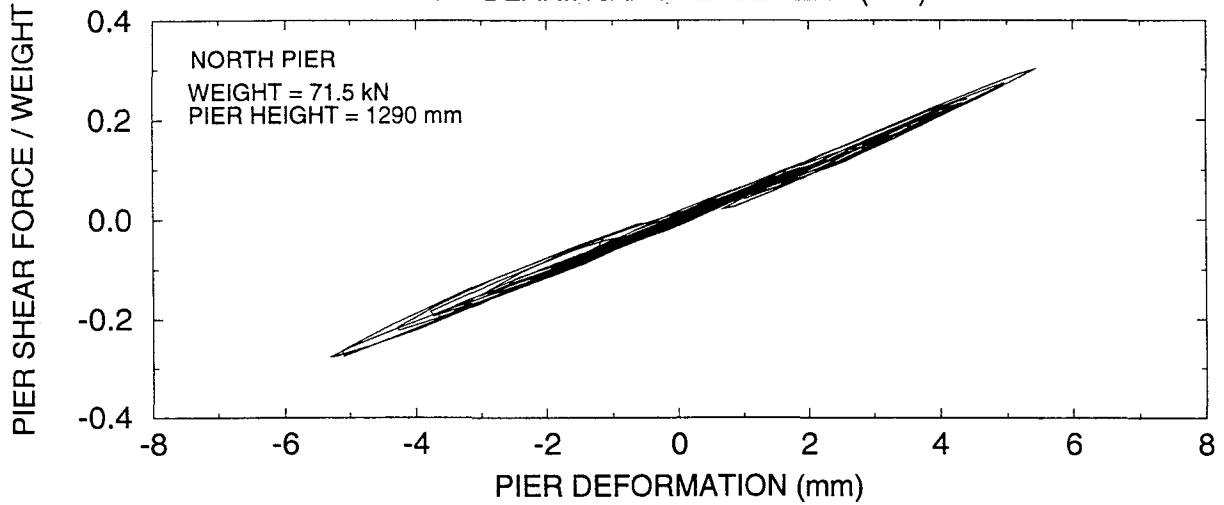
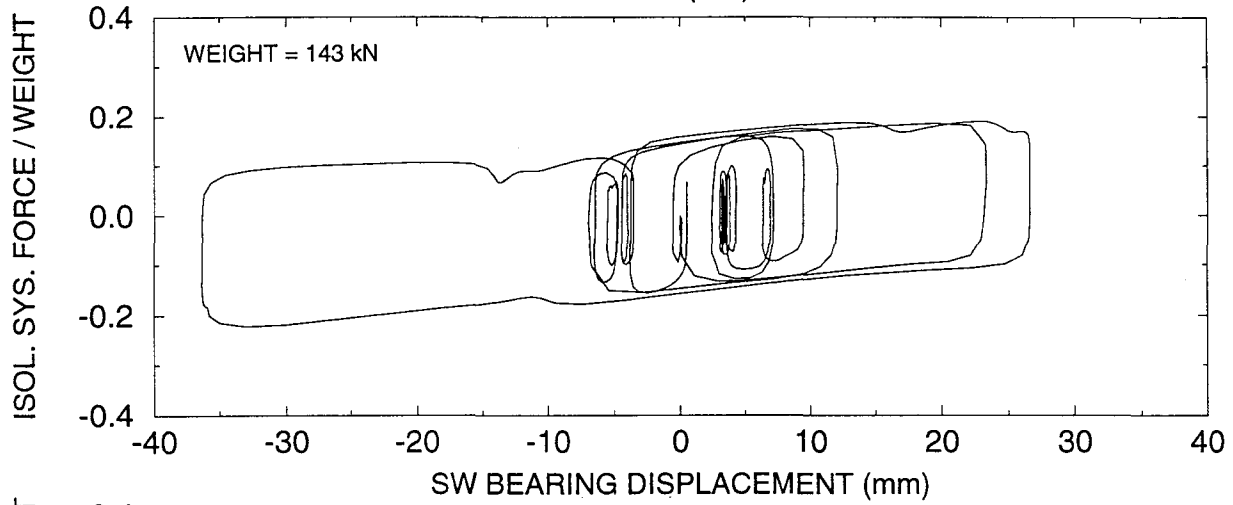
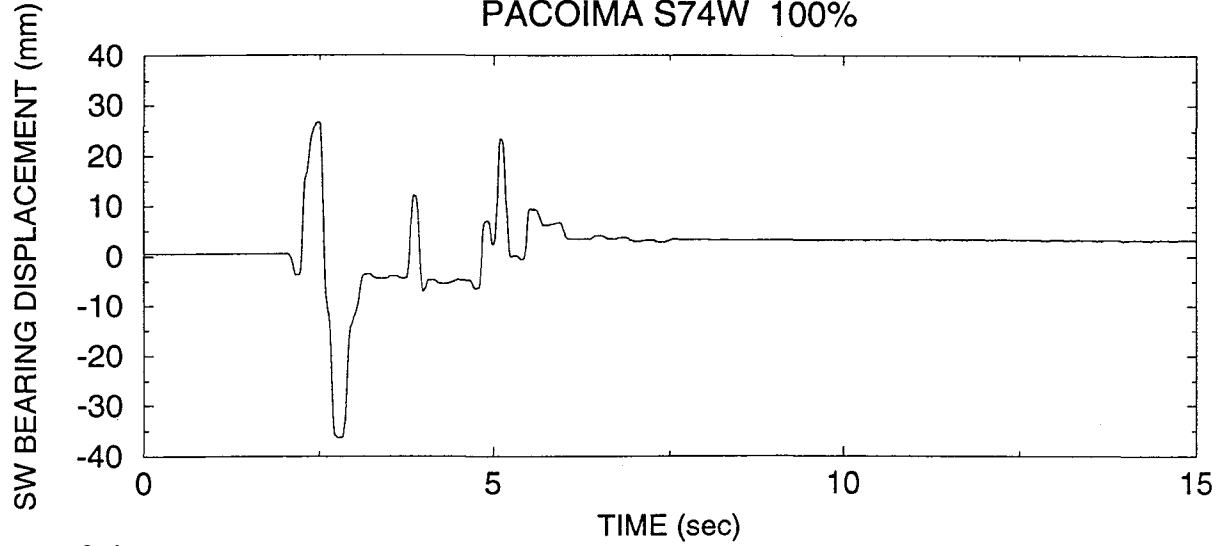




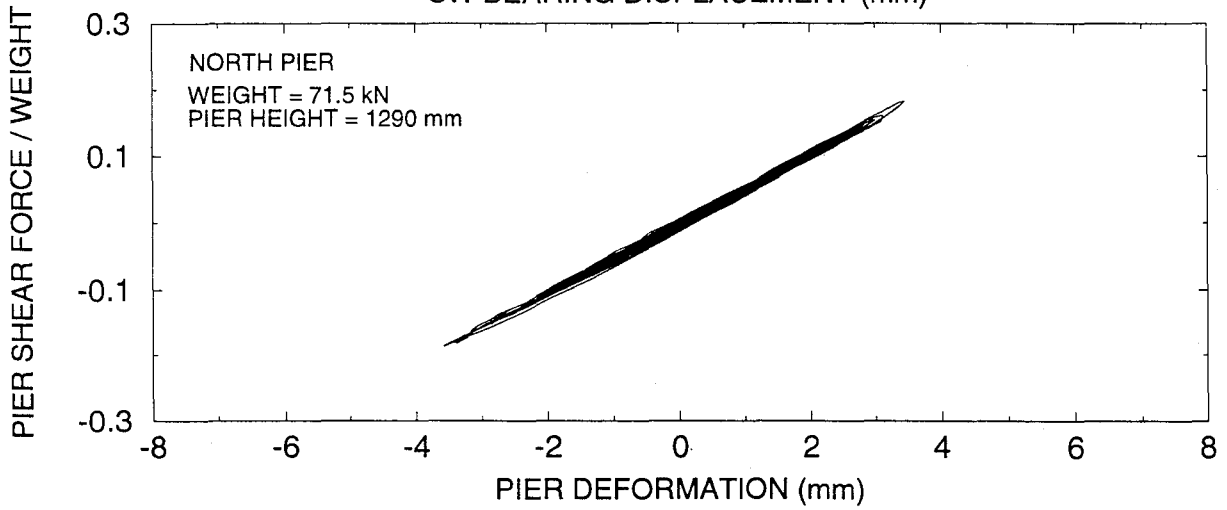
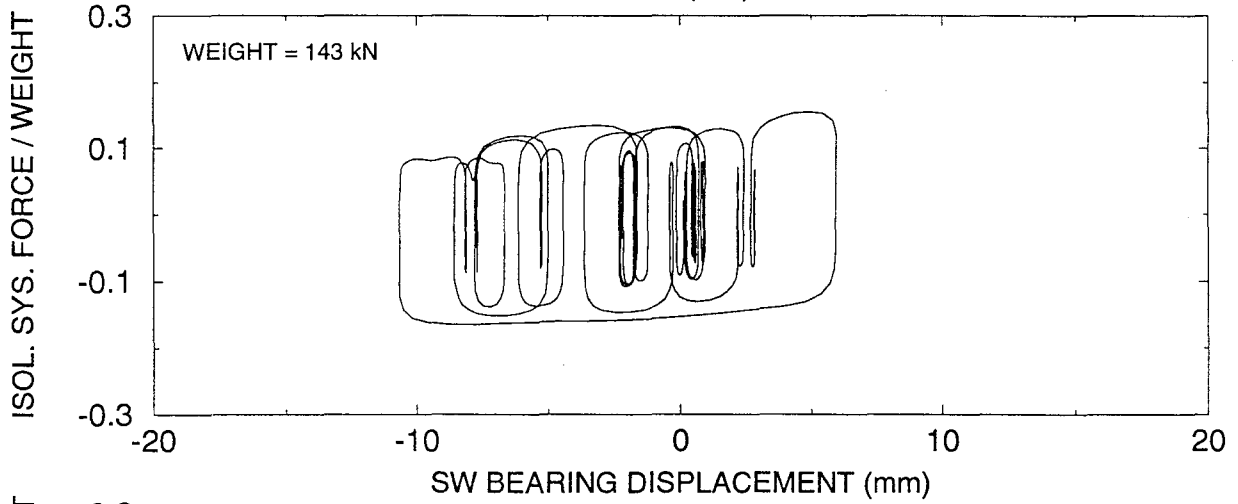
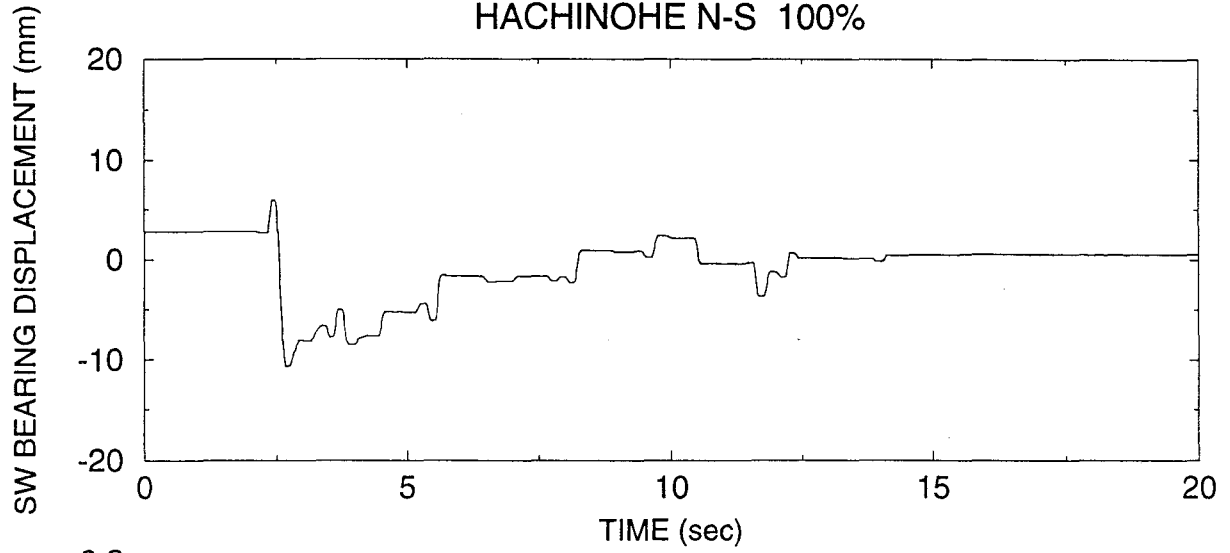
SYSTEM T2-No.2, TEST No. RD2RUN49  
JP. LEVEL 2 G.C. 3 75%



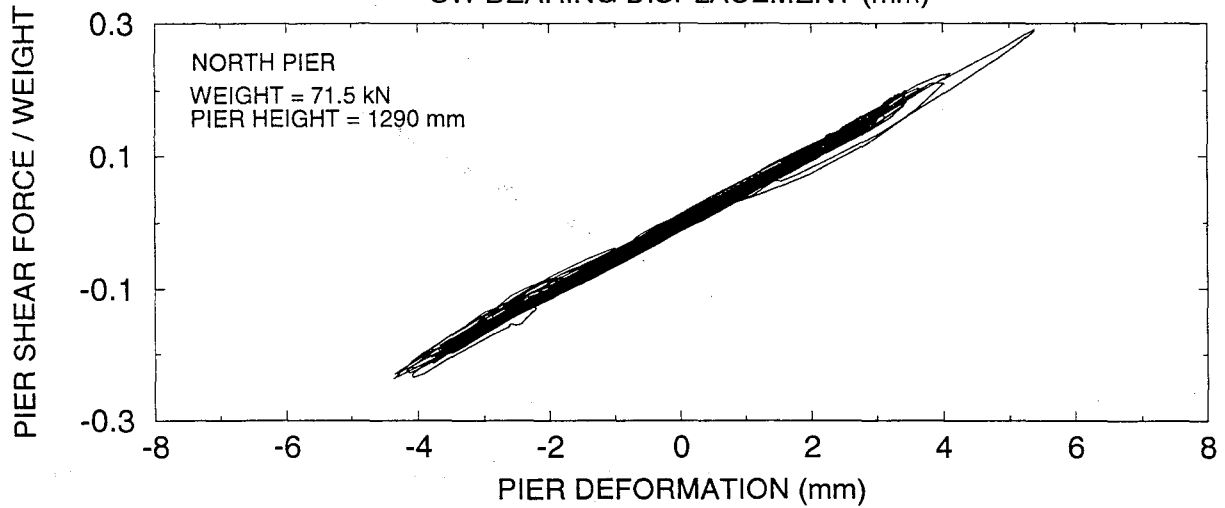
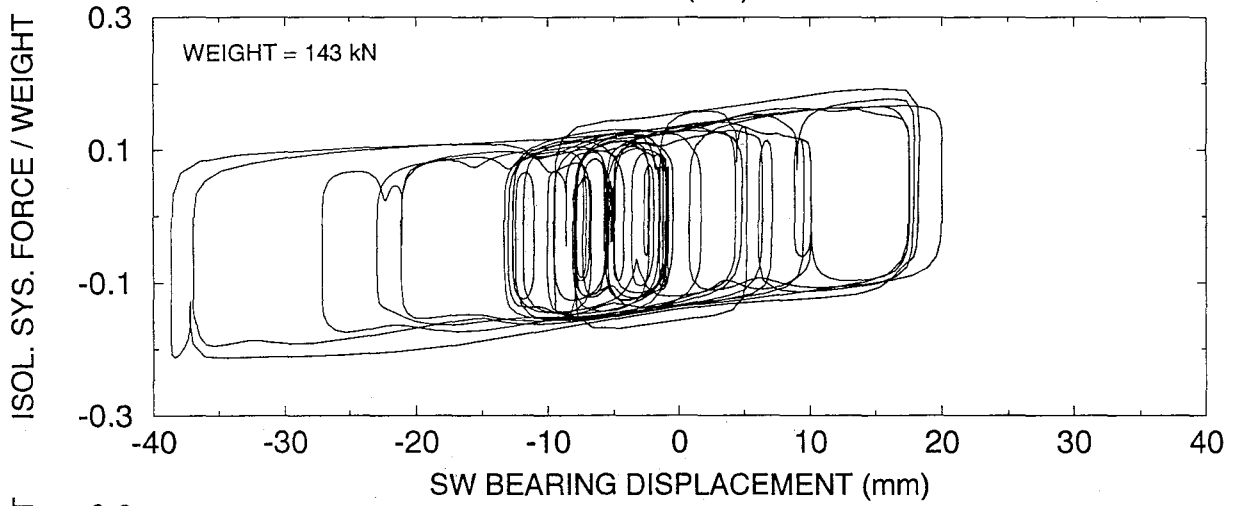
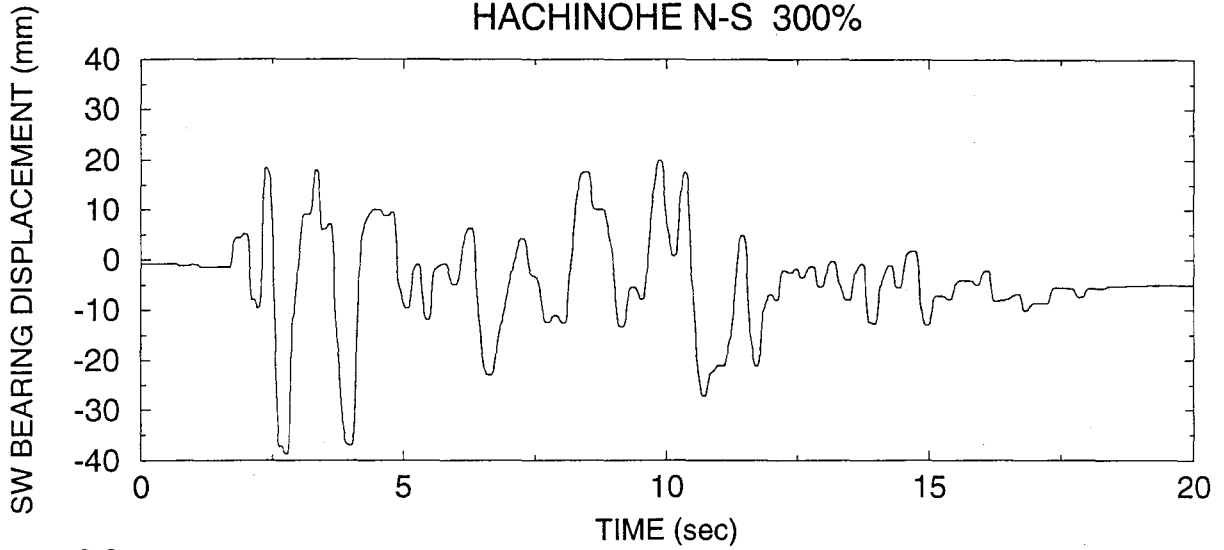
SYSTEM T2-No.2, TEST No. RD2RUN50  
PACOIMA S74W 100%



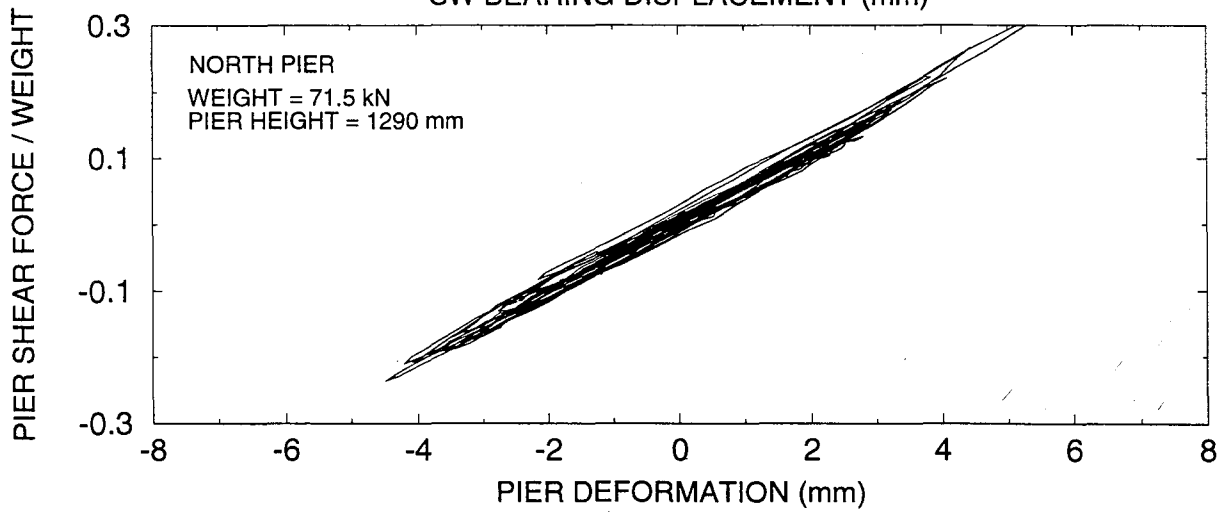
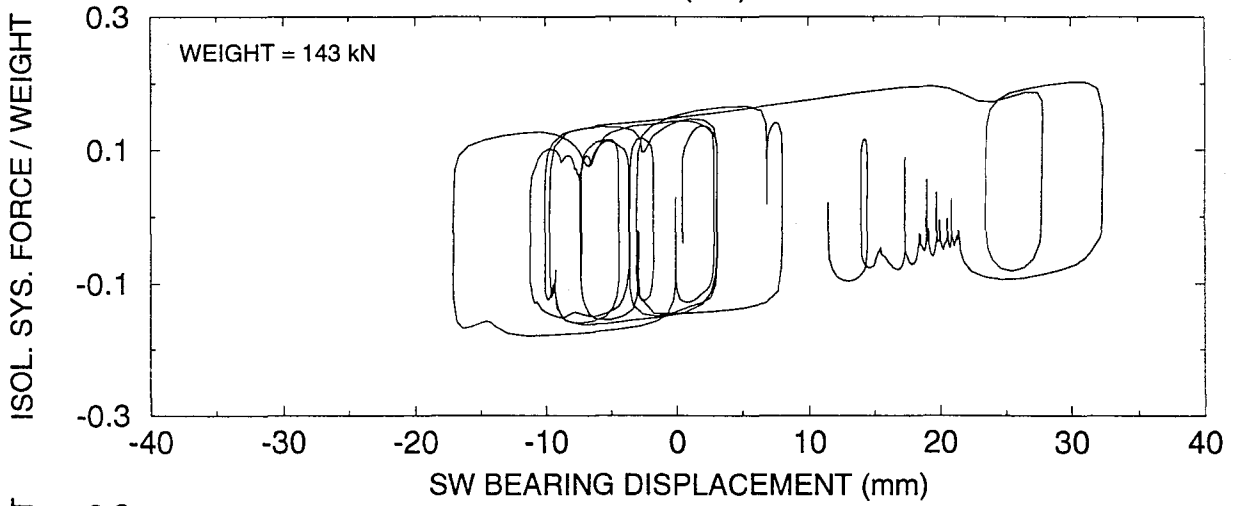
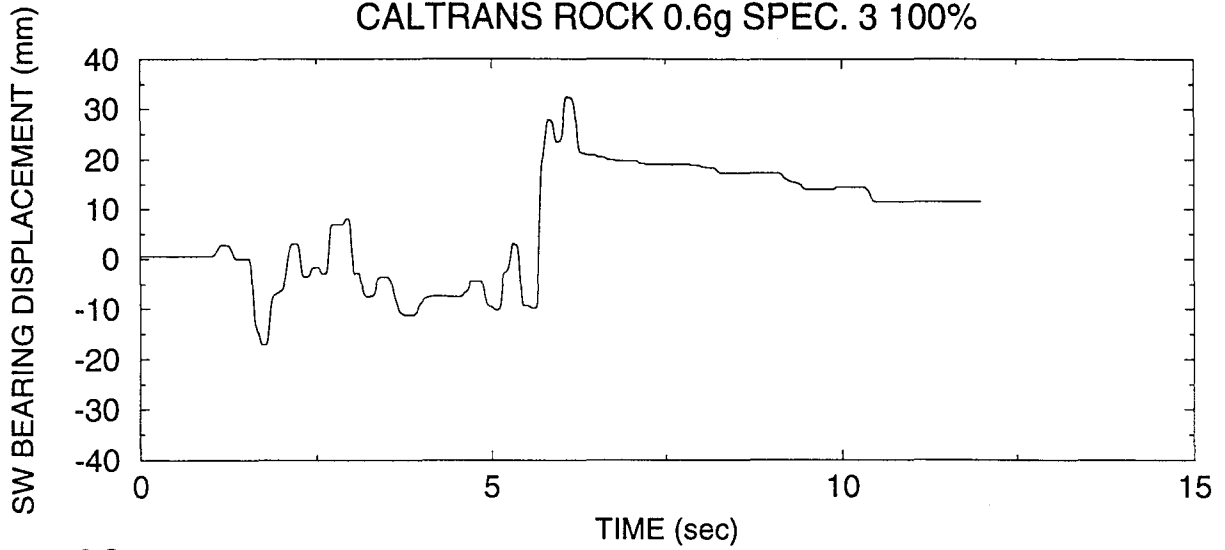
SYSTEM T2-No.2, TEST No. RD2RUN51  
HACHINOHE N-S 100%



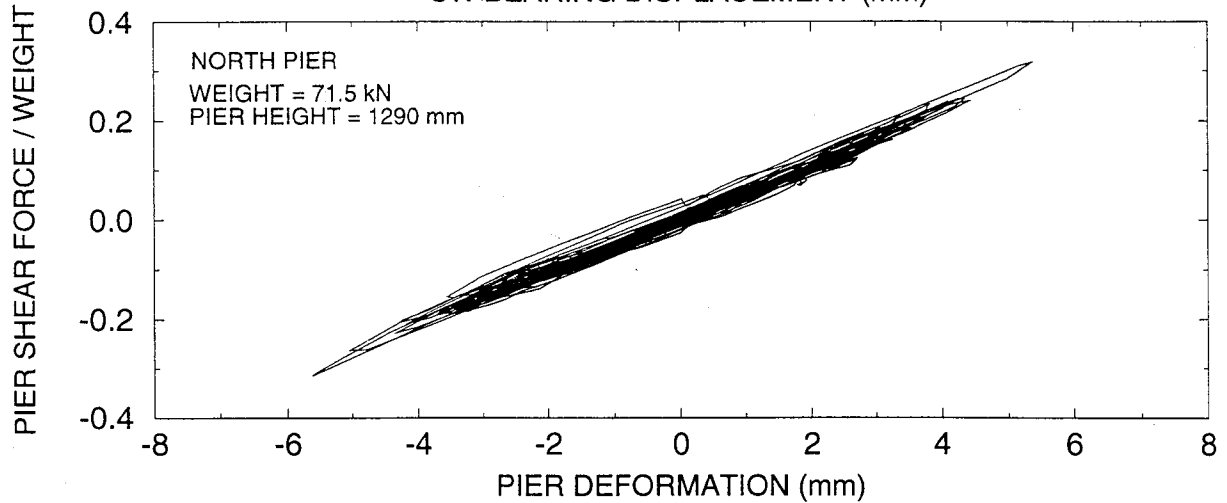
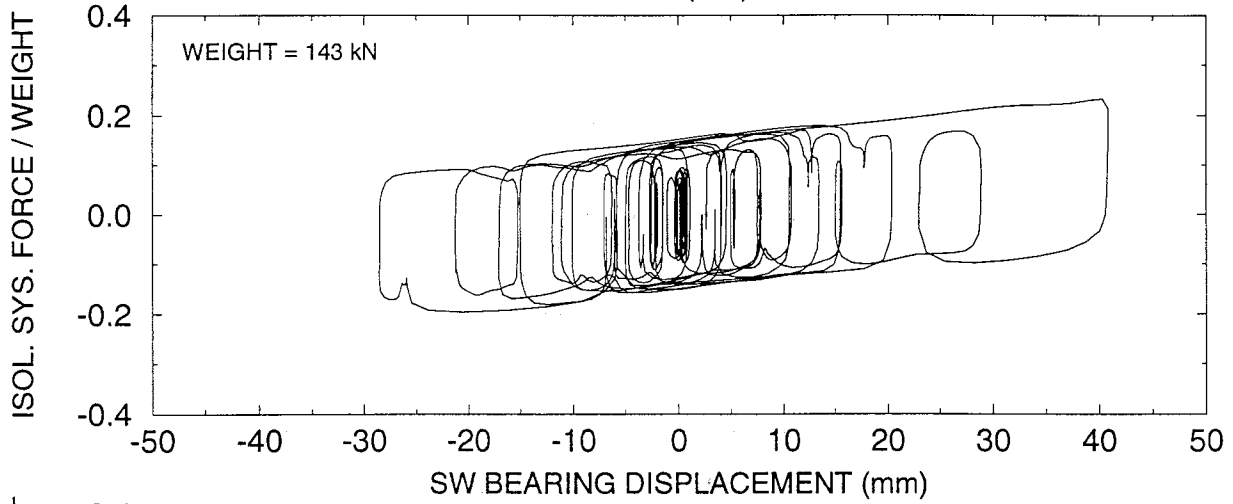
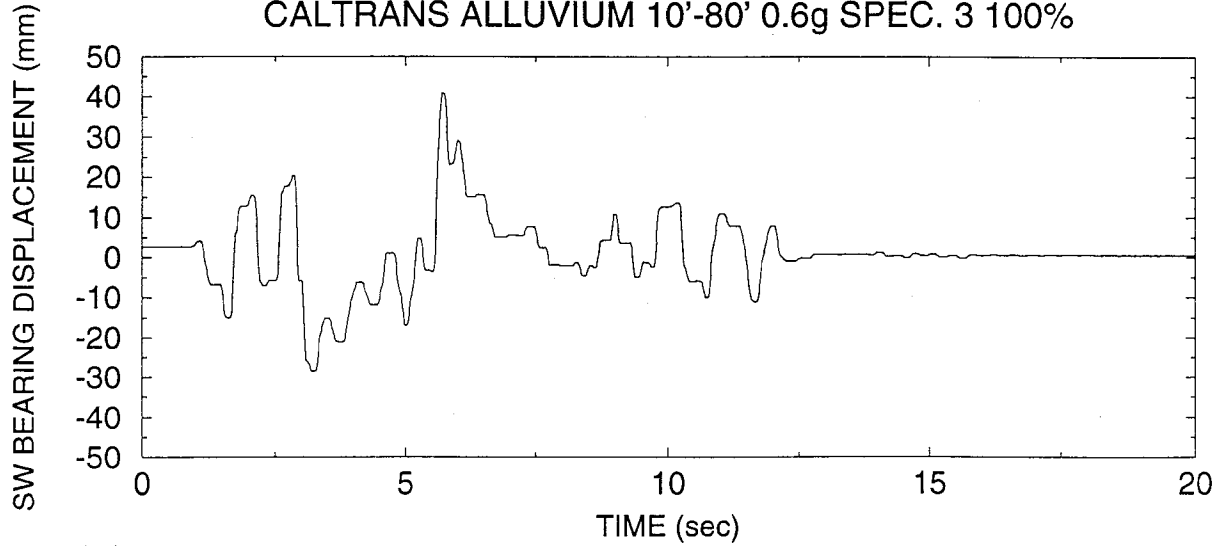
SYSTEM T2-No.2, TEST No. RD2RUN53  
HACHINOHE N-S 300%



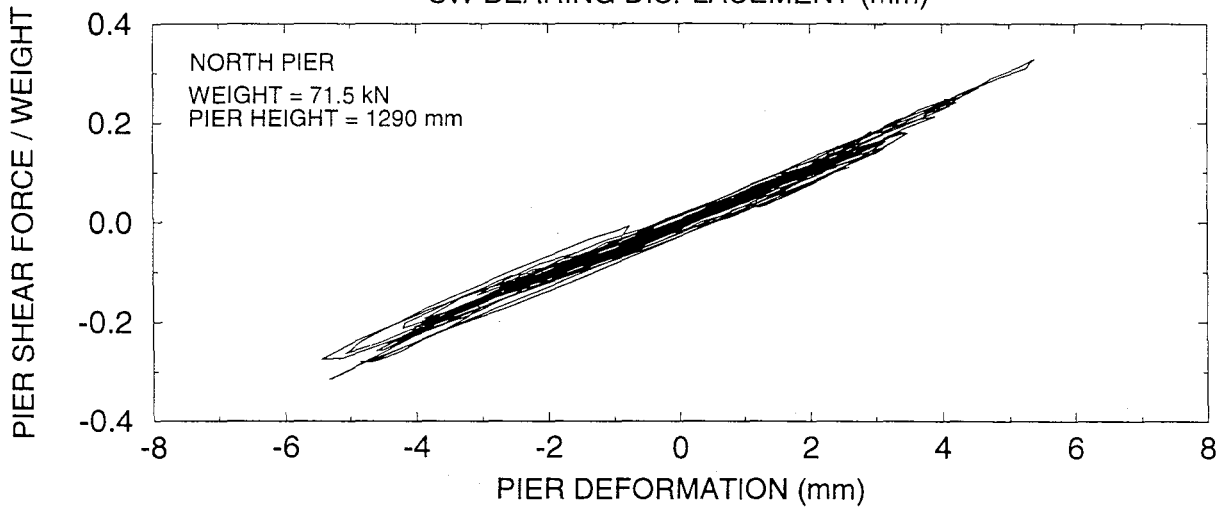
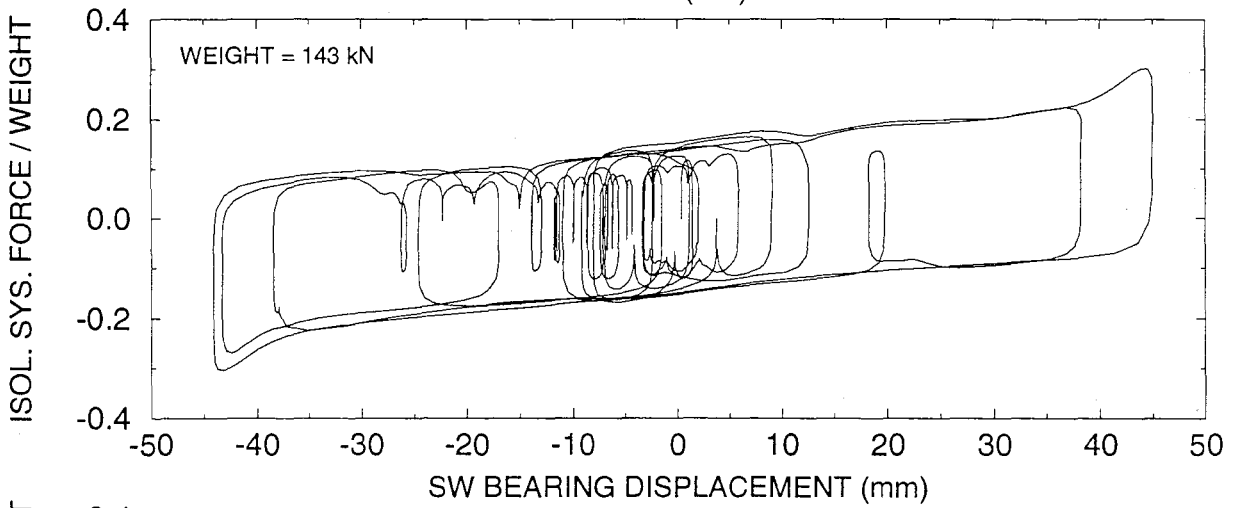
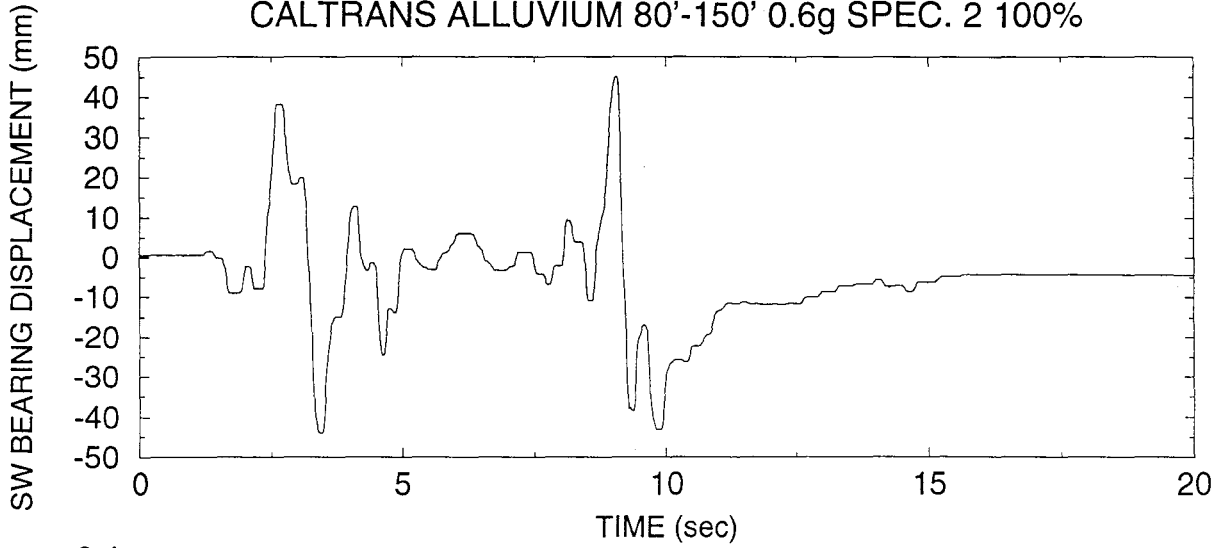
SYSTEM T2-No.2, TEST No. RD2RUN54  
CALTRANS ROCK 0.6g SPEC. 3 100%



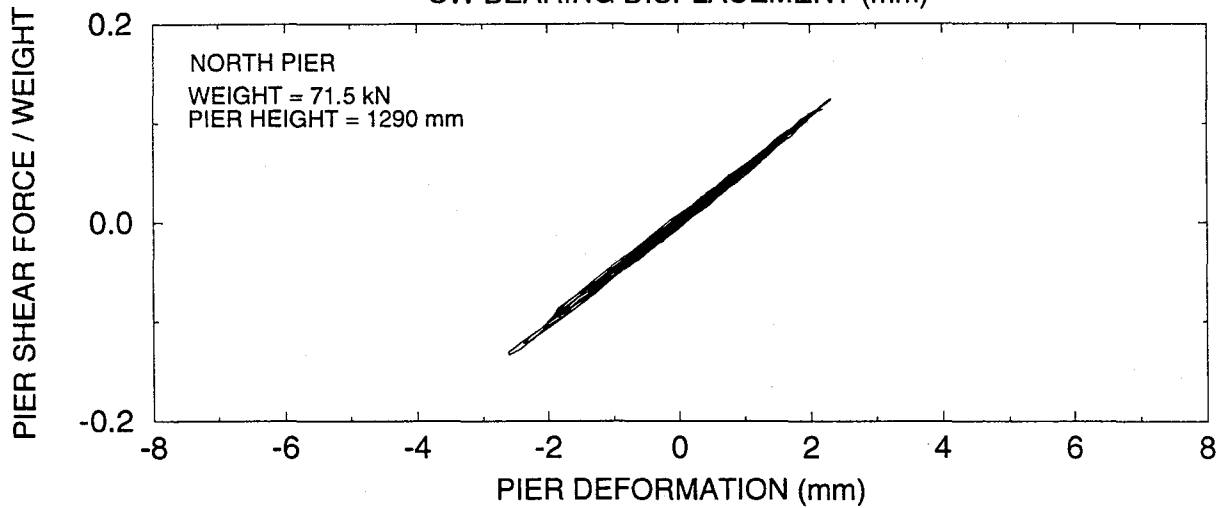
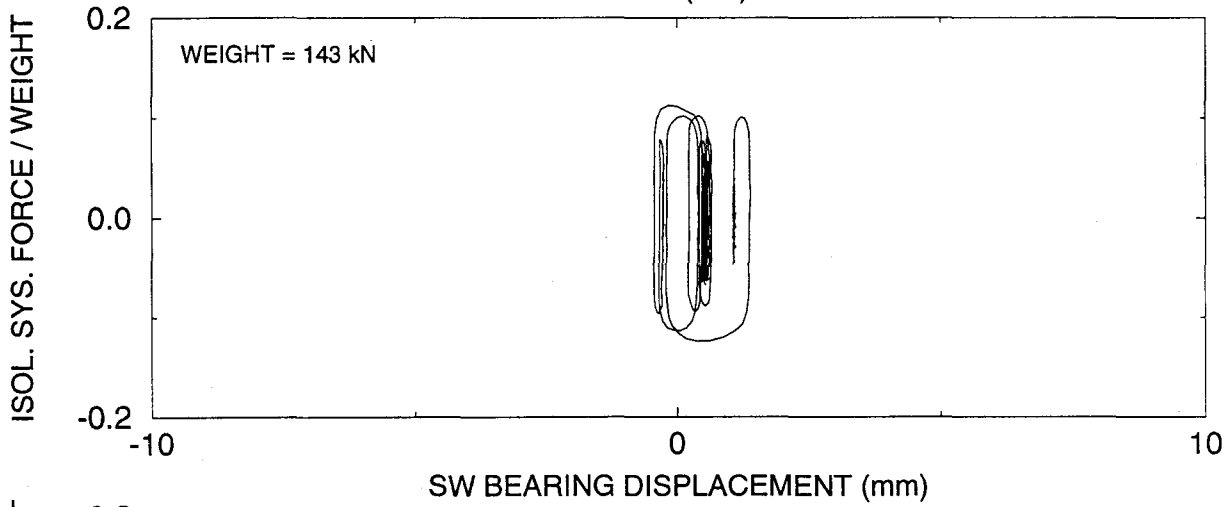
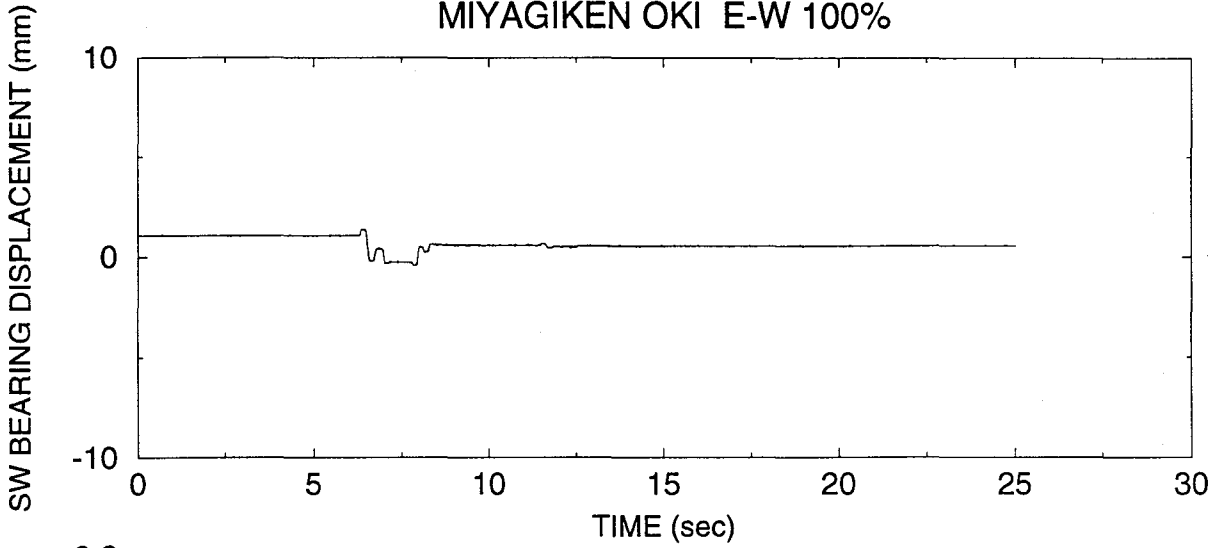
SYSTEM T2-No.2, TEST No. RD2RUN55  
CALTRANS ALLUVIUM 10'-80' 0.6g SPEC. 3 100%



SYSTEM T2-No.2, TEST No. RD2RUN56  
CALTRANS ALLUVIUM 80'-150' 0.6g SPEC. 2 100%

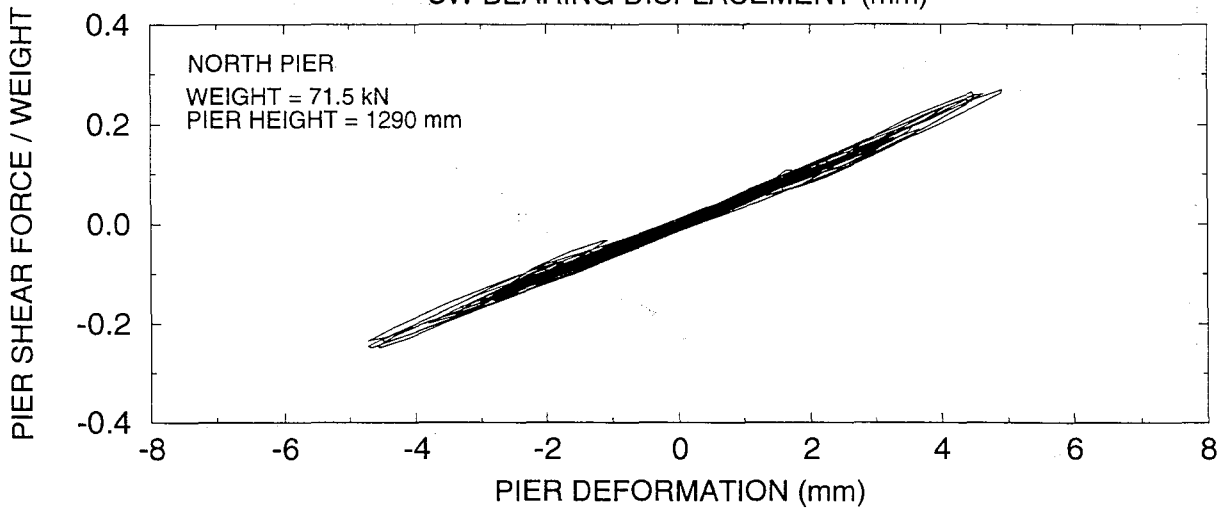
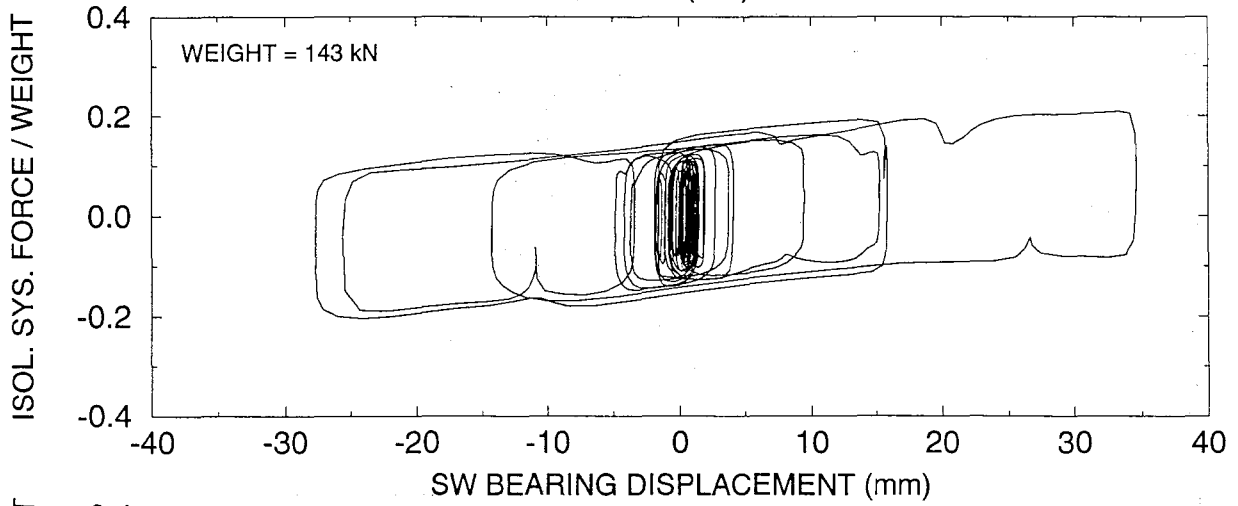
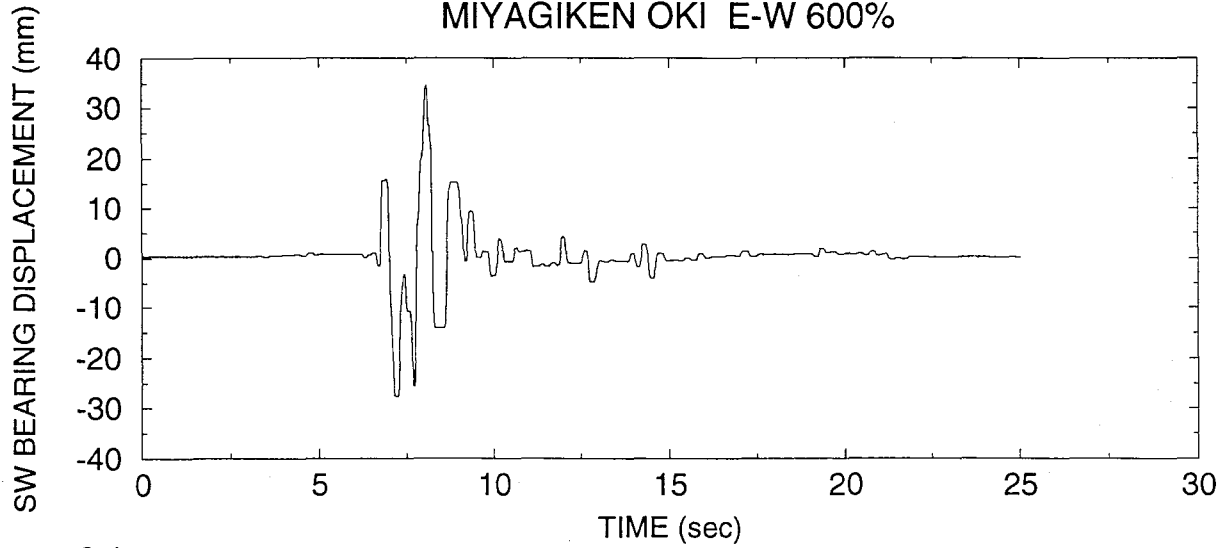


SYSTEM T2-No.2, TEST No. RD2RUN57  
MIYAGIKEN OKI E-W 100%

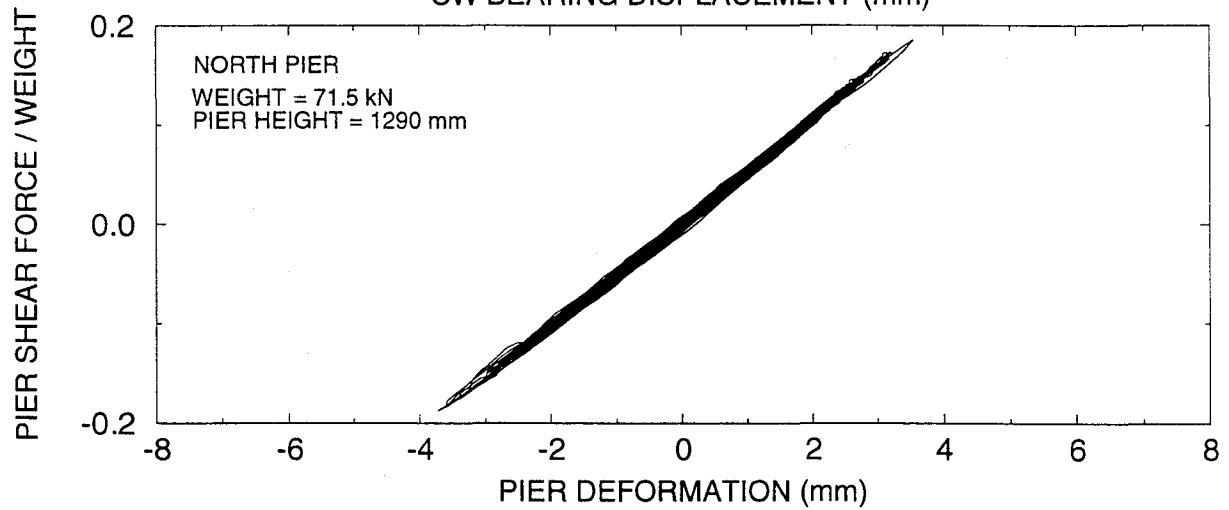
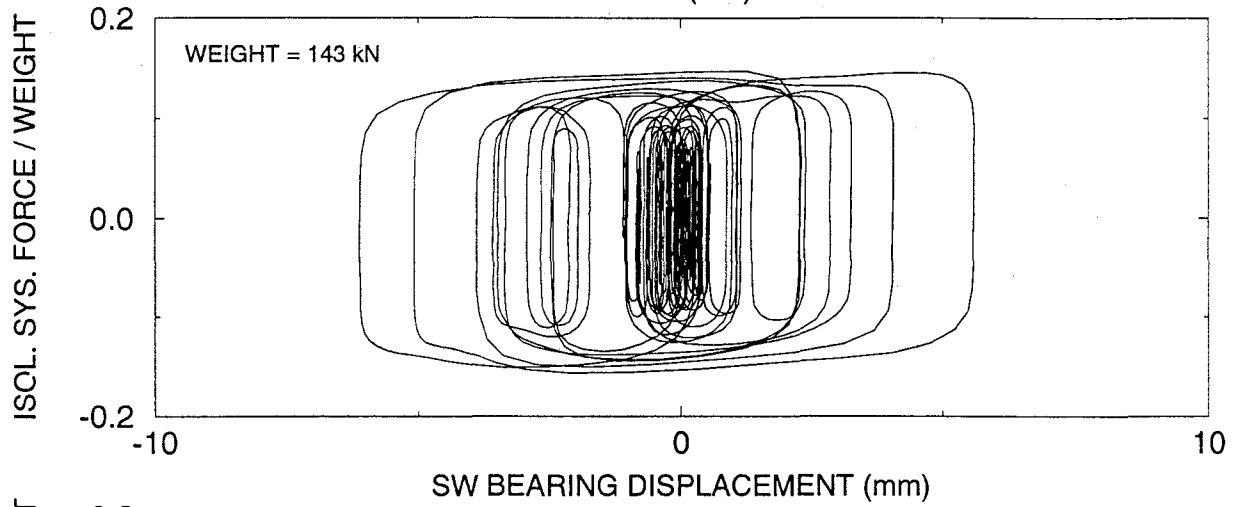
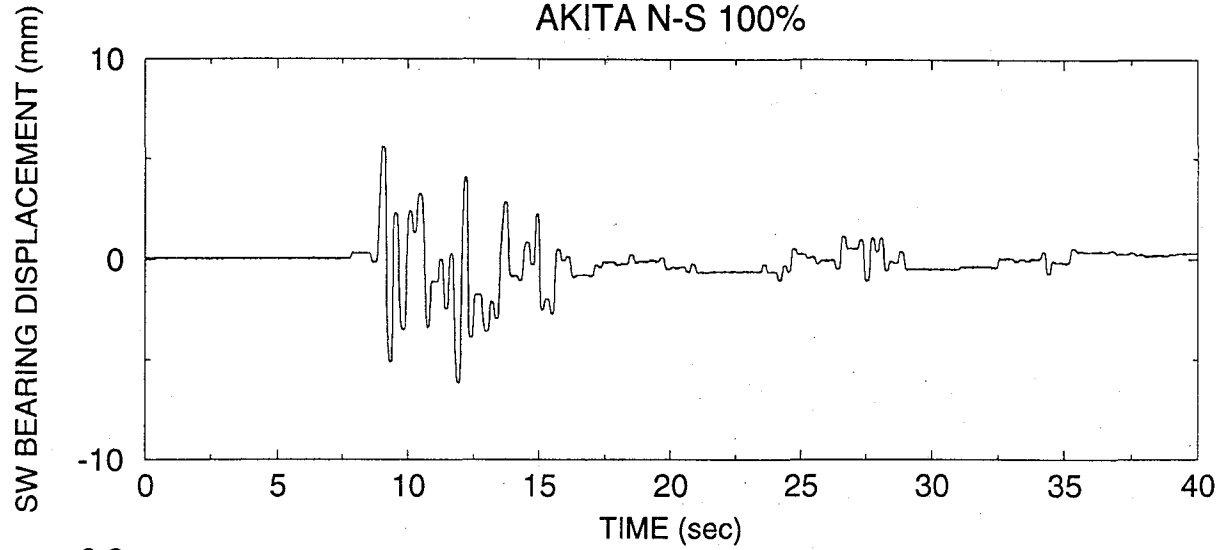




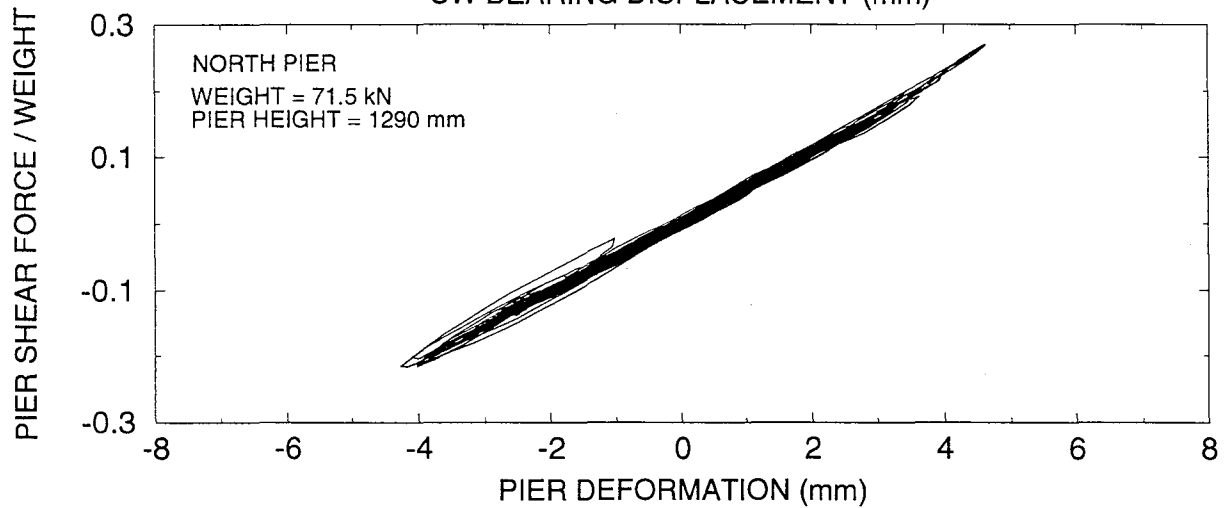
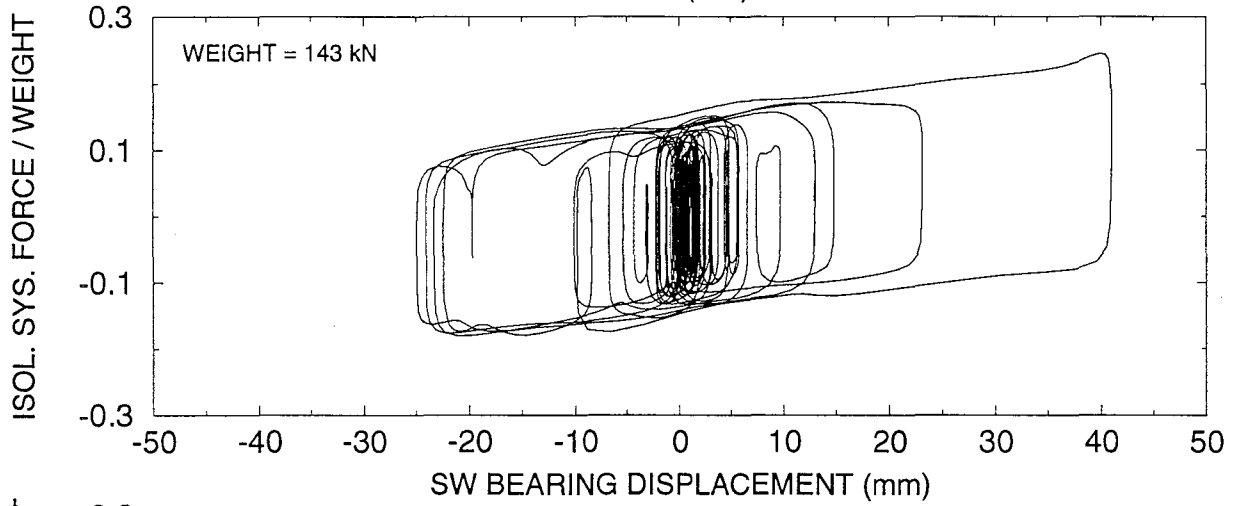
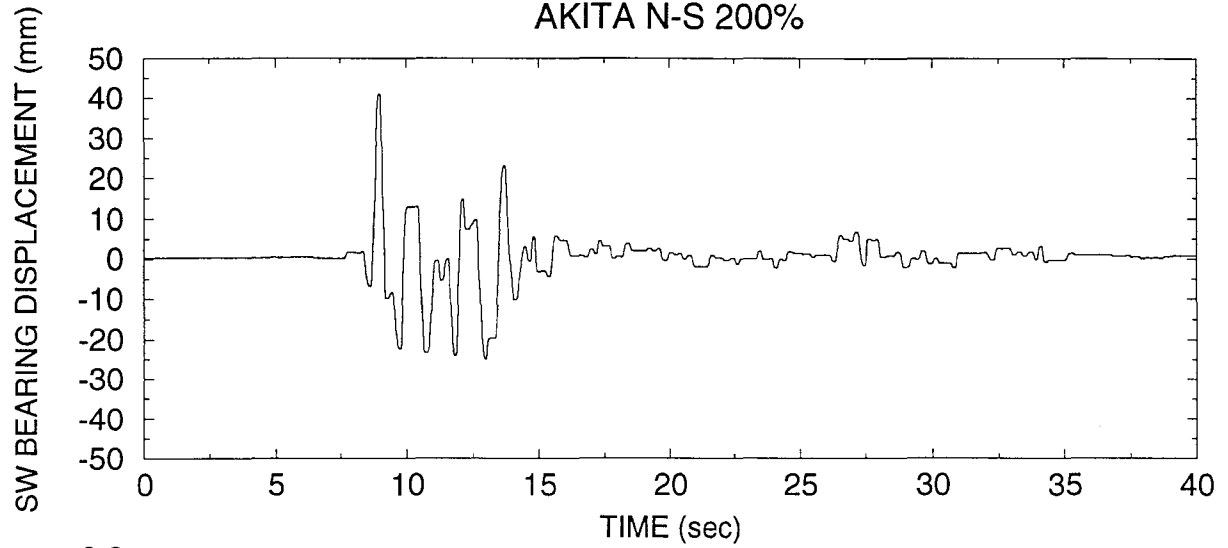
SYSTEM T2-No.2, TEST No. RD2RUN59  
MIYAGIKEN OKI E-W 600%



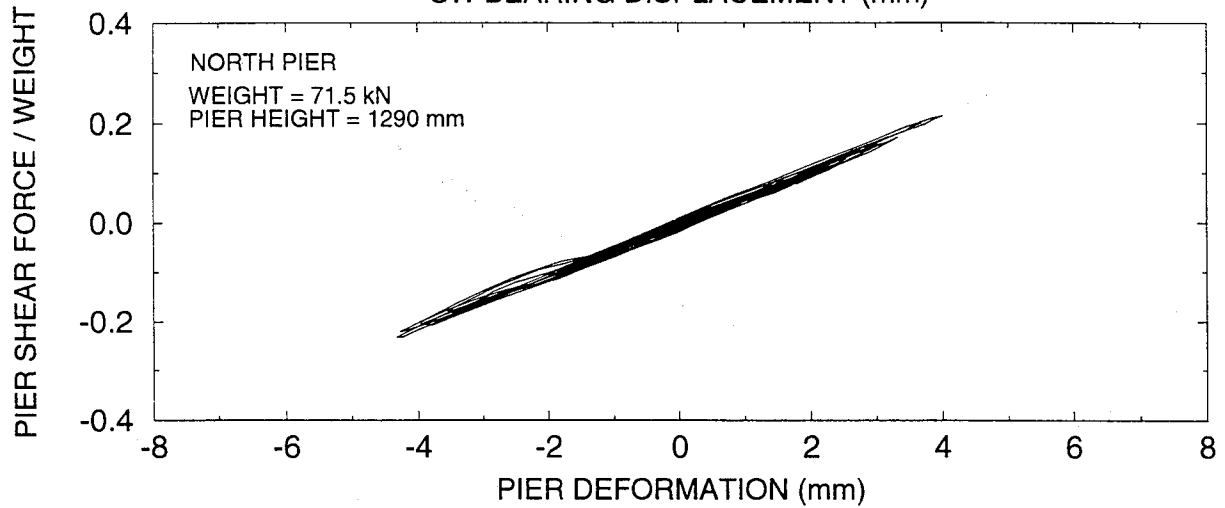
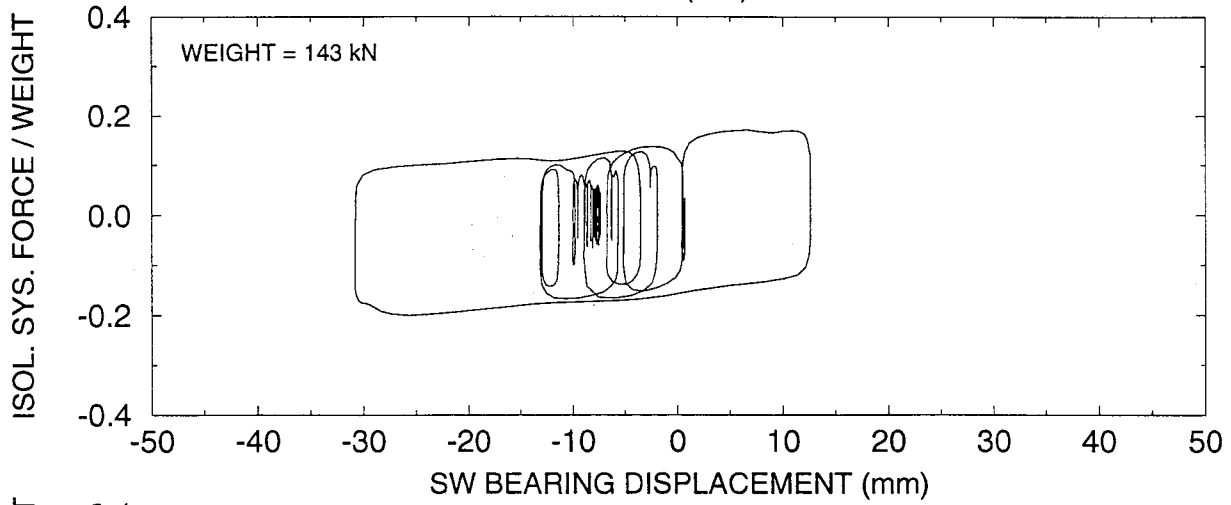
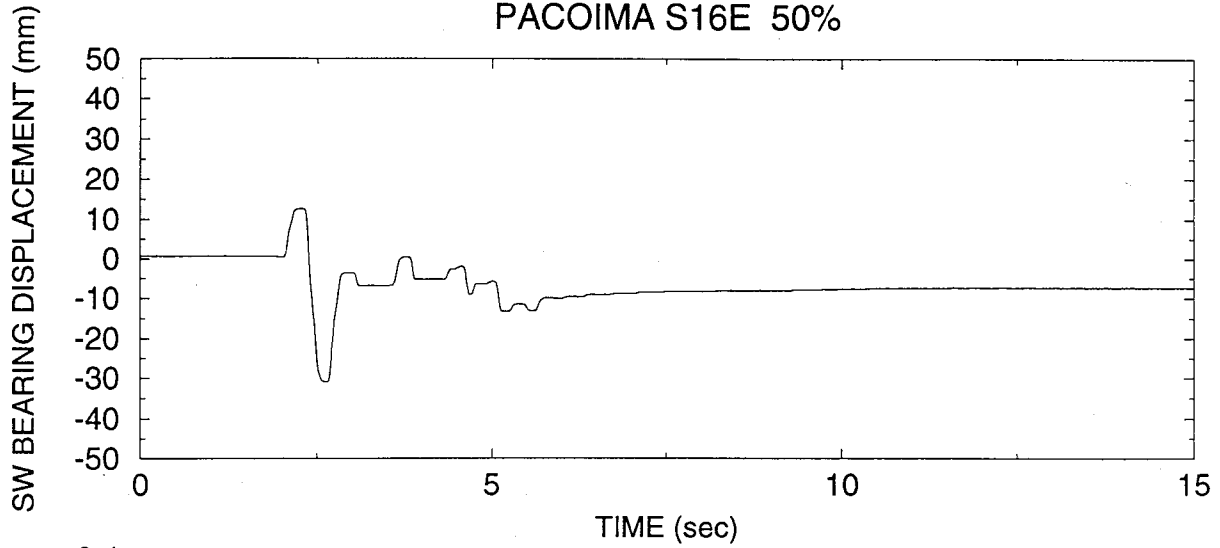
SYSTEM T2-No.2, TEST No. RD2RUN60  
AKITA N-S 100%



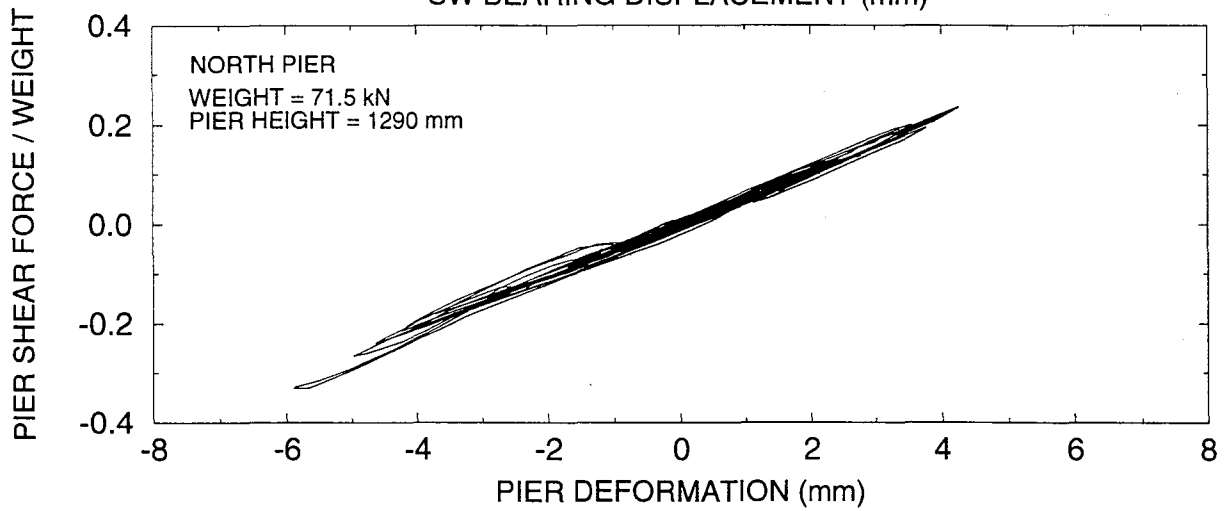
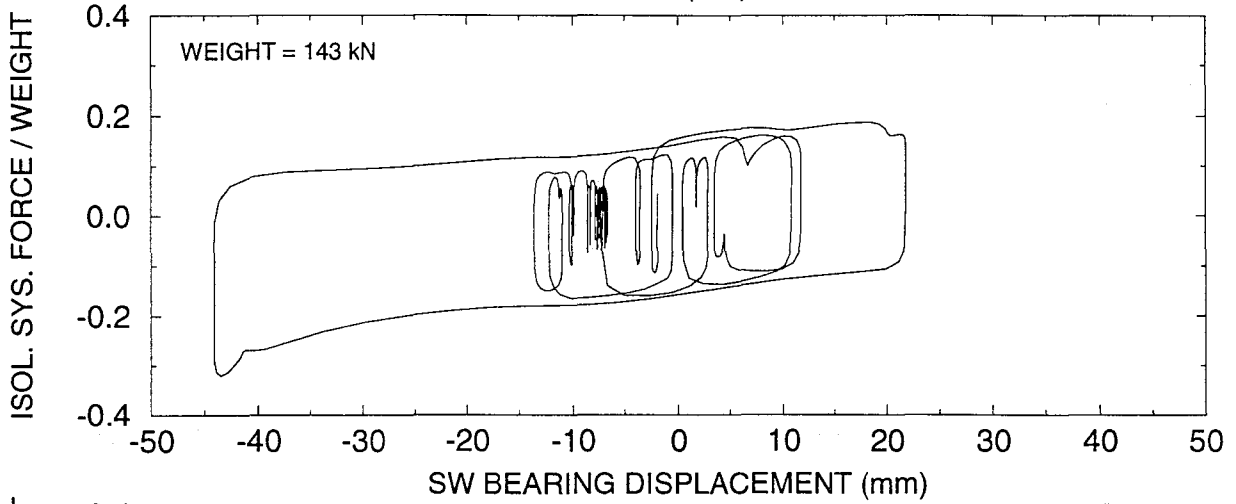
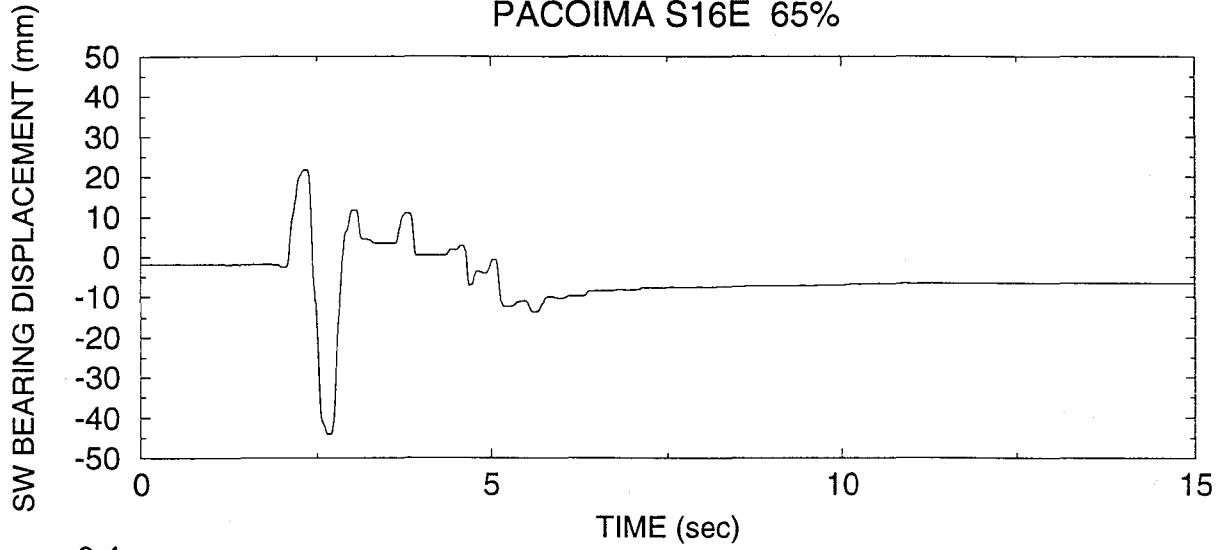
SYSTEM T2-No.2, TEST No. RD2RUN61  
AKITA N-S 200%



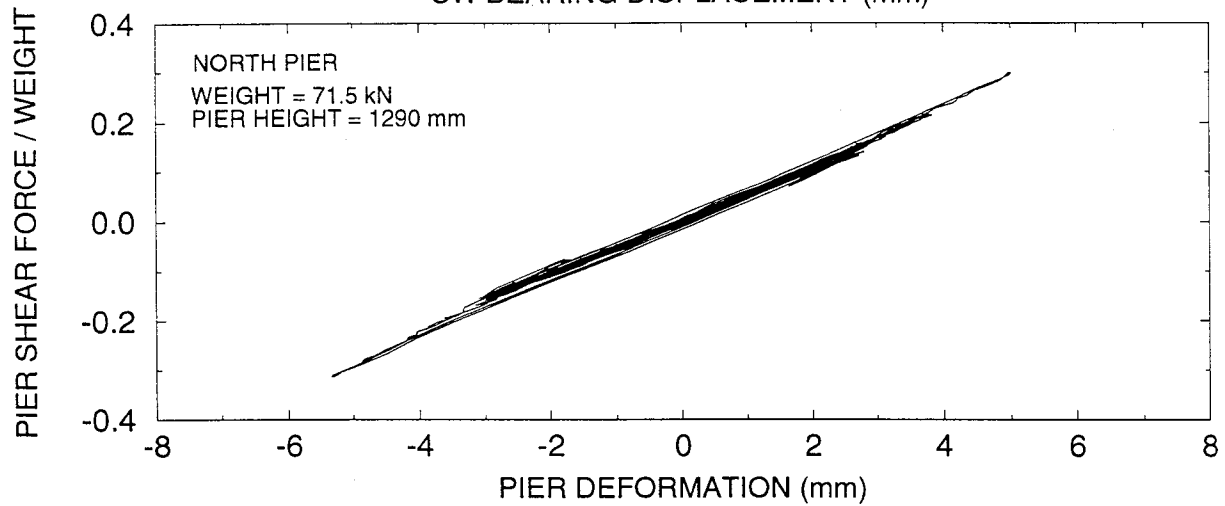
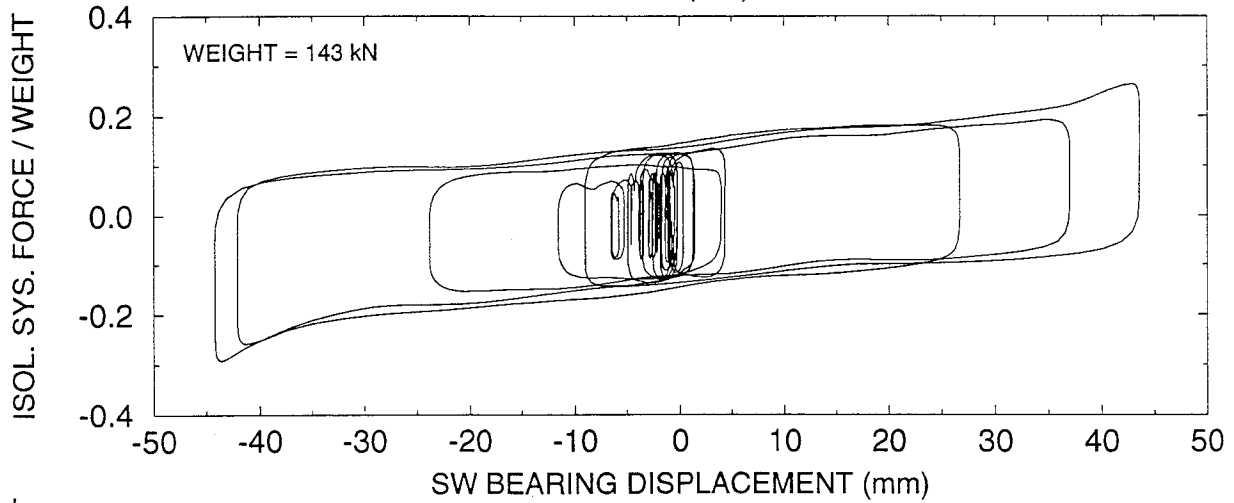
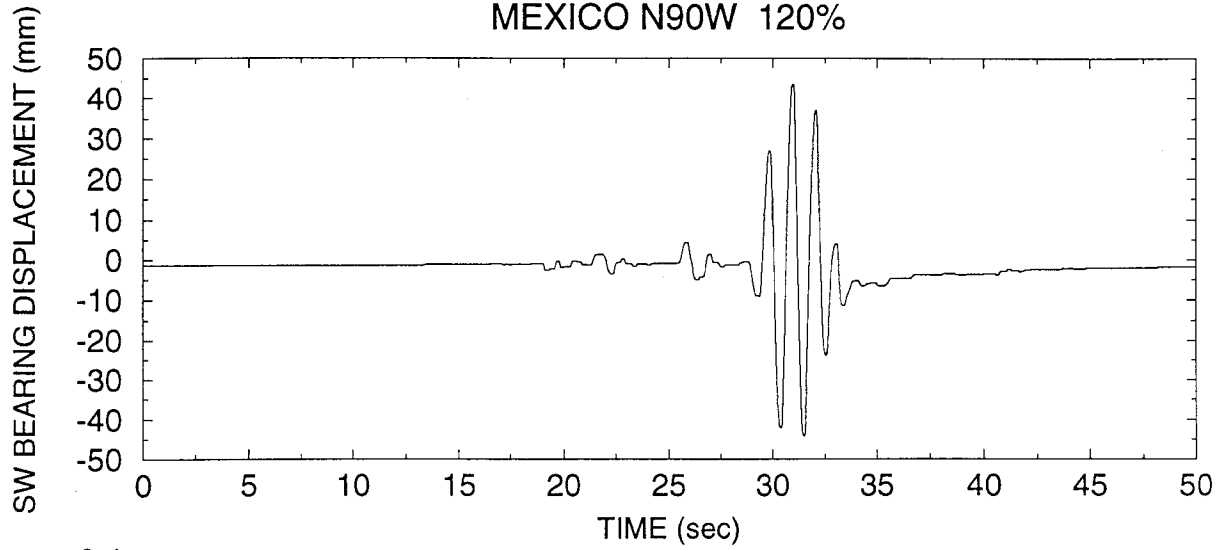
SYSTEM T2-No.2, TEST No. RD2RUN62  
PACOIMA S16E 50%



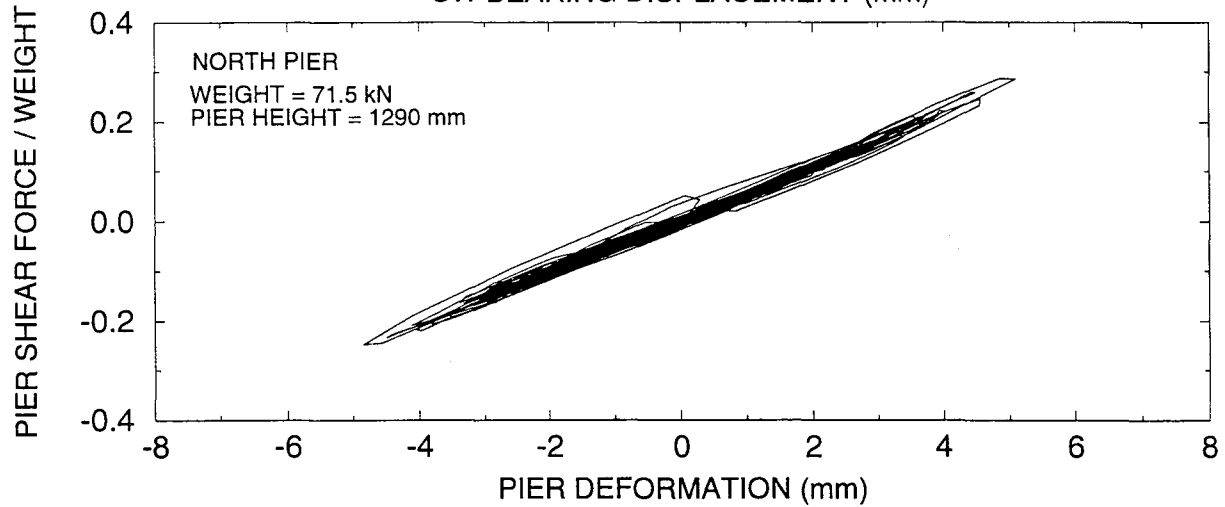
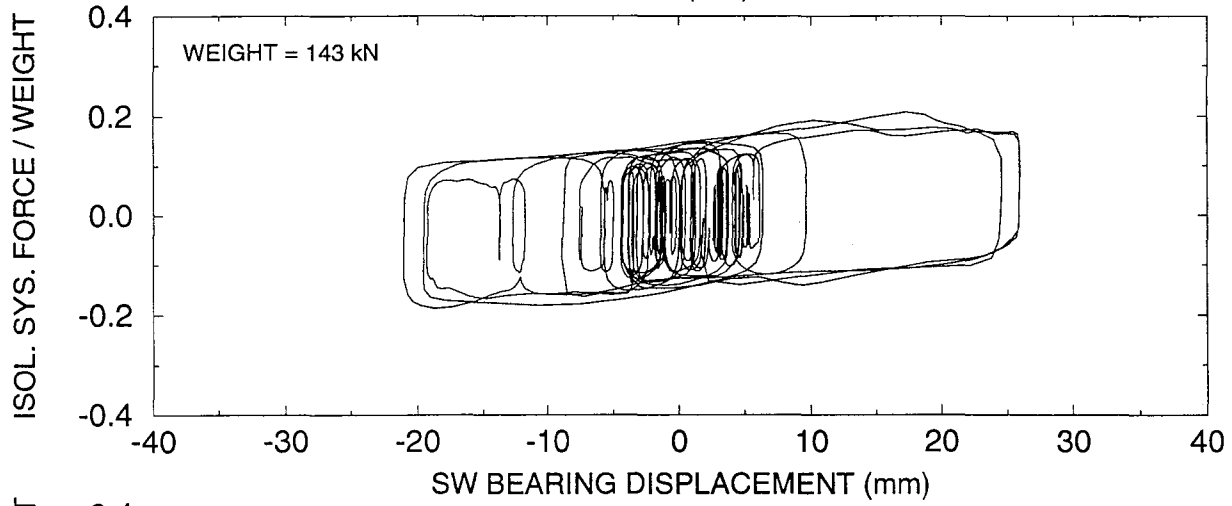
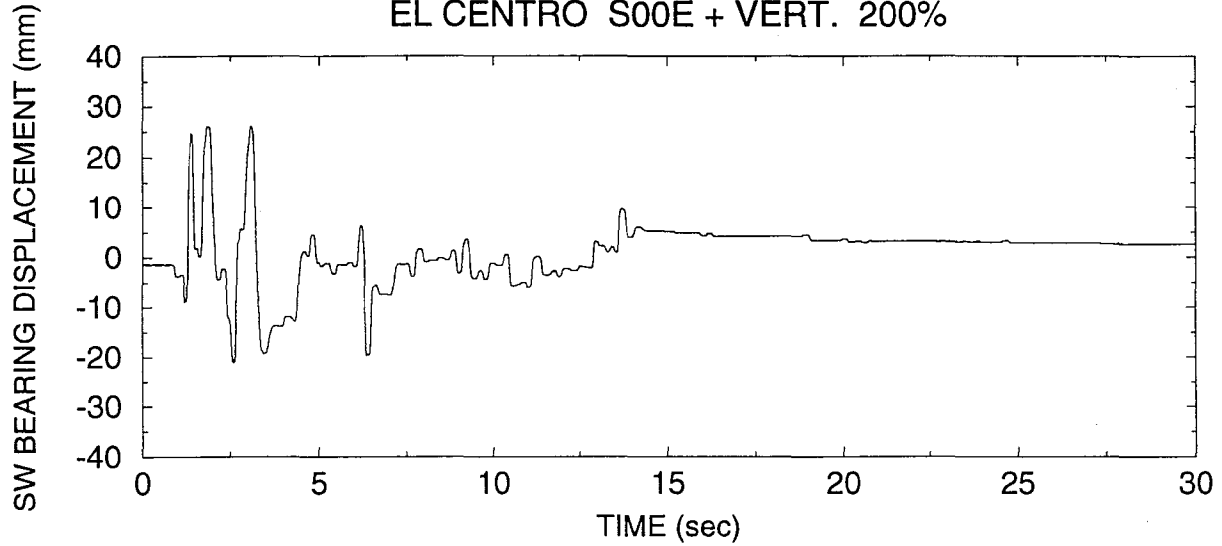
SYSTEM T2-No.2, TEST No. RD2RUN63  
PACOIMA S16E 65%



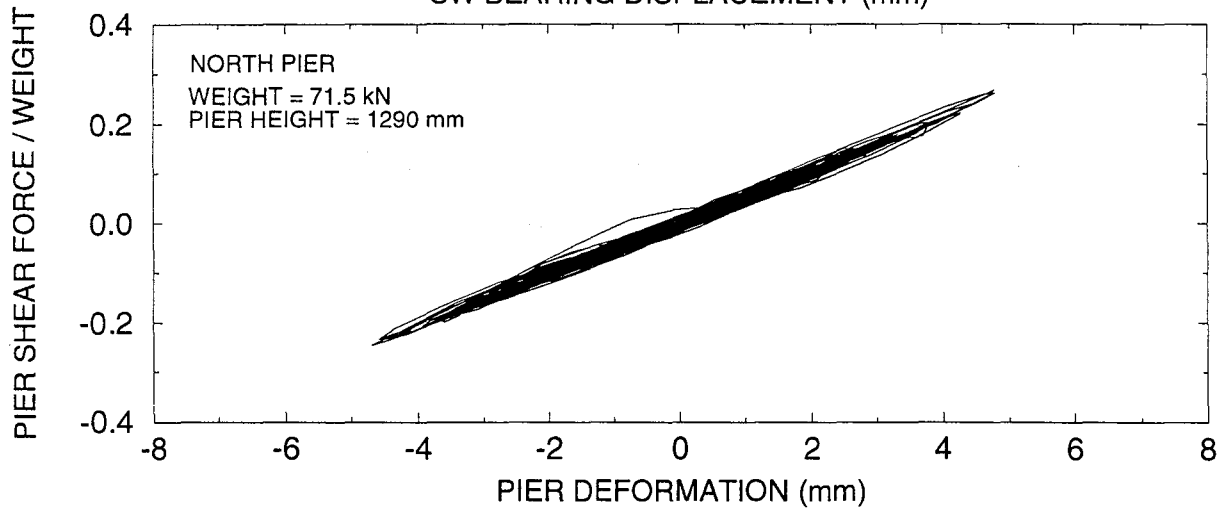
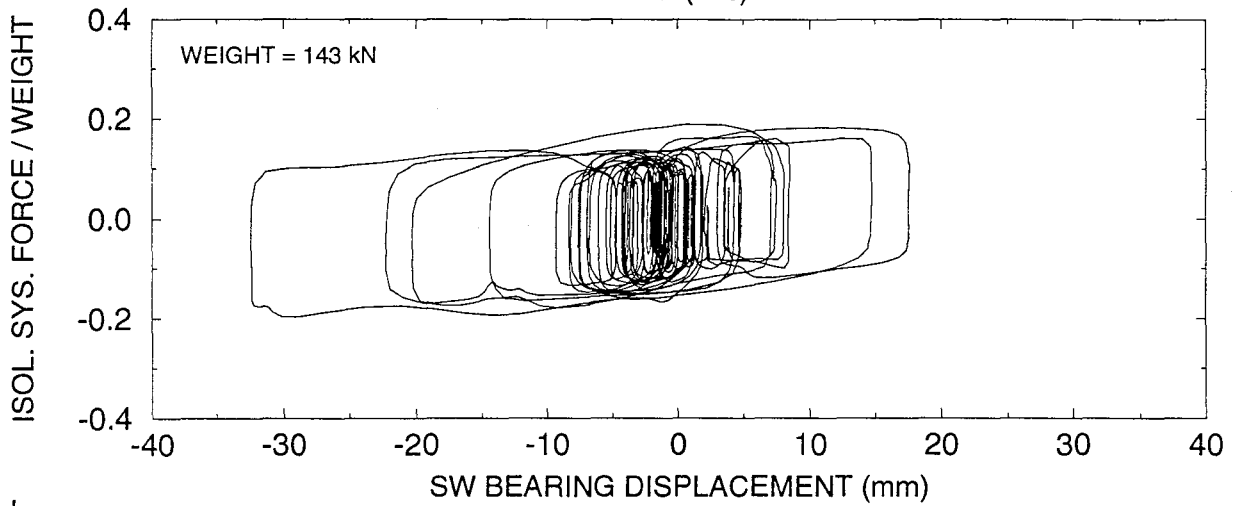
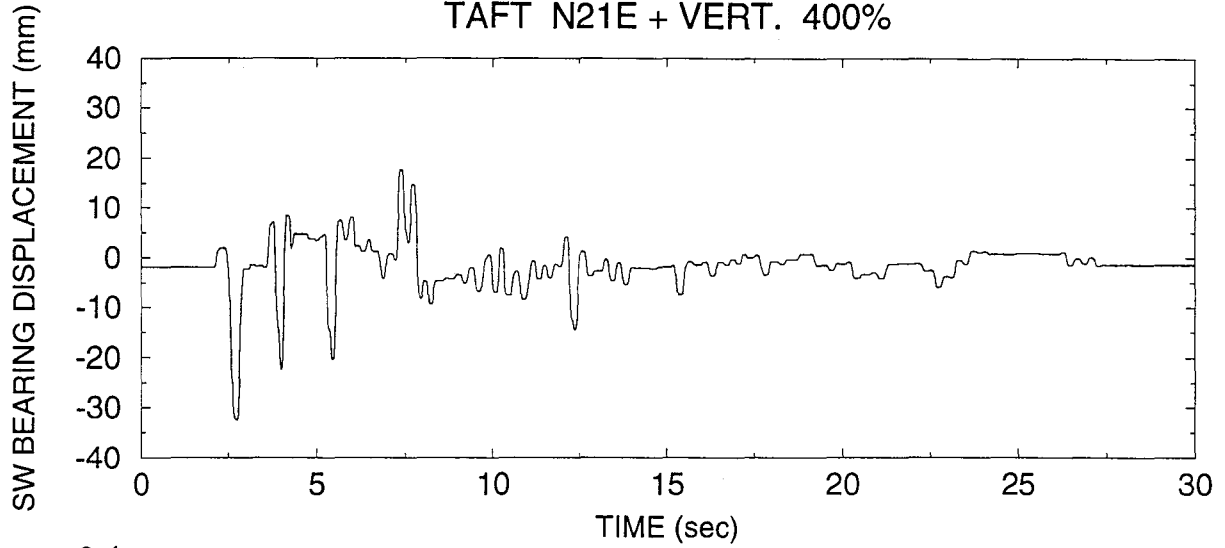
SYSTEM T2-No.2, TEST No. RD2RUN65  
MEXICO N90W 120%



SYSTEM T2-No.2, TEST No. RD2RUN67  
EL CENTRO S00E + VERT. 200%

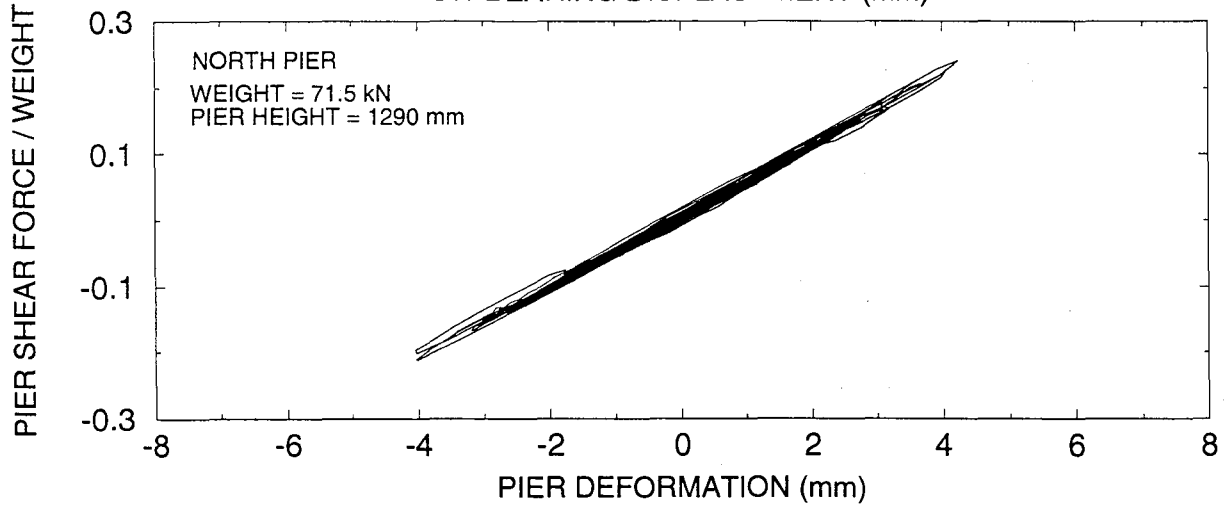
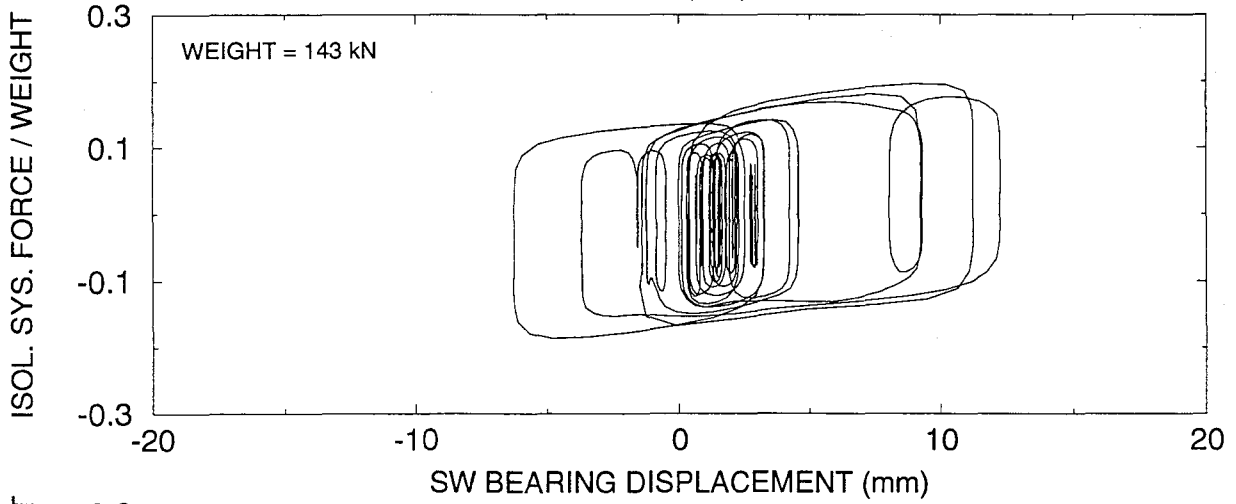
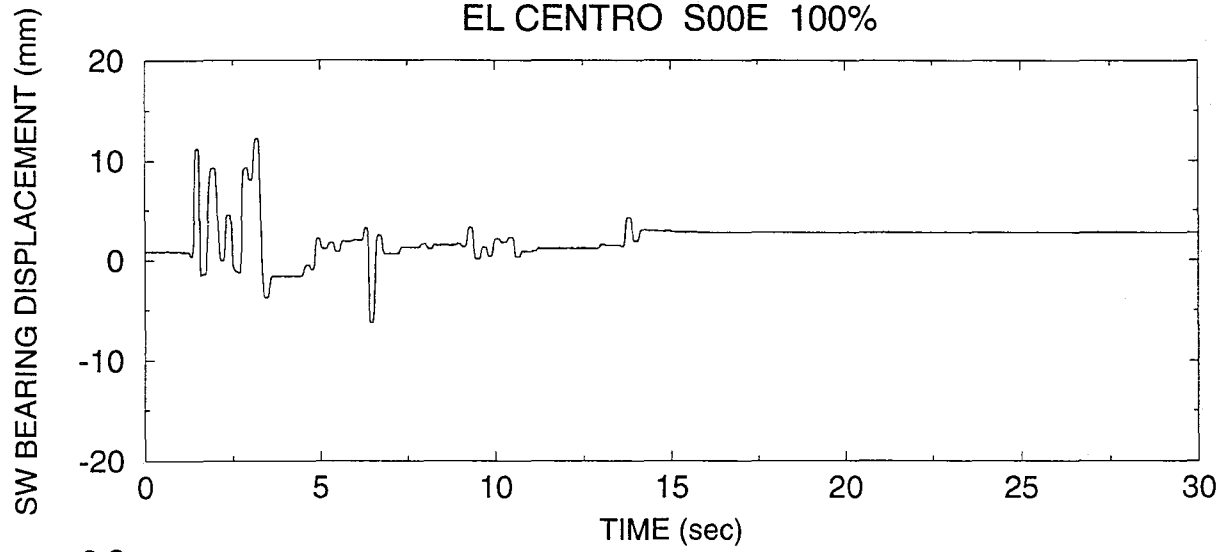


SYSTEM T2-No.2, TEST No. RD2RUN66  
TAFT N21E + VERT. 400%

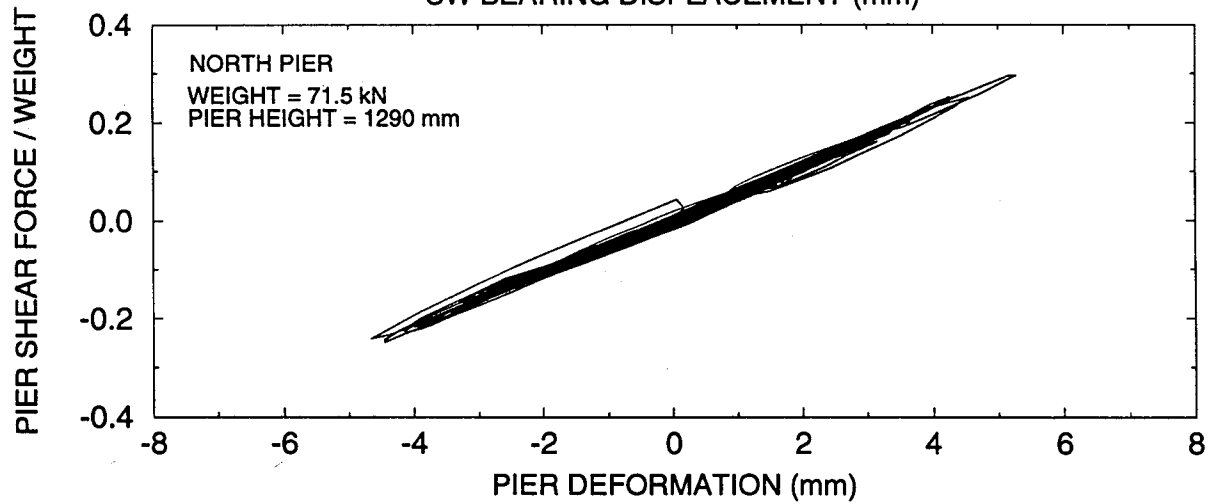
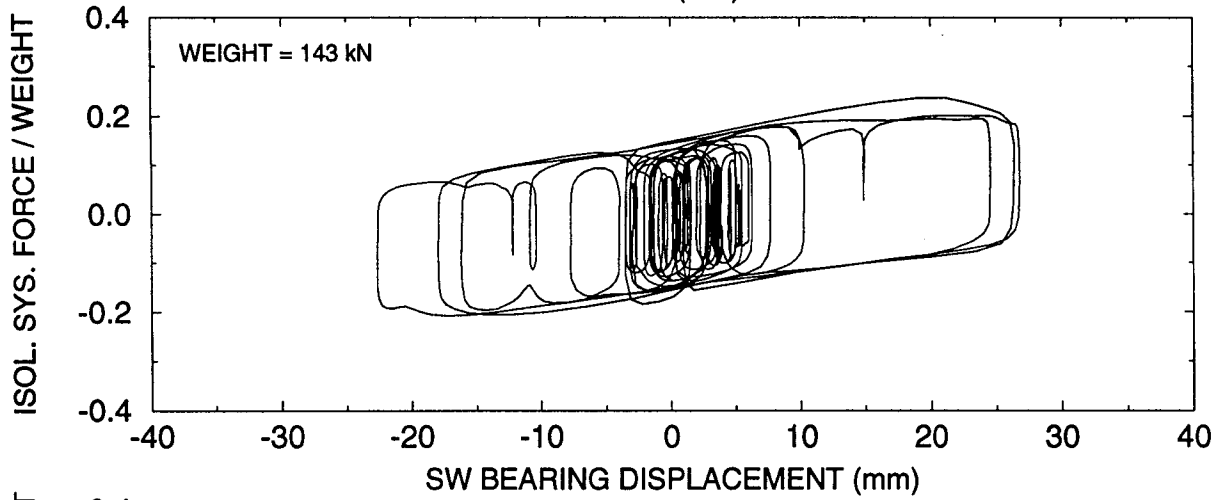
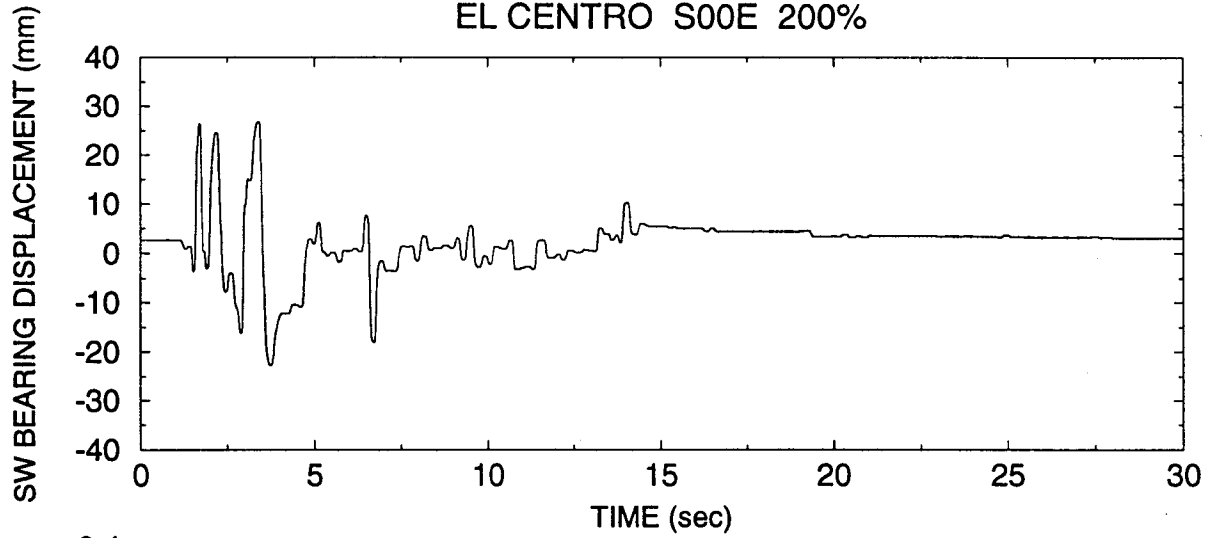




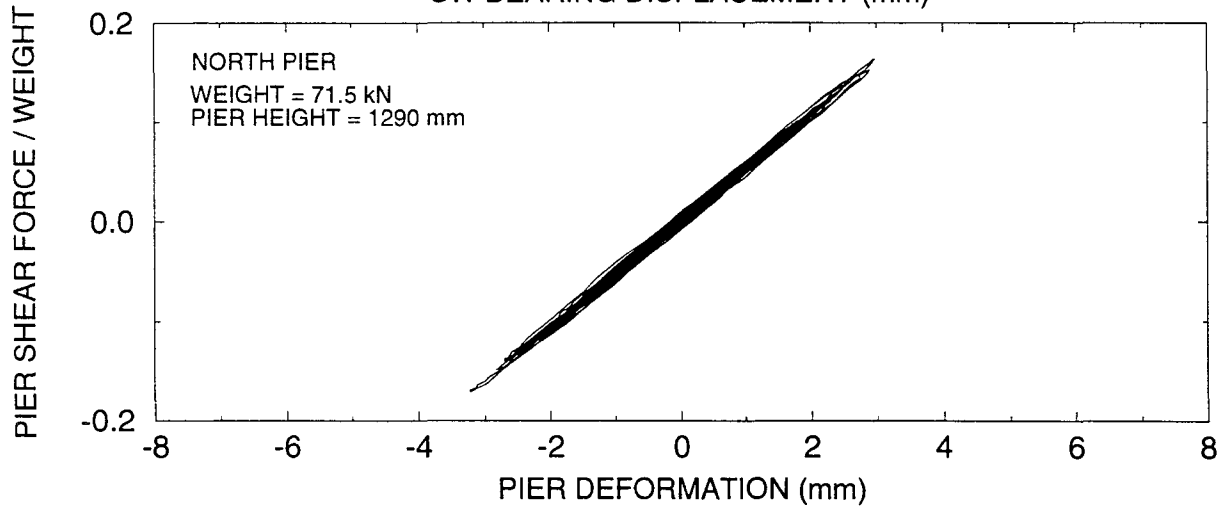
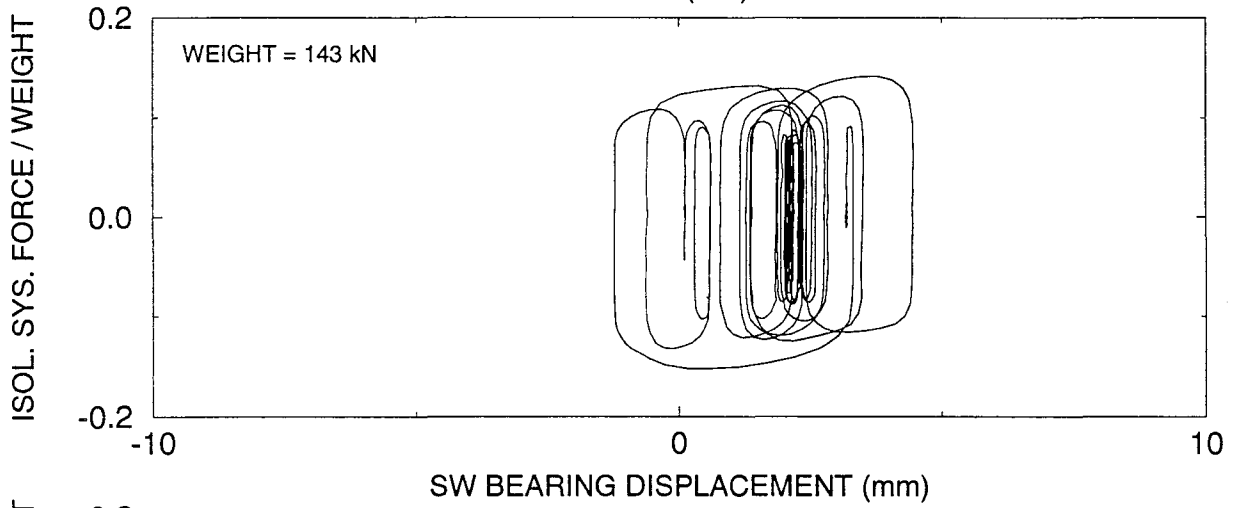
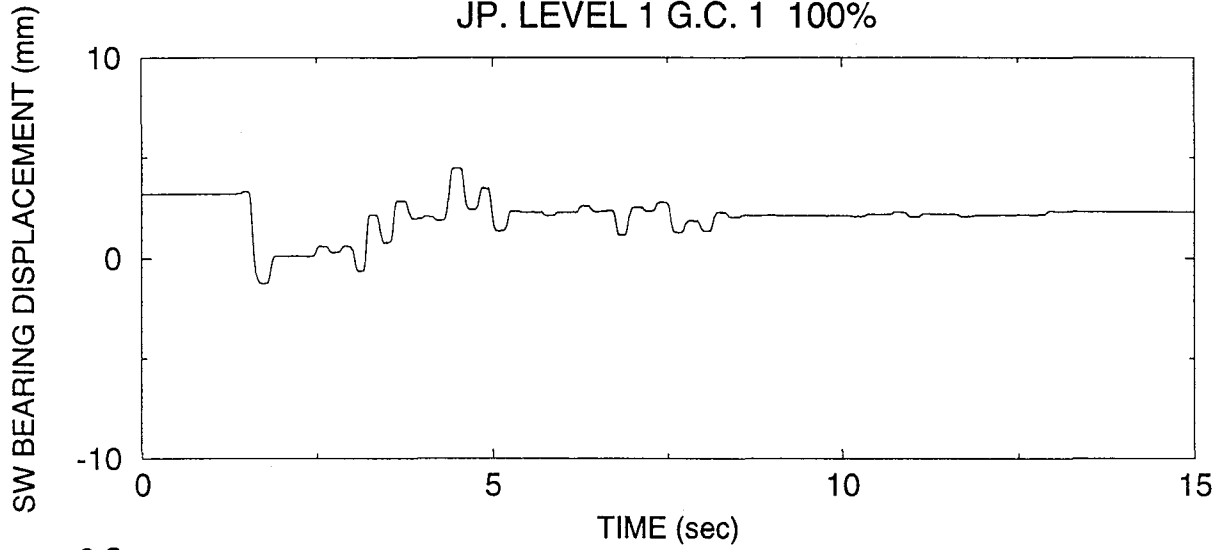
SYSTEM T2-No.3, TEST No. RHHRUN28  
EL CENTRO S00E 100%



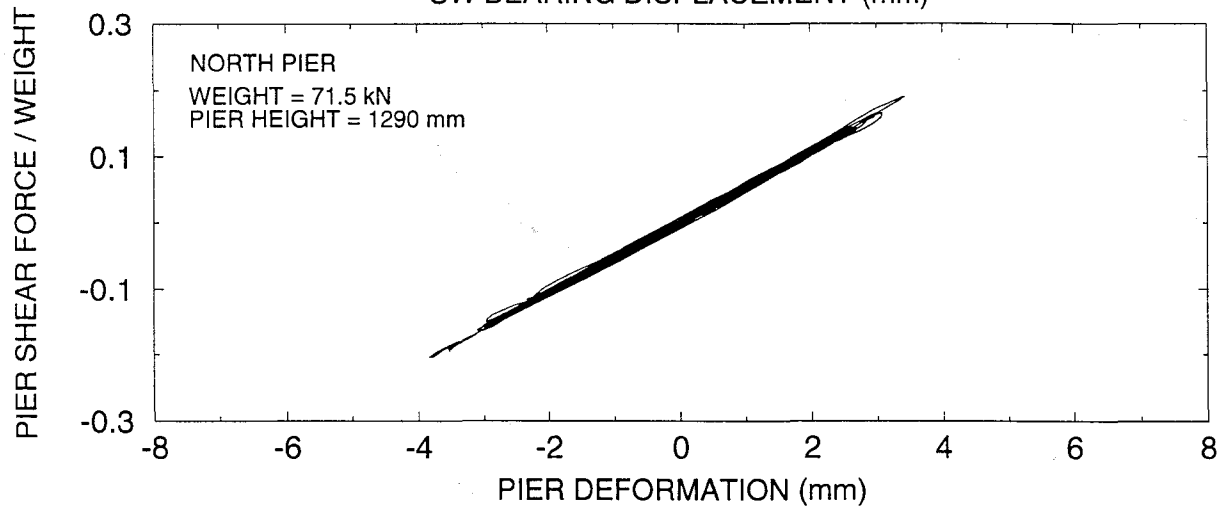
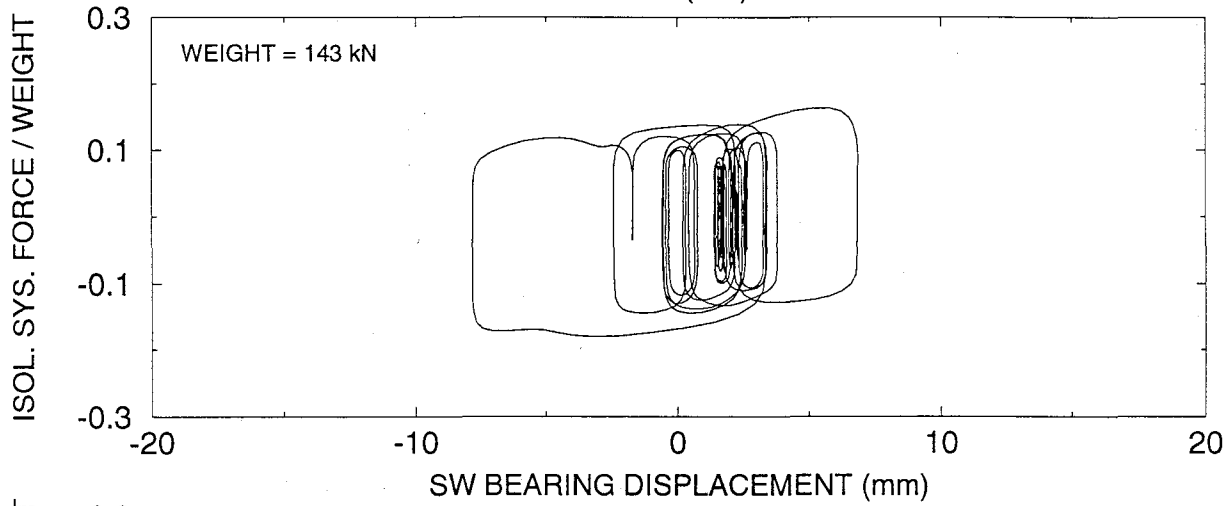
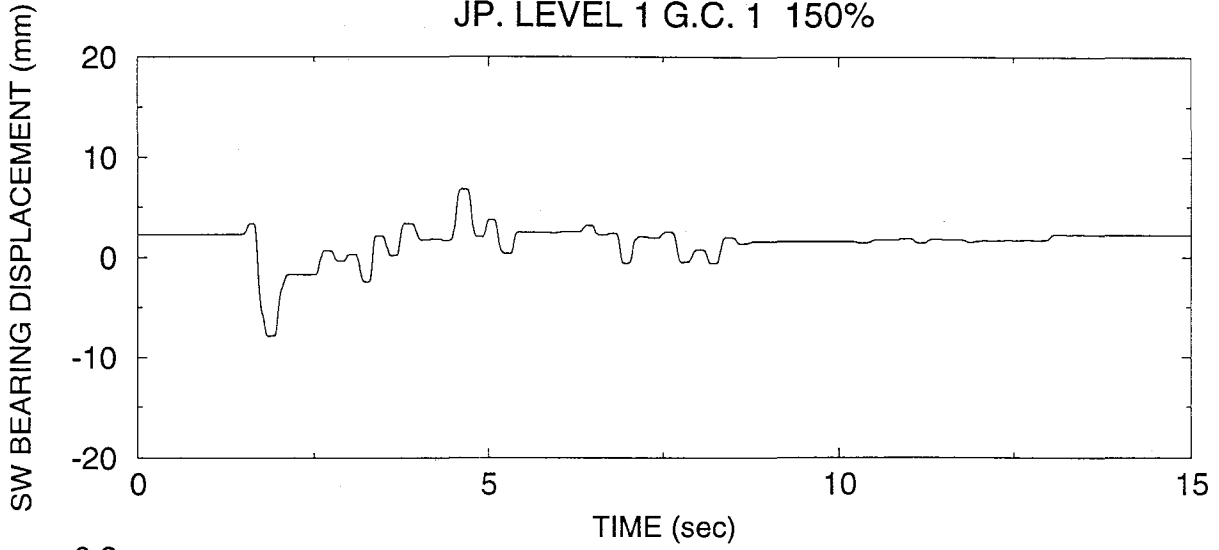
SYSTEM T2-No.3, TEST No. RHHRUN29  
EL CENTRO S00E 200%



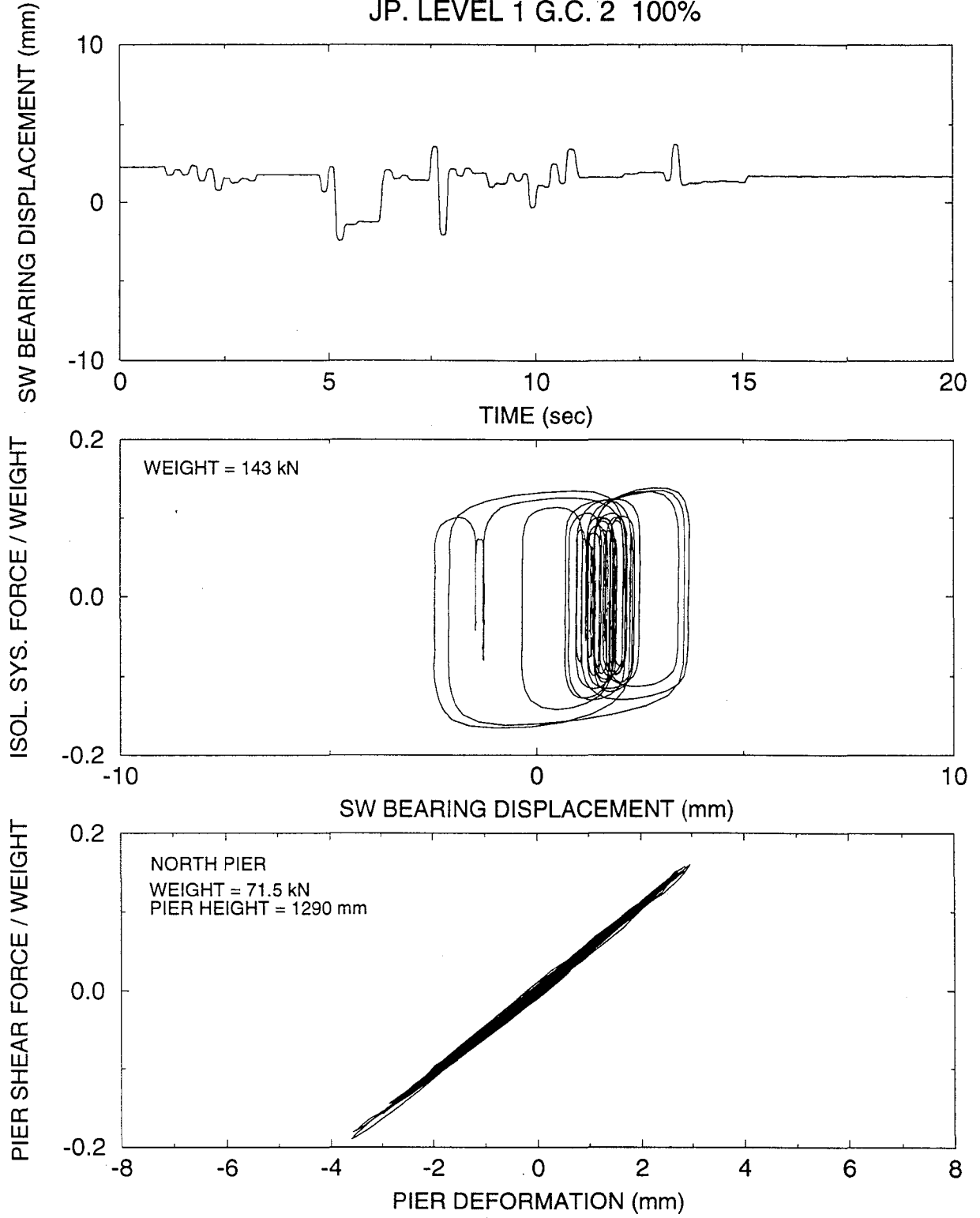
SYSTEM T2-No.3, TEST No. RHHRUN30  
JP. LEVEL 1 G.C. 1 100%



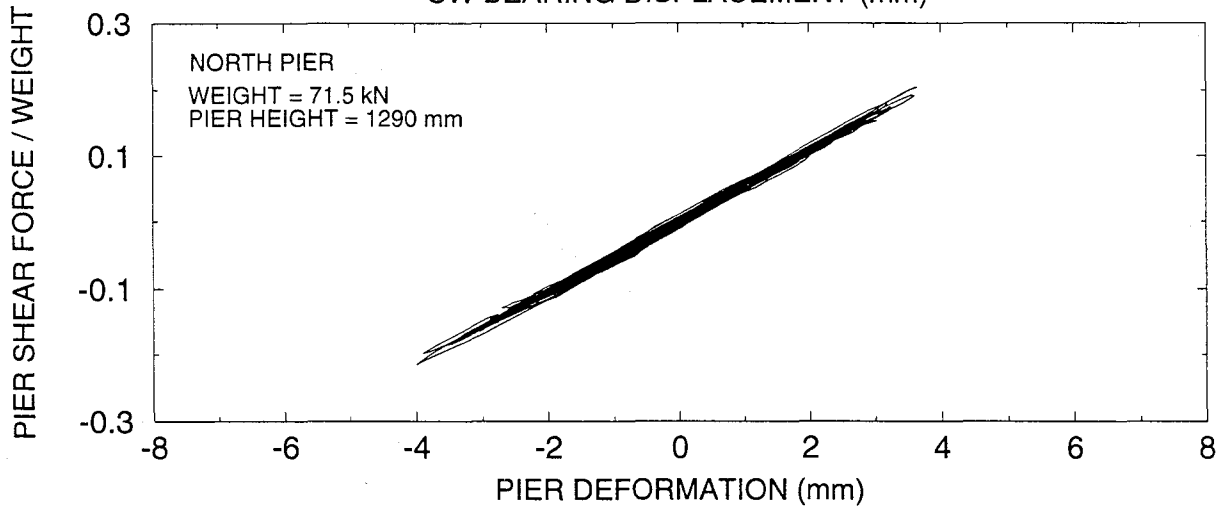
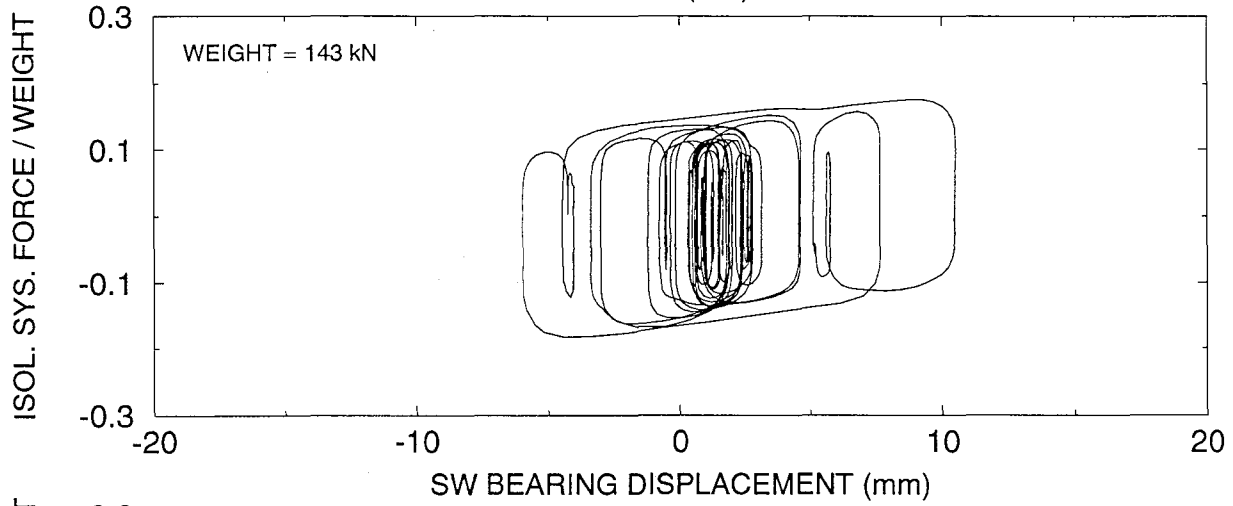
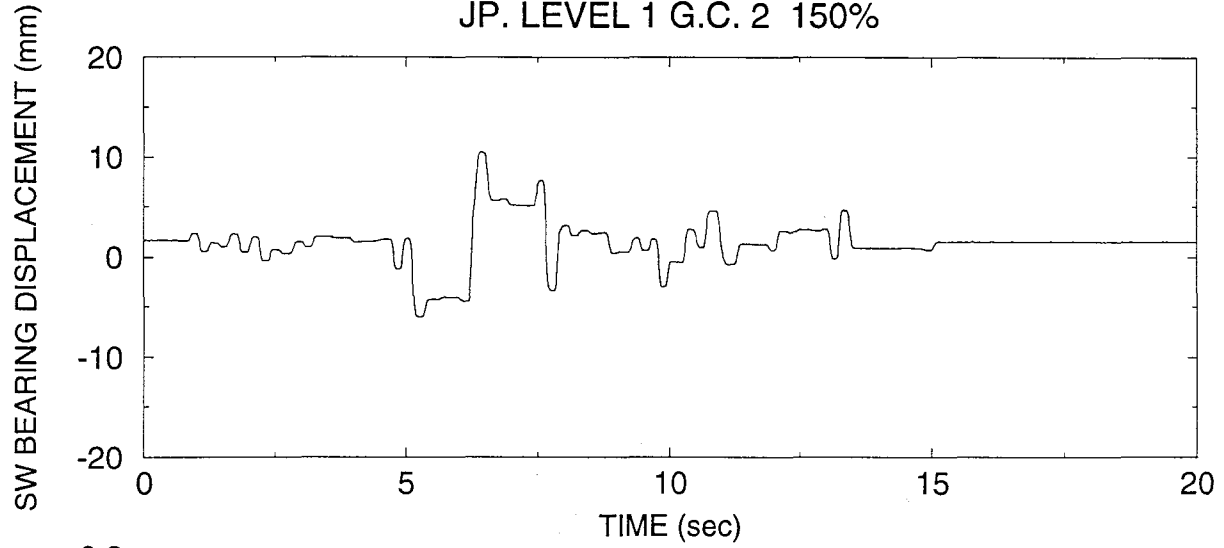
SYSTEM T2-No.3, TEST No. RHHRUN31  
JP. LEVEL 1 G.C. 1 150%



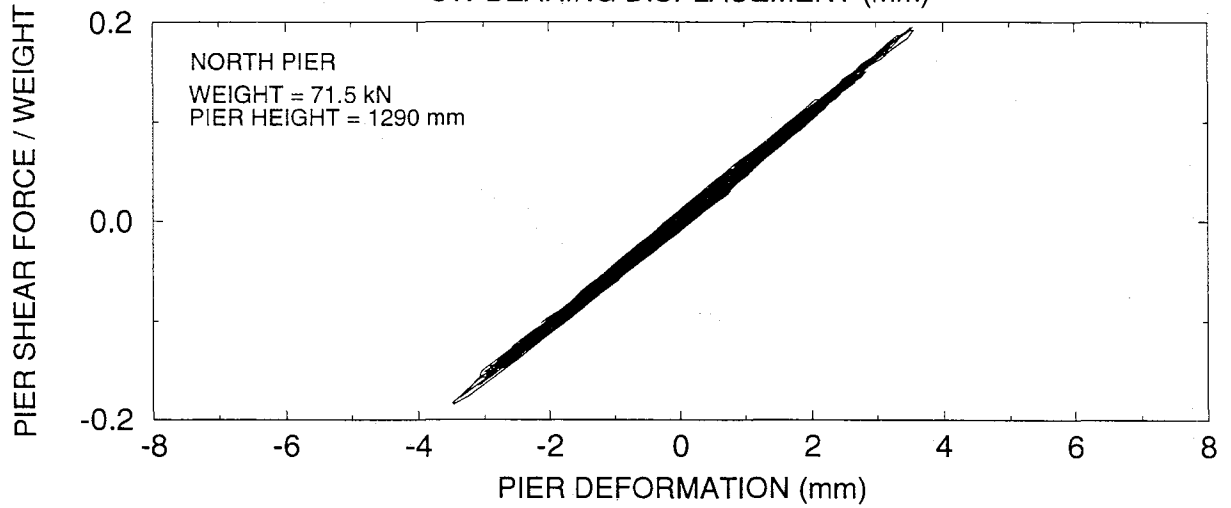
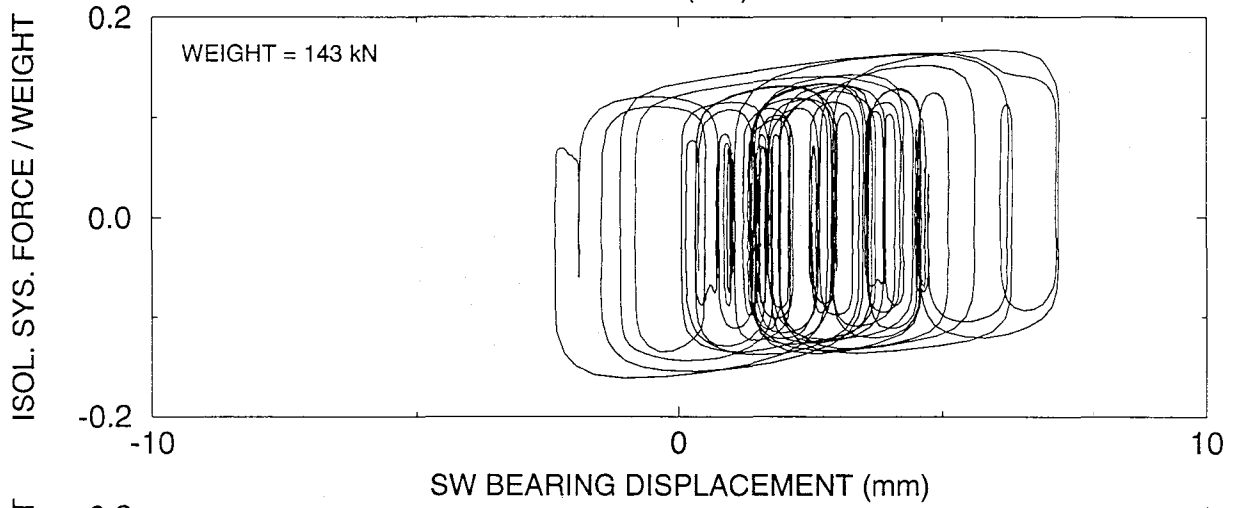
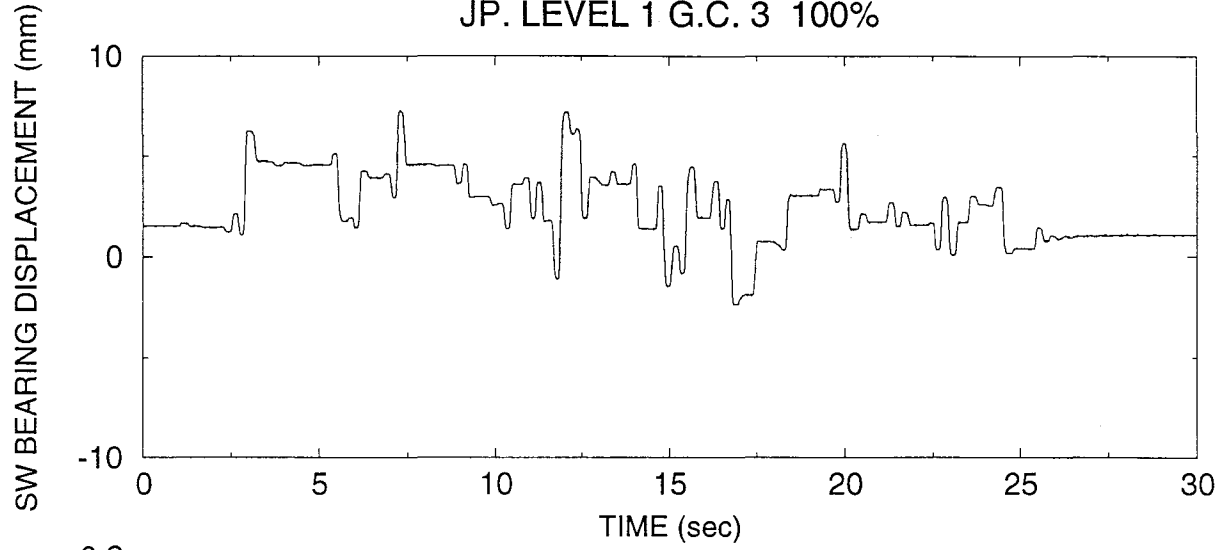
SYSTEM T2-No.3, TEST No. RHHRUN32  
JP. LEVEL 1 G.C. 2 100%



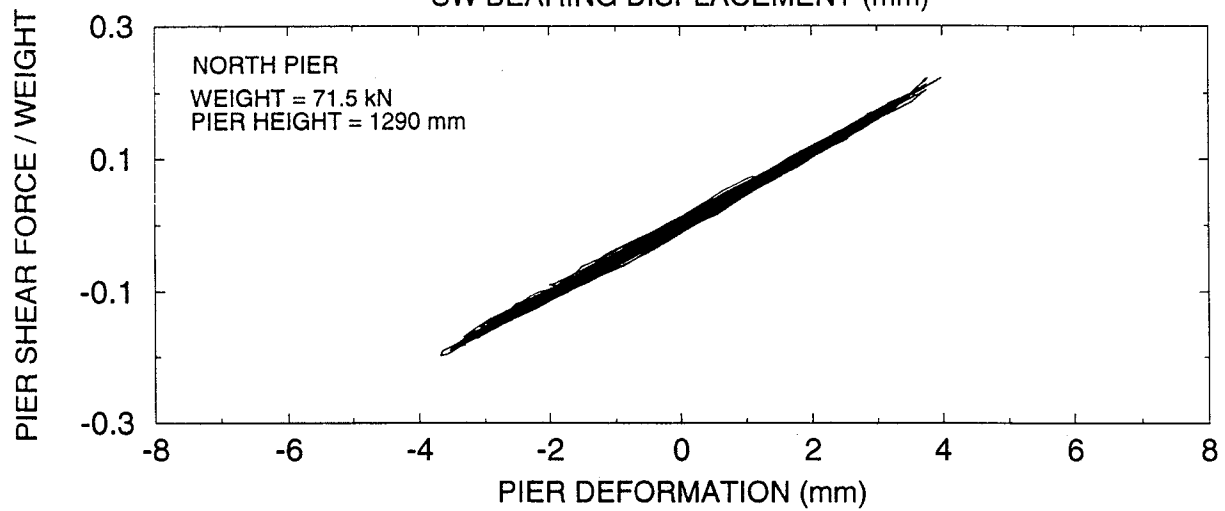
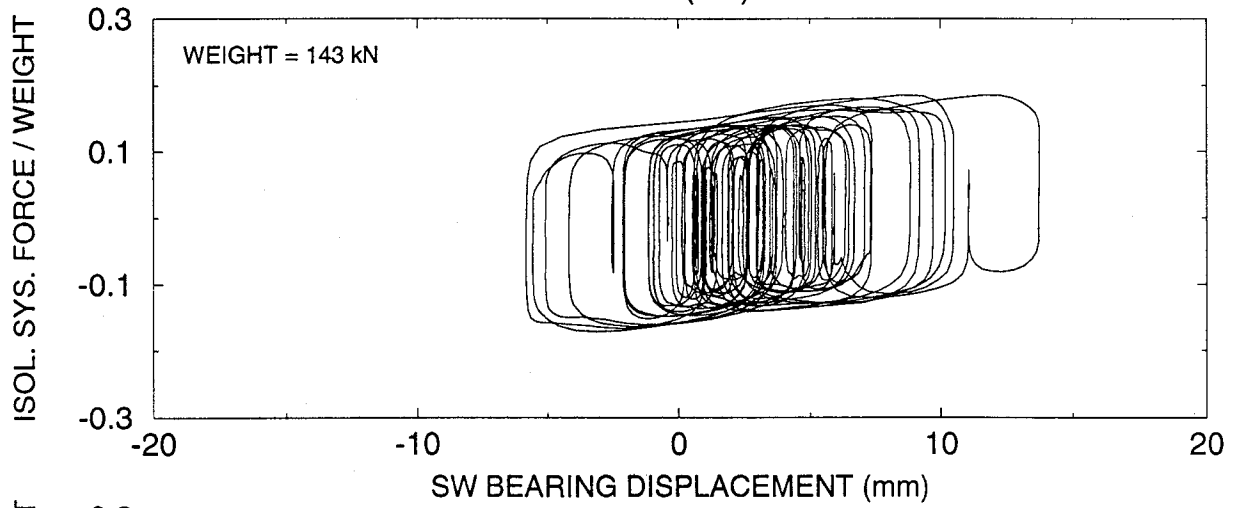
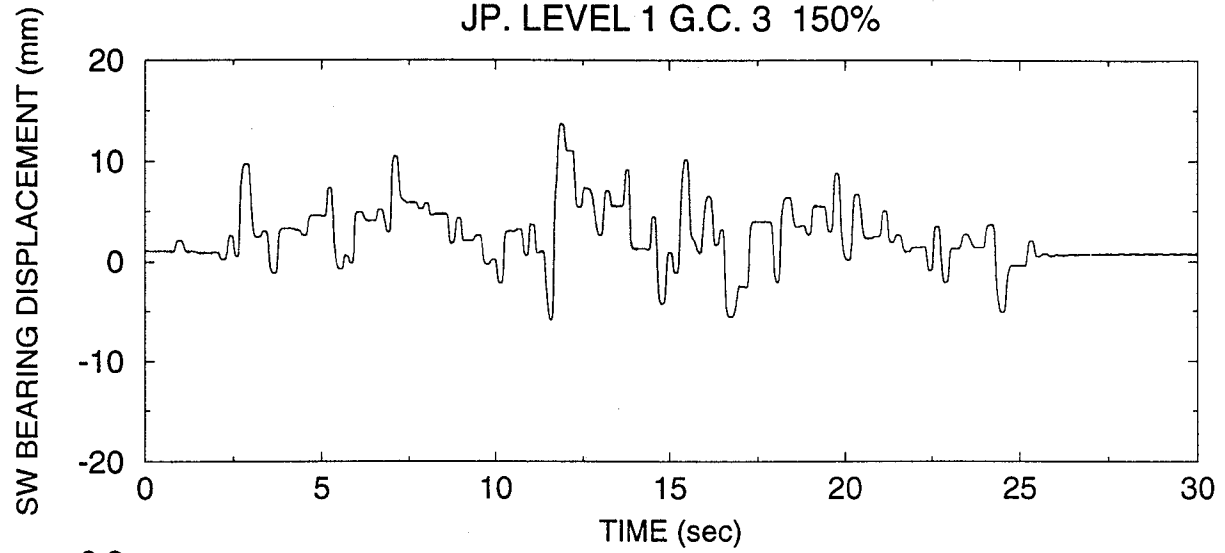
SYSTEM T2-No.3, TEST No. RHHRUN33  
JP. LEVEL 1 G.C. 2 150%



SYSTEM T2-No.3, TEST No. RHHRUN34  
JP. LEVEL 1 G.C. 3 100%

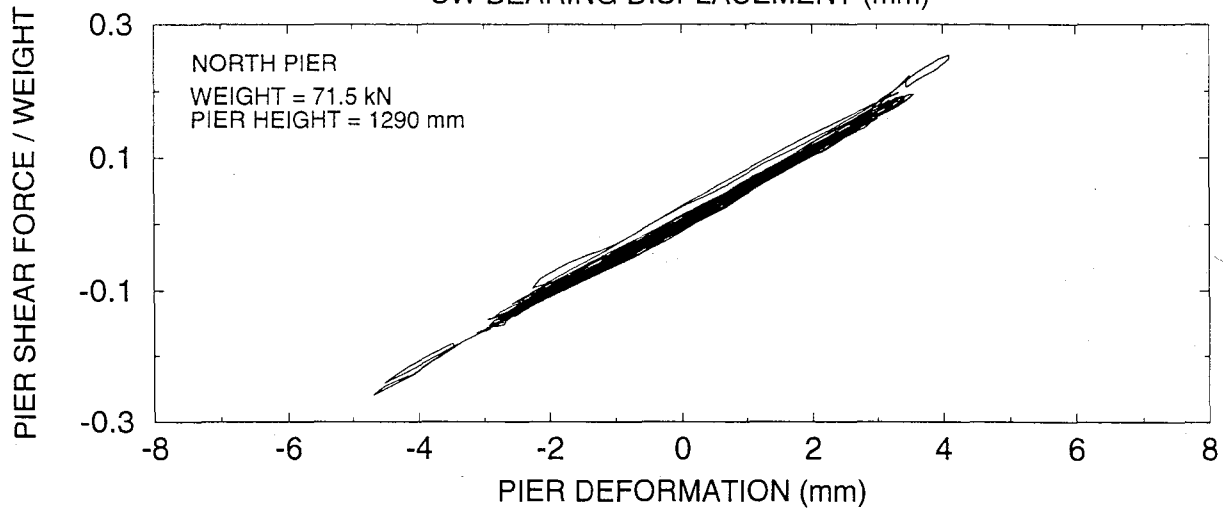
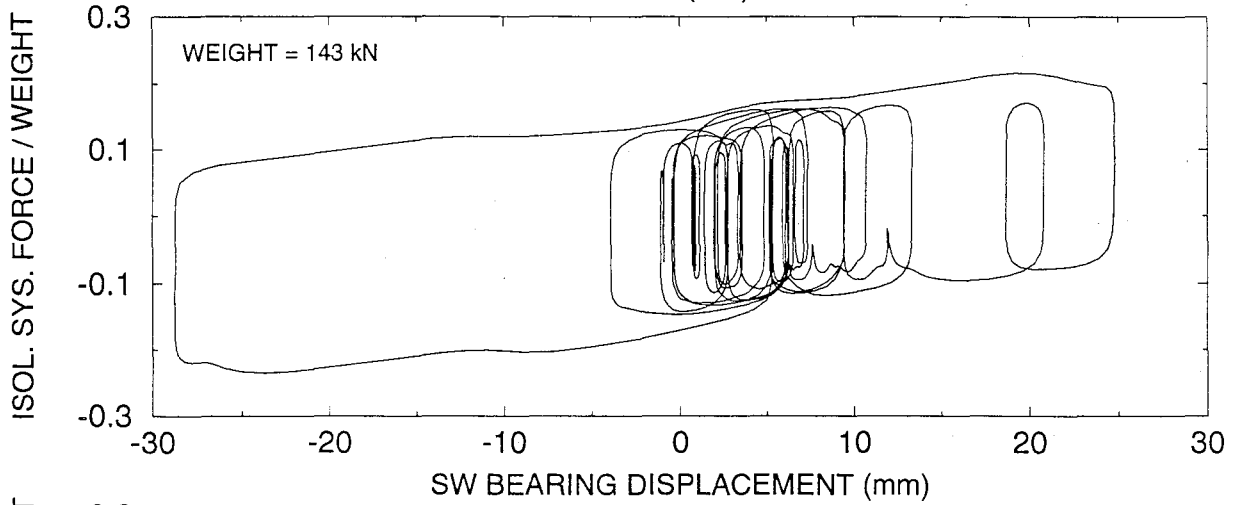
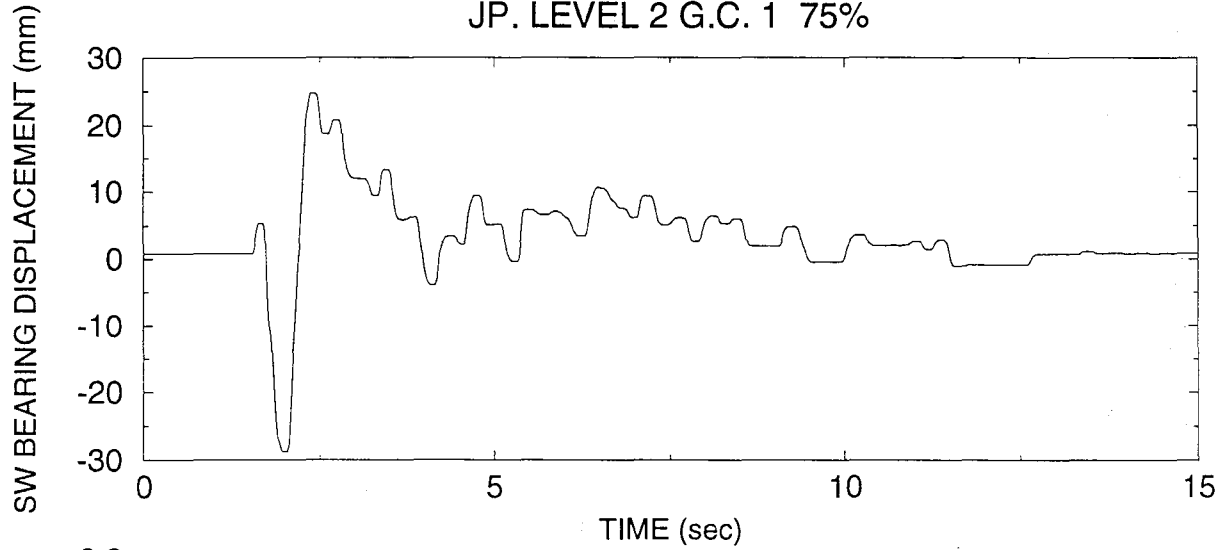


SYSTEM T2-No.3, TEST No. RHHRUN35  
JP. LEVEL 1 G.C. 3 150%

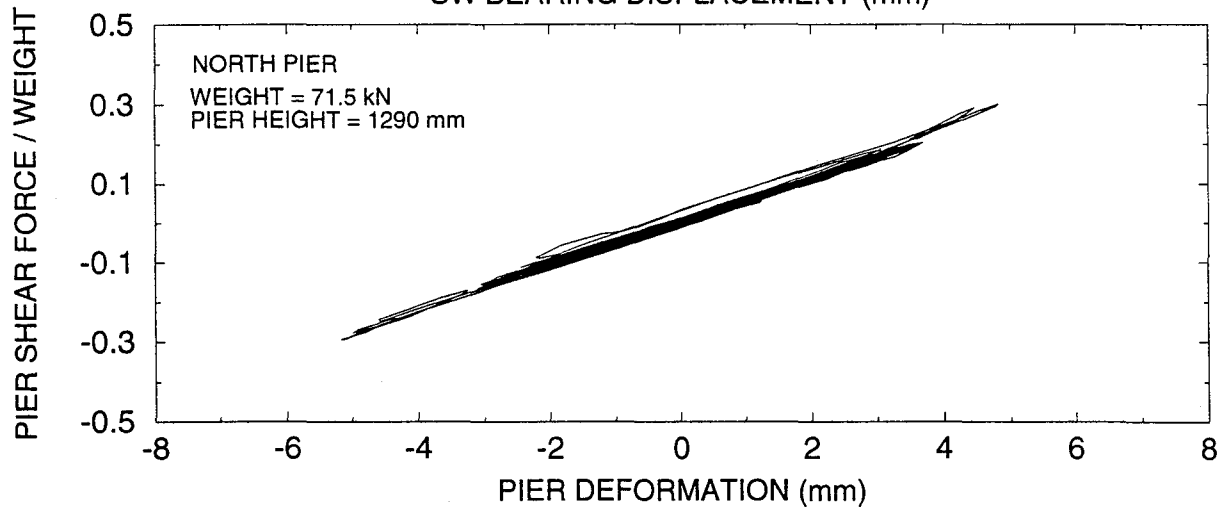
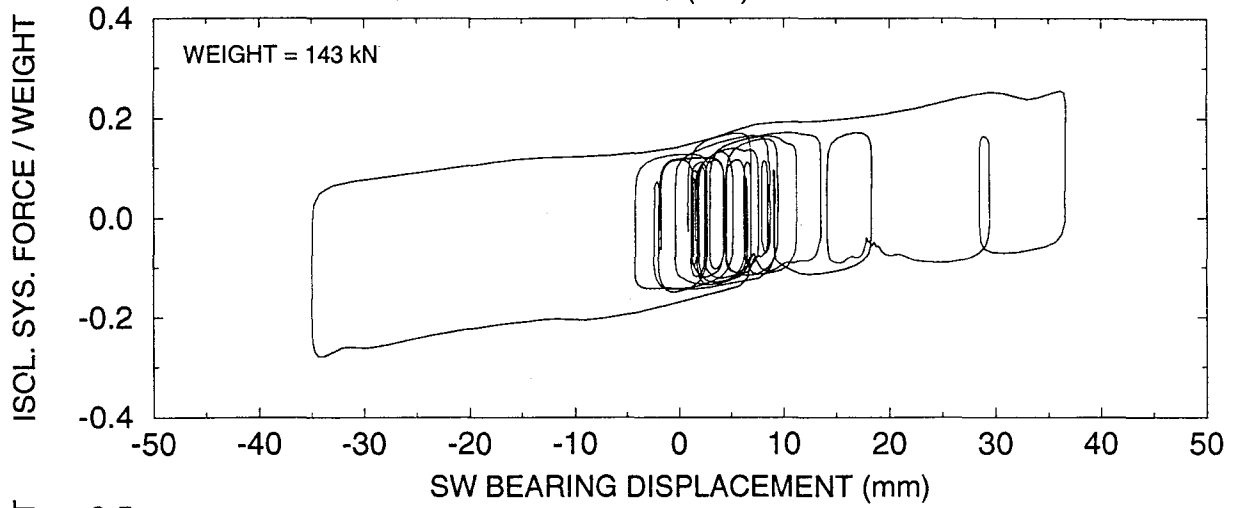
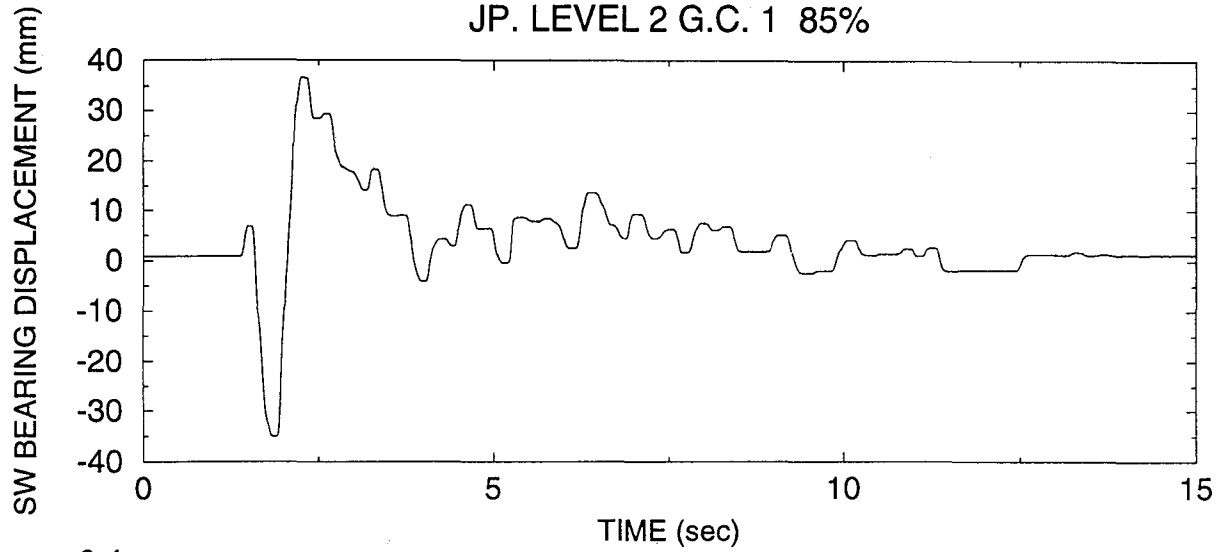




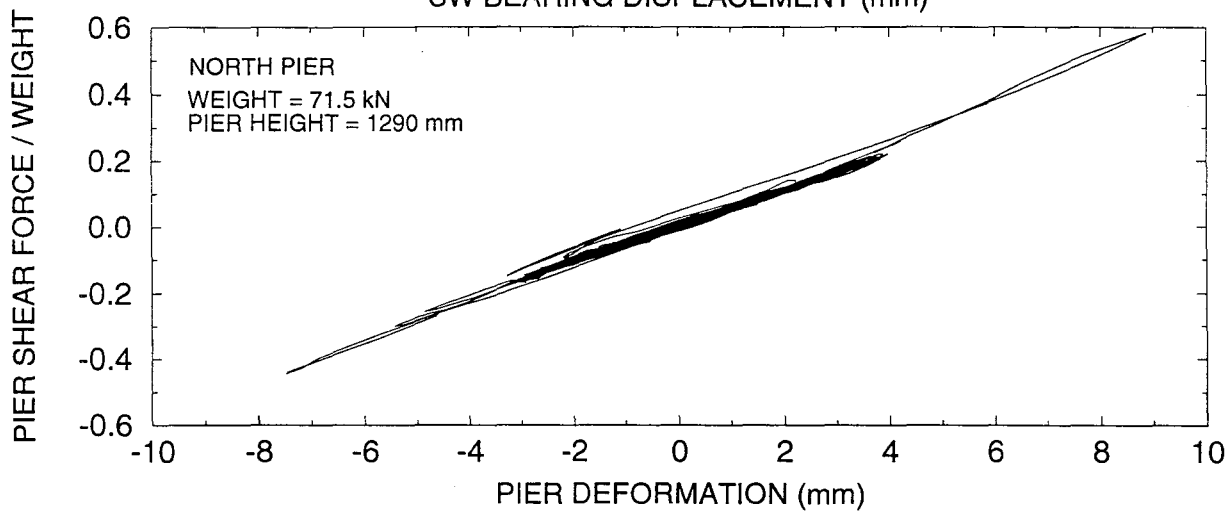
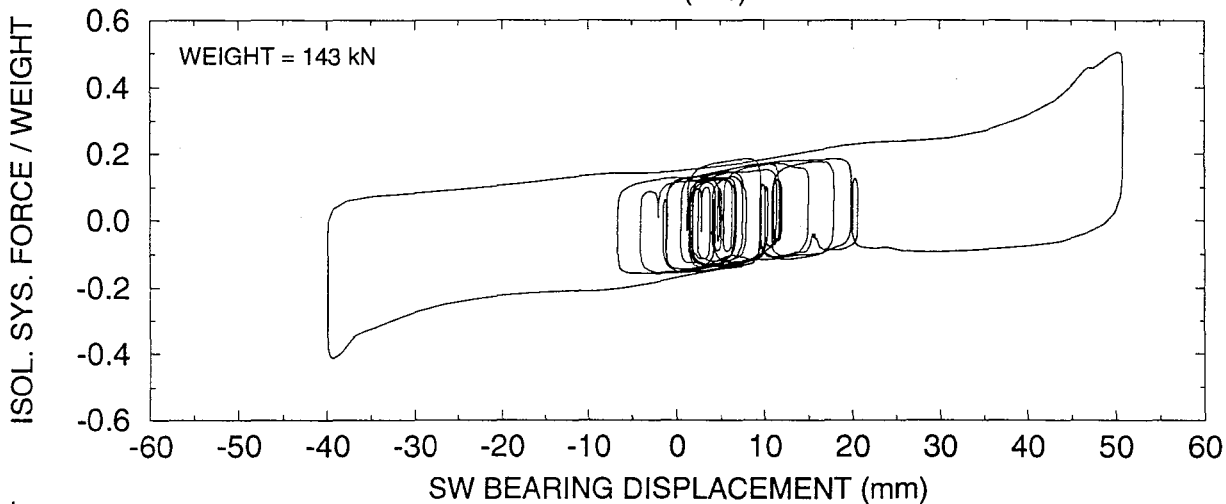
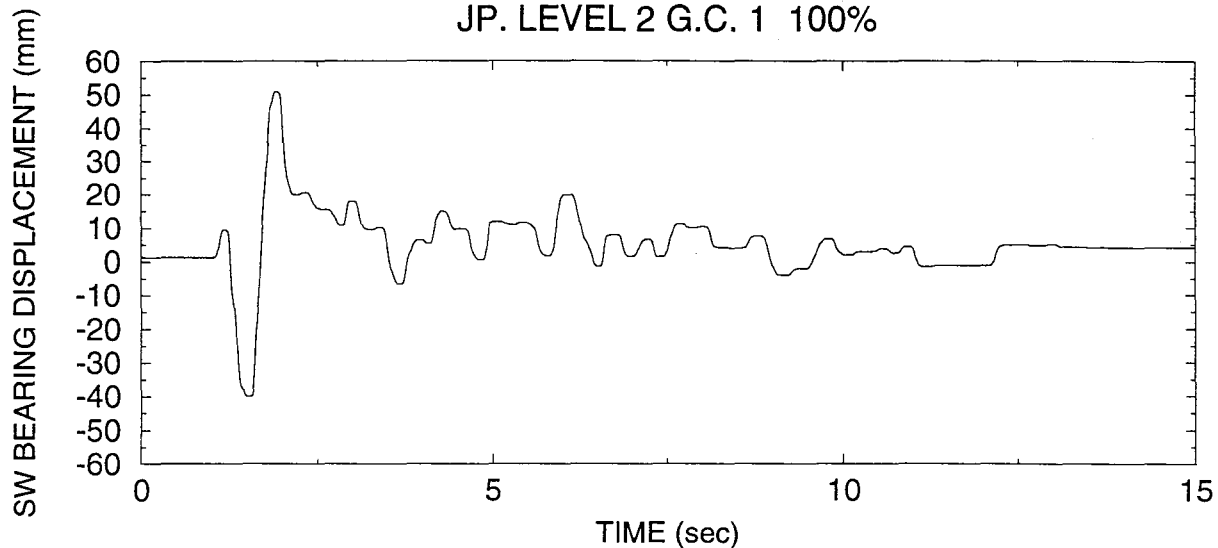
SYSTEM T2-No.3, TEST No. RHHRUN36  
JP. LEVEL 2 G.C. 1 75%



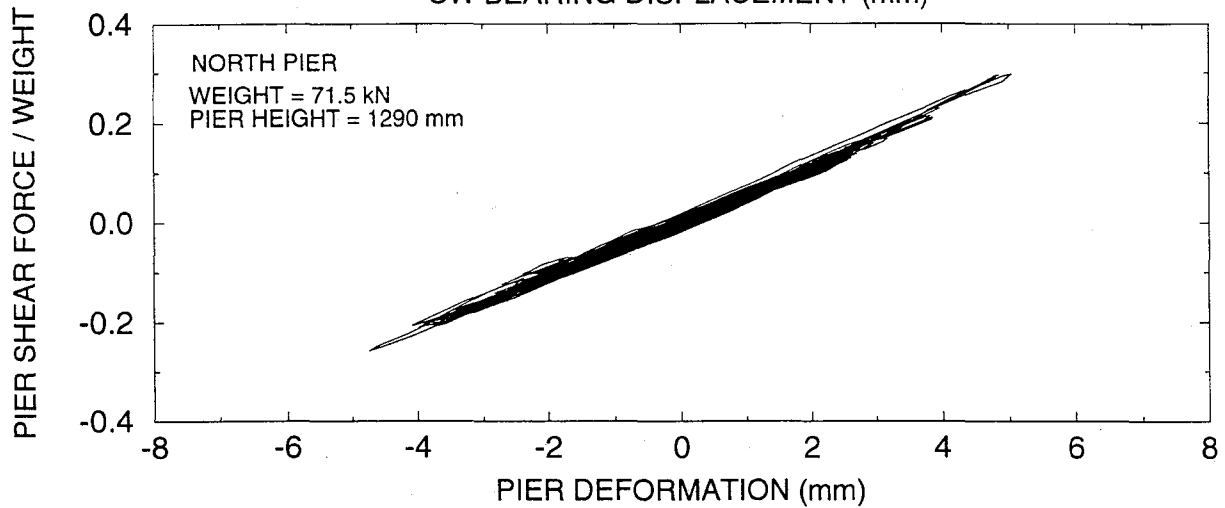
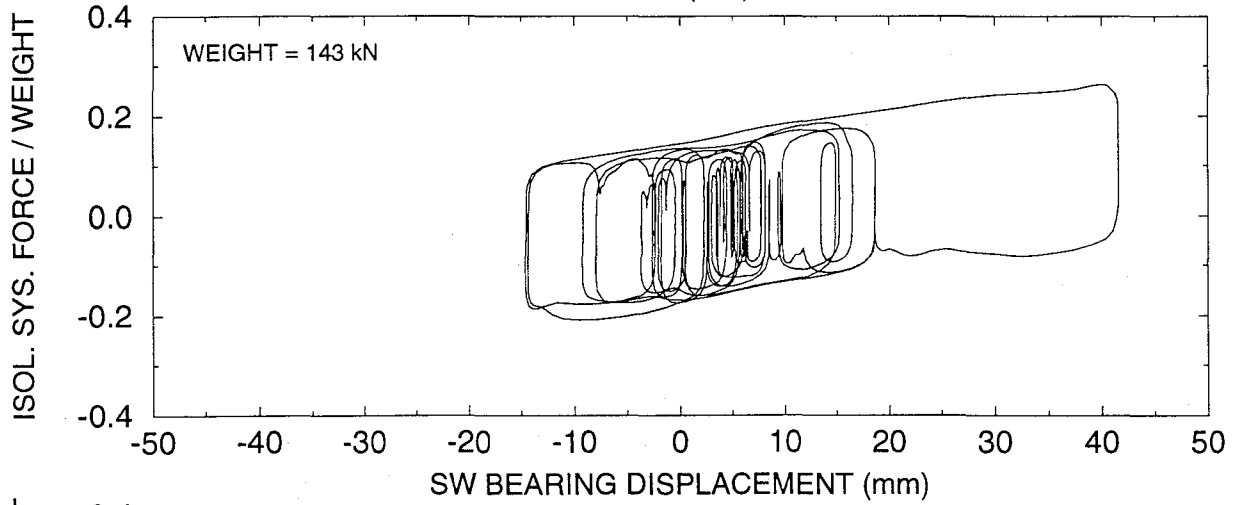
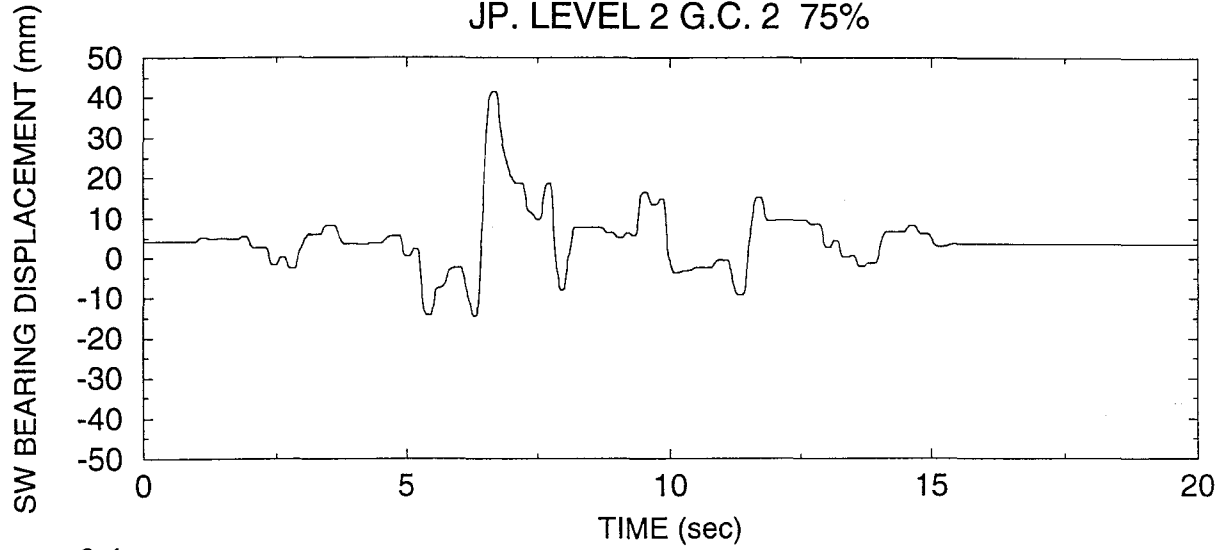
SYSTEM T2-No.3, TEST No. RHHRUN37  
JP. LEVEL 2 G.C. 1 85%



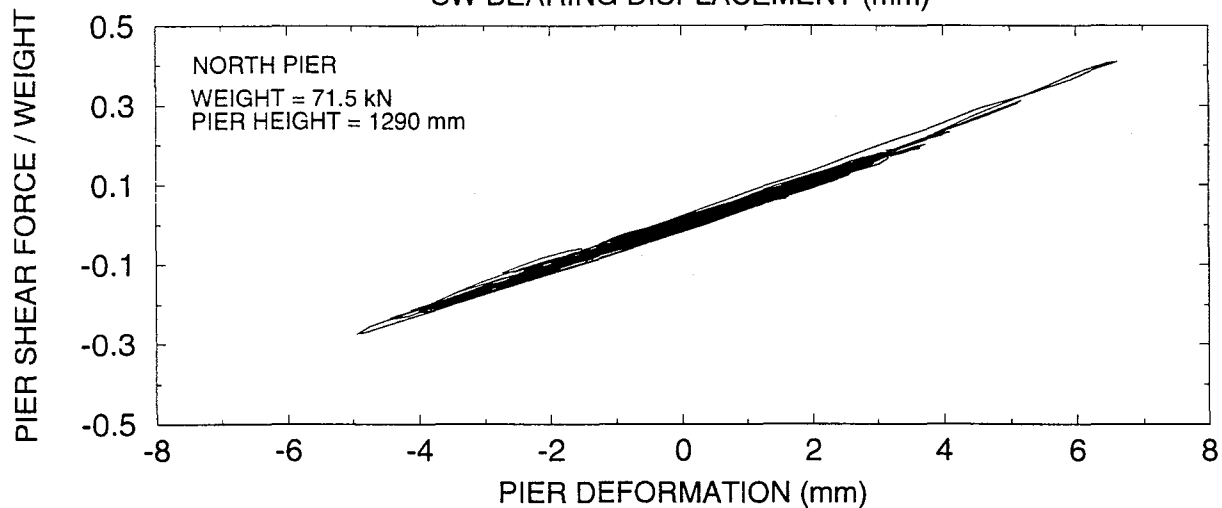
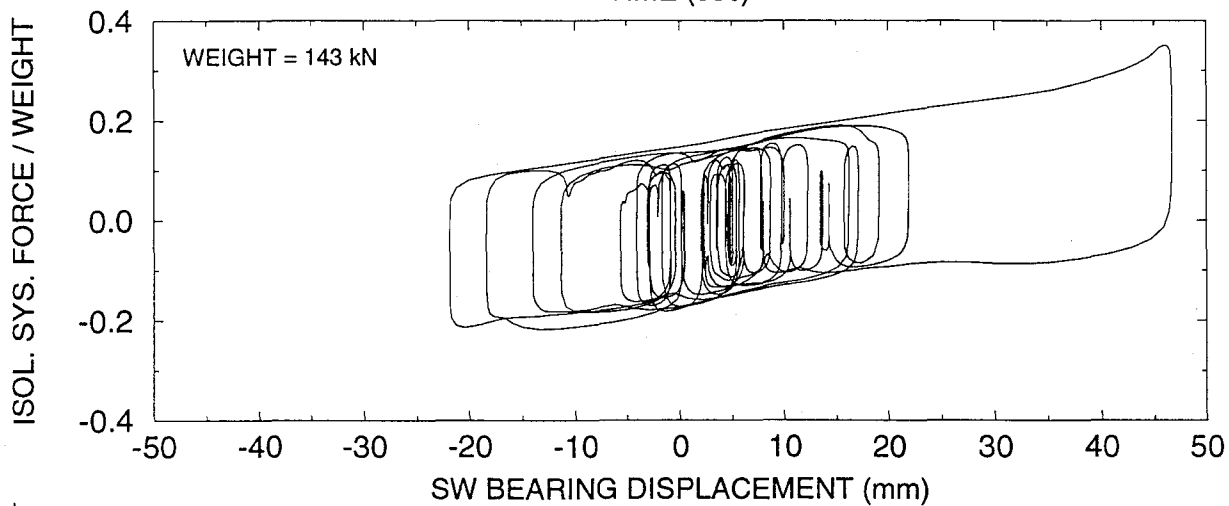
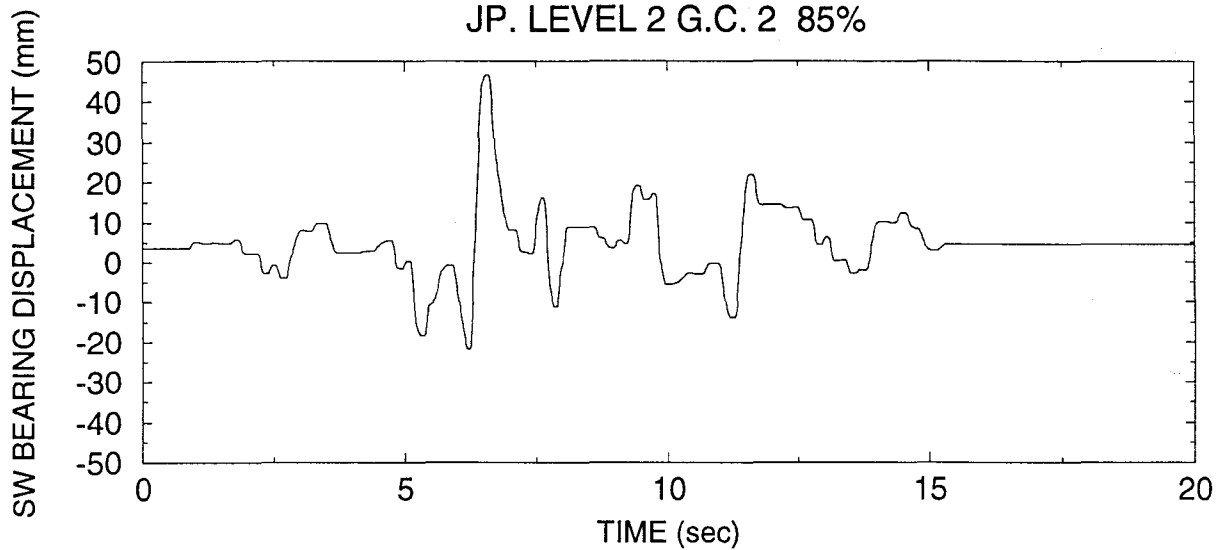
SYSTEM T2-No.3, TEST No. RHHRUN38  
JP. LEVEL 2 G.C. 1 100%



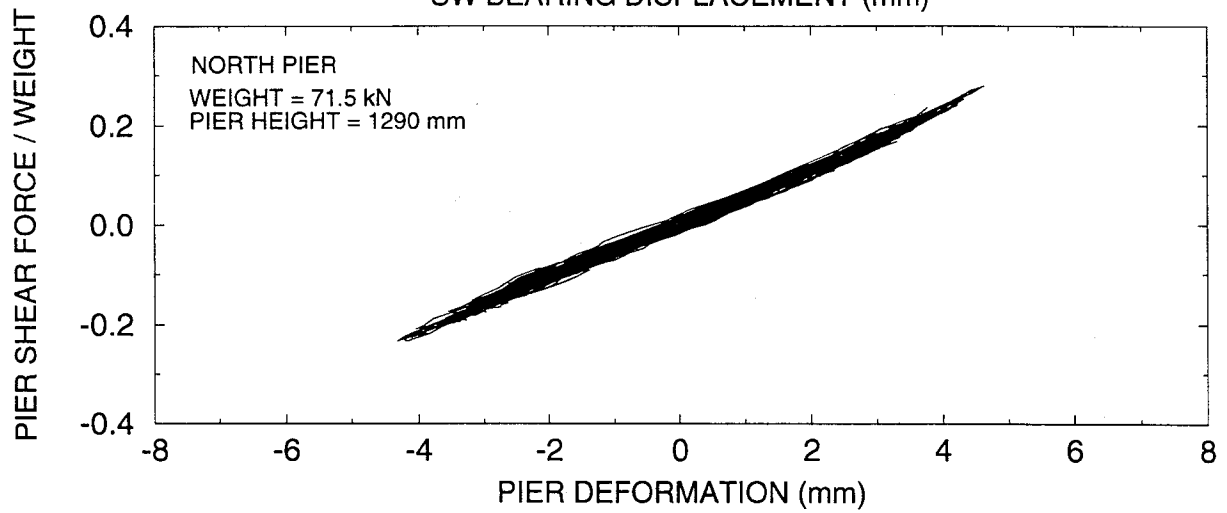
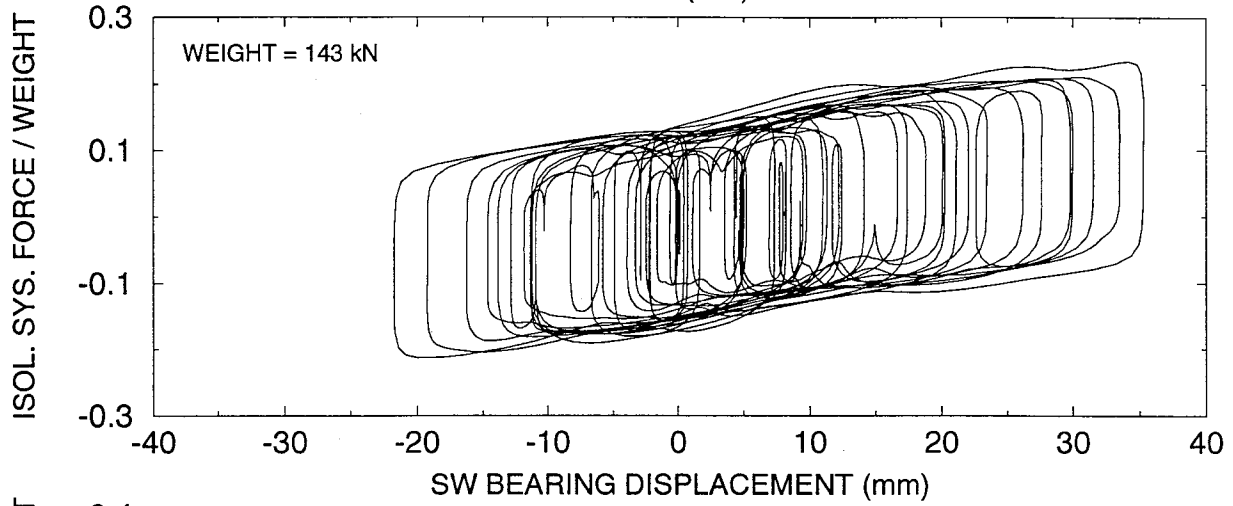
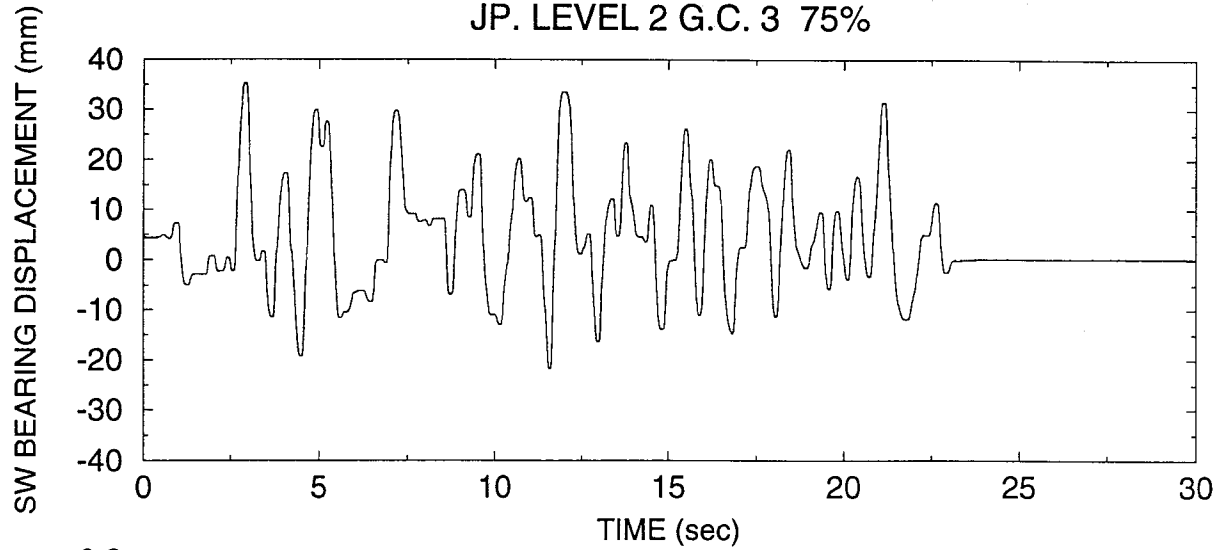
SYSTEM T2-No.3, TEST No. RHHRUN39  
JP. LEVEL 2 G.C. 2 75%



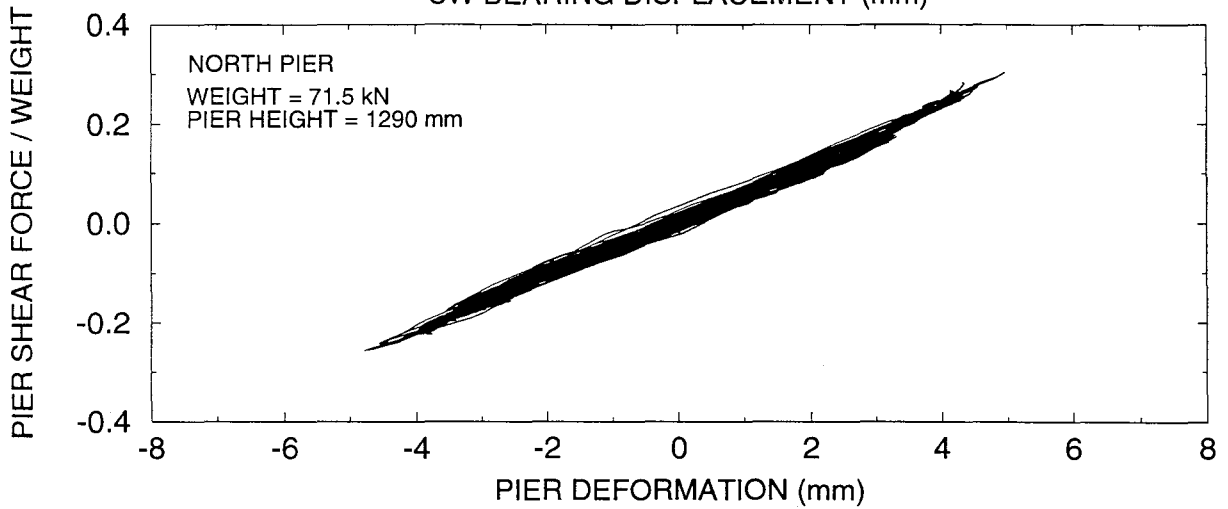
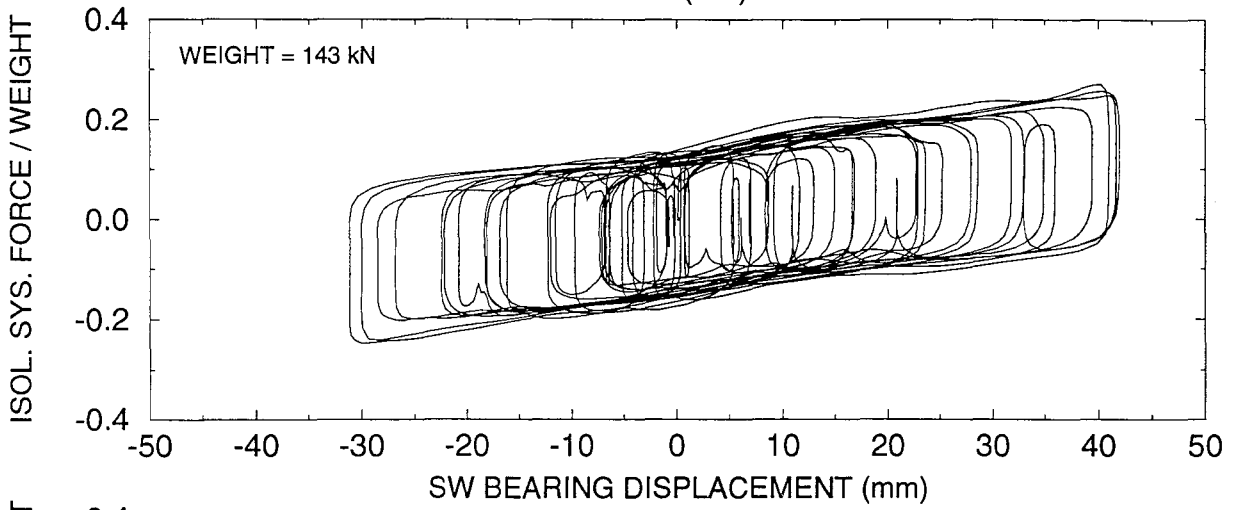
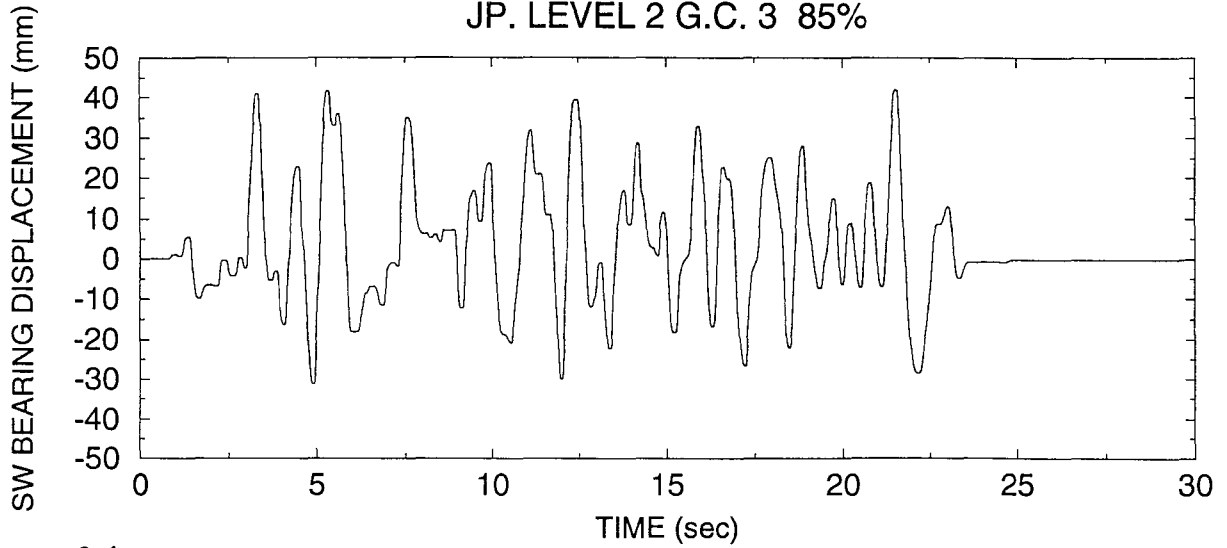
SYSTEM T2-No.3, TEST No. RHHRUN40  
JP. LEVEL 2 G.C. 2 85%



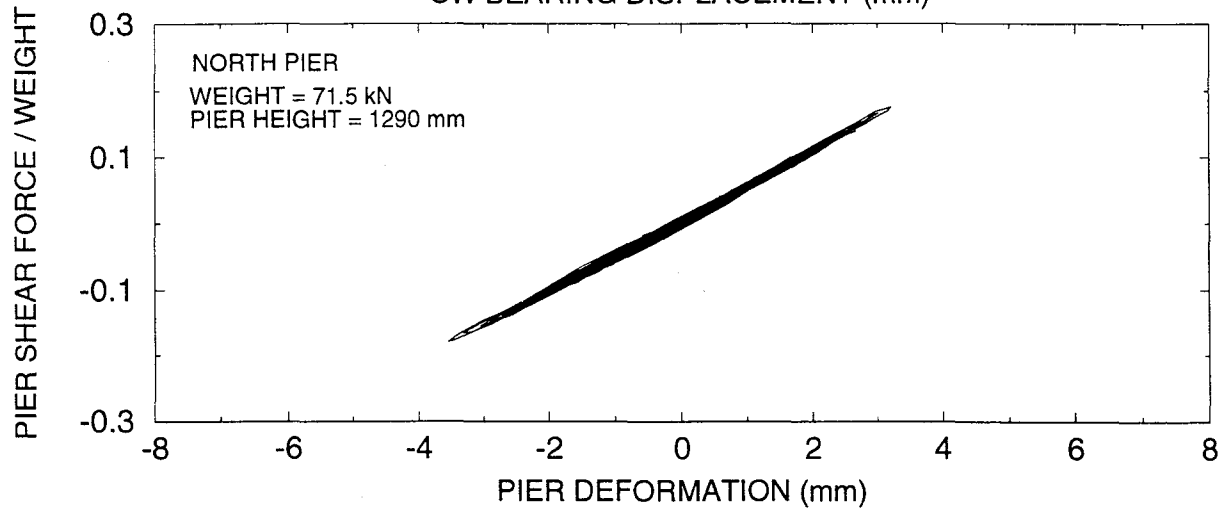
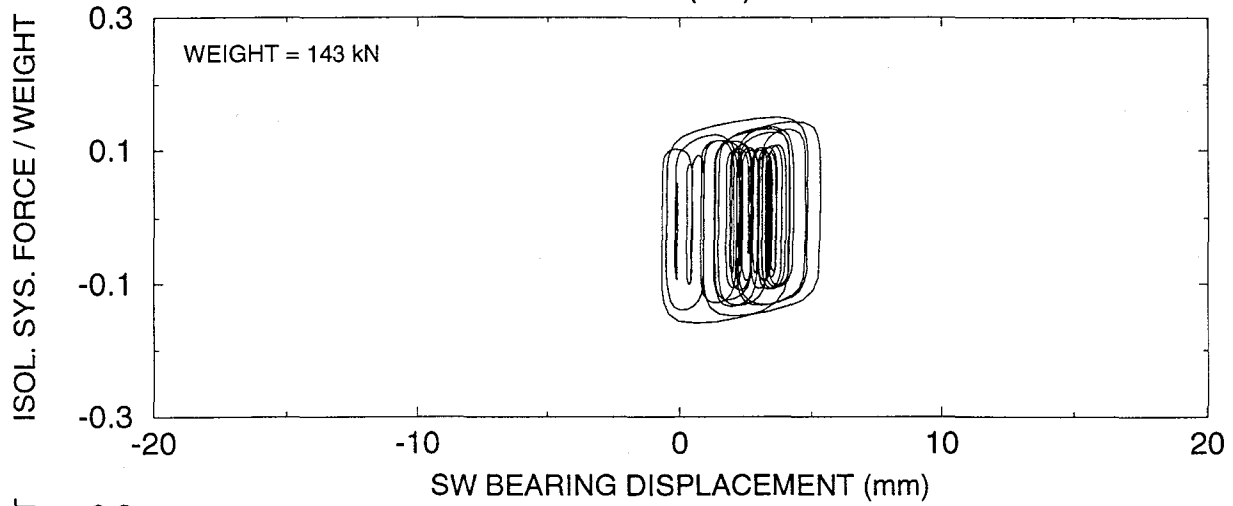
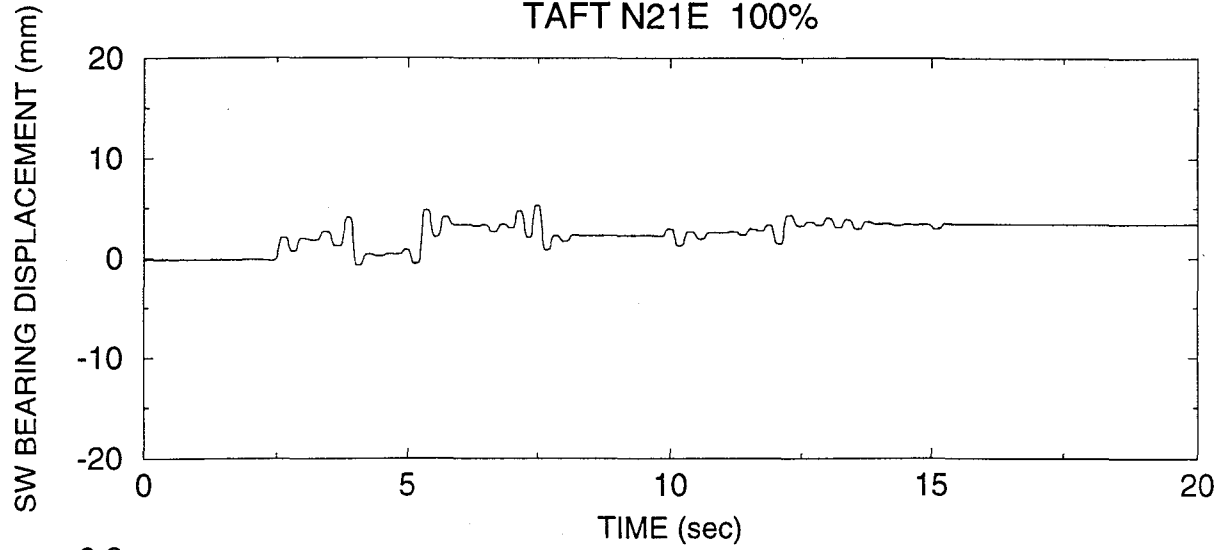
SYSTEM T2-No.3, TEST No. RHHRUN41  
JP. LEVEL 2 G.C. 3 75%



SYSTEM T2-No.3, TEST No. RHHRUN42  
JP. LEVEL 2 G.C. 3 85%

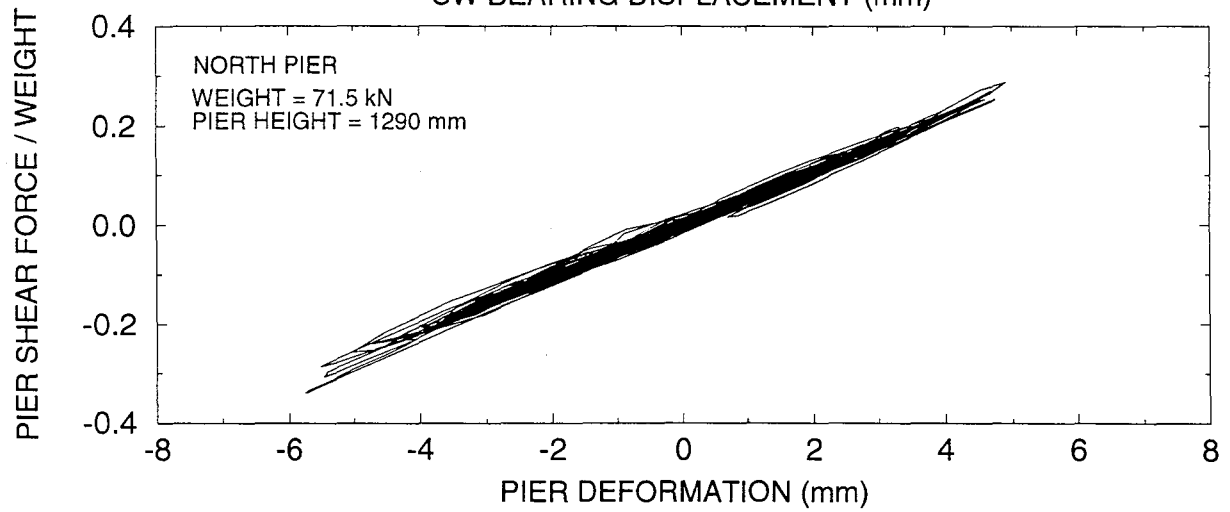
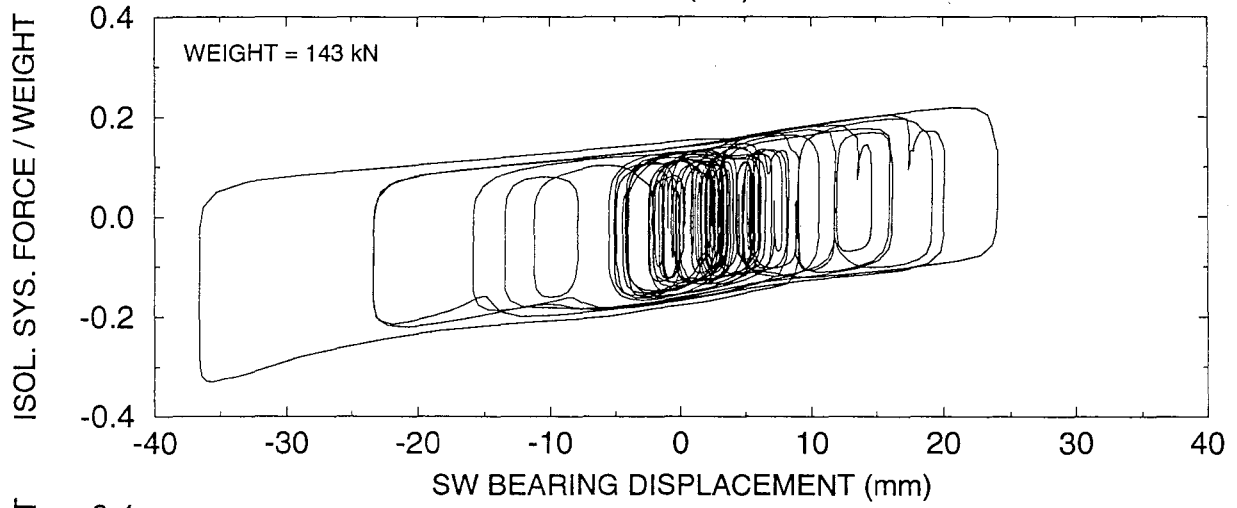
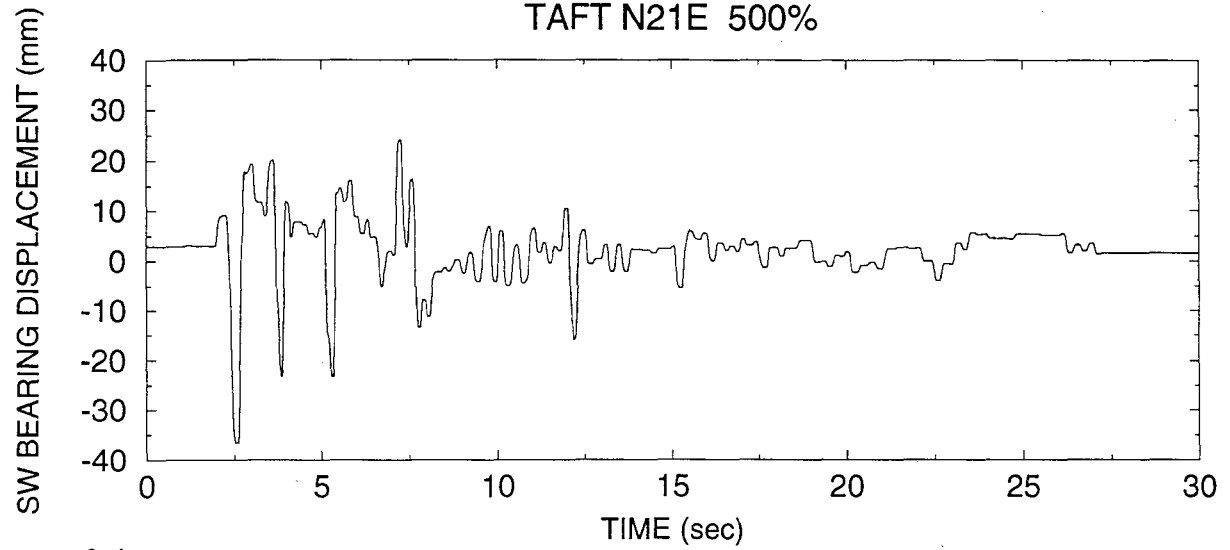


SYSTEM T2-No.3, TEST No. RHHRUN43  
TAFT N21E 100%

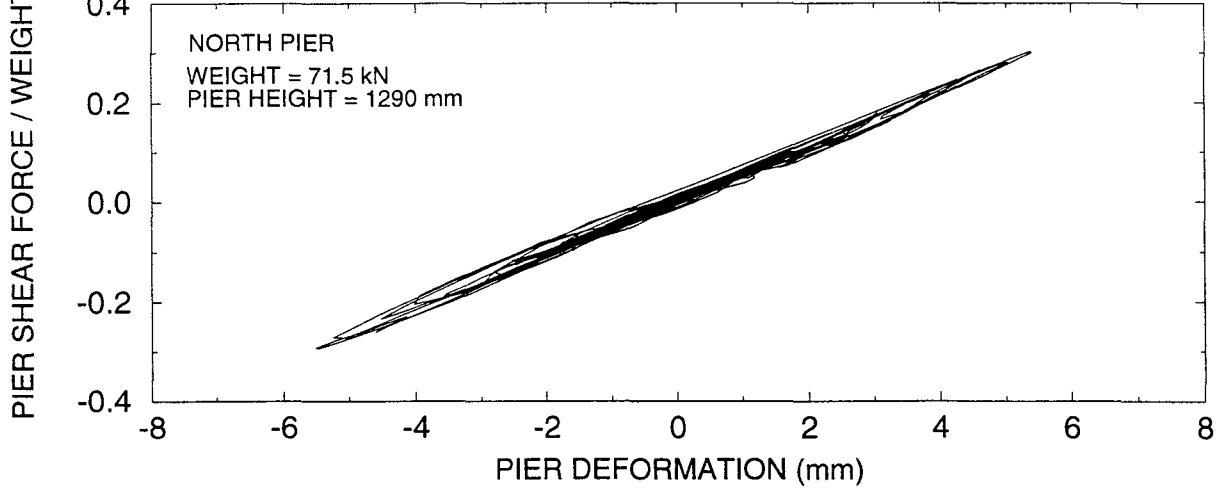
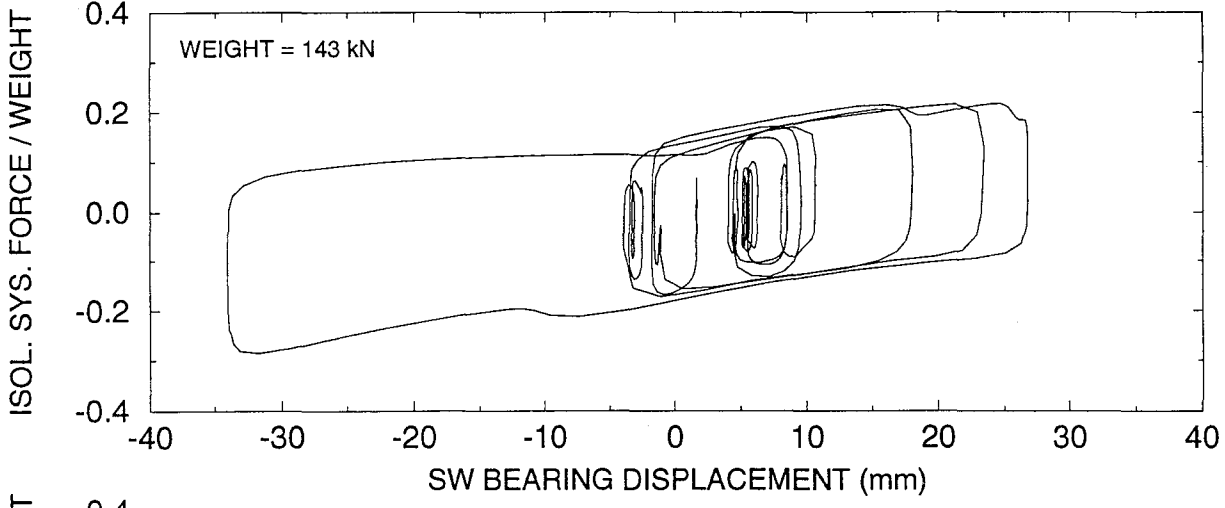
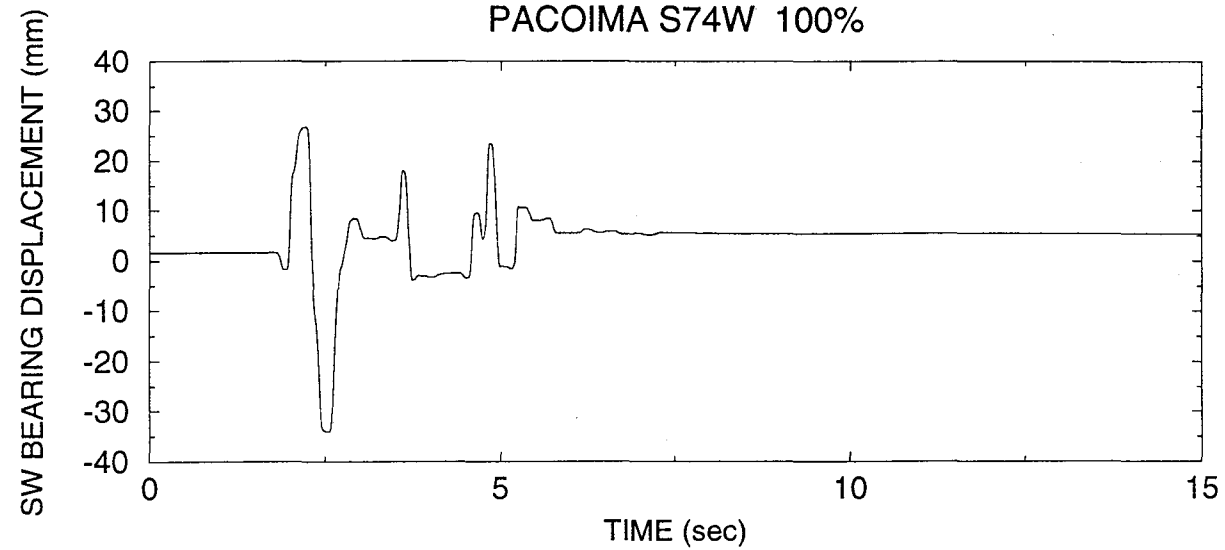




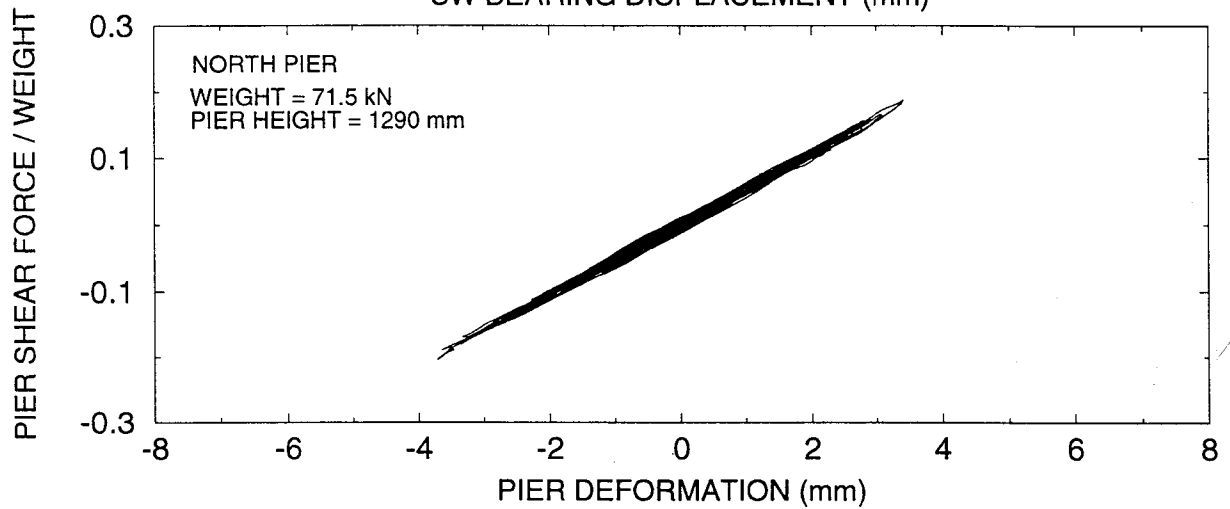
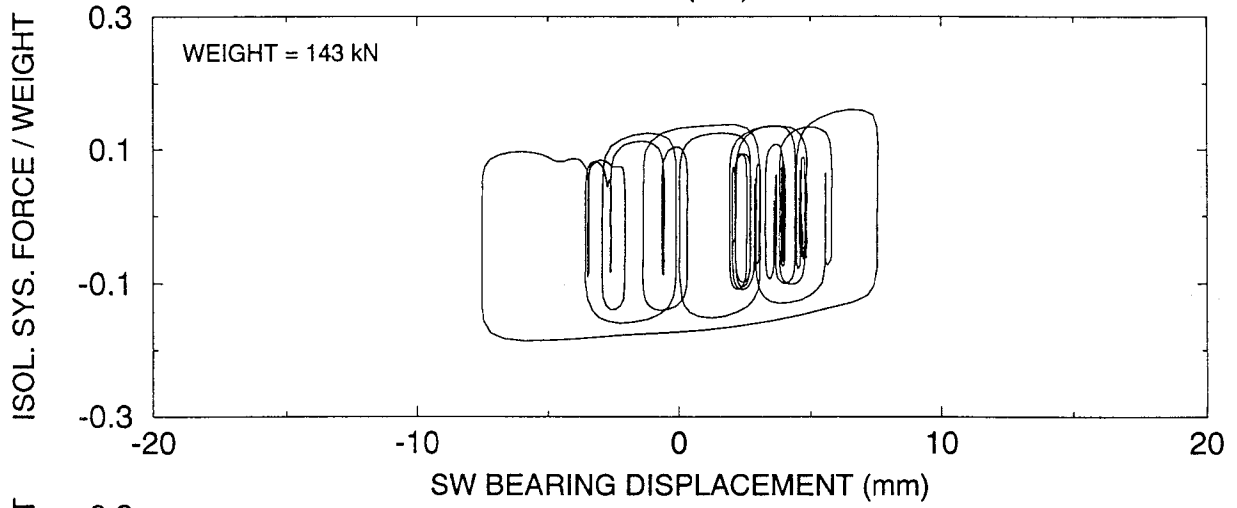
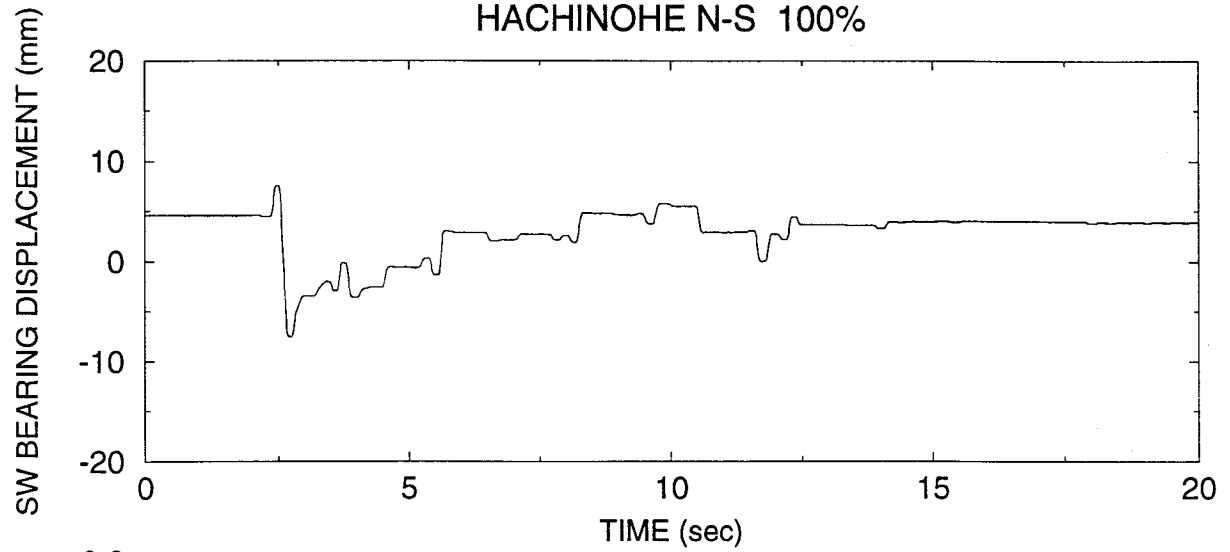
SYSTEM T2-No.3, TEST No. RHHRUN45  
TAFT N21E 500%



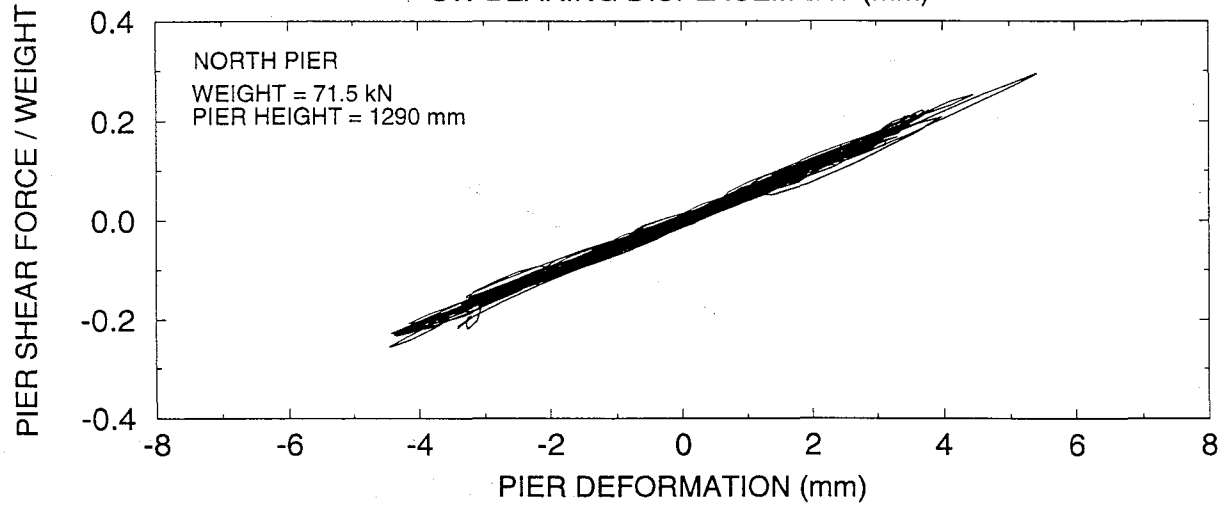
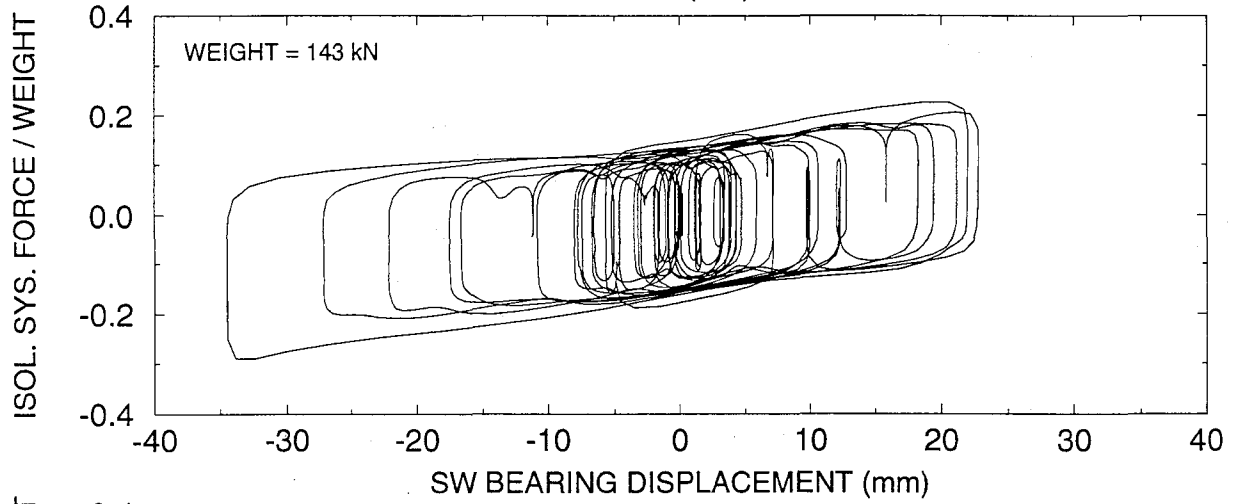
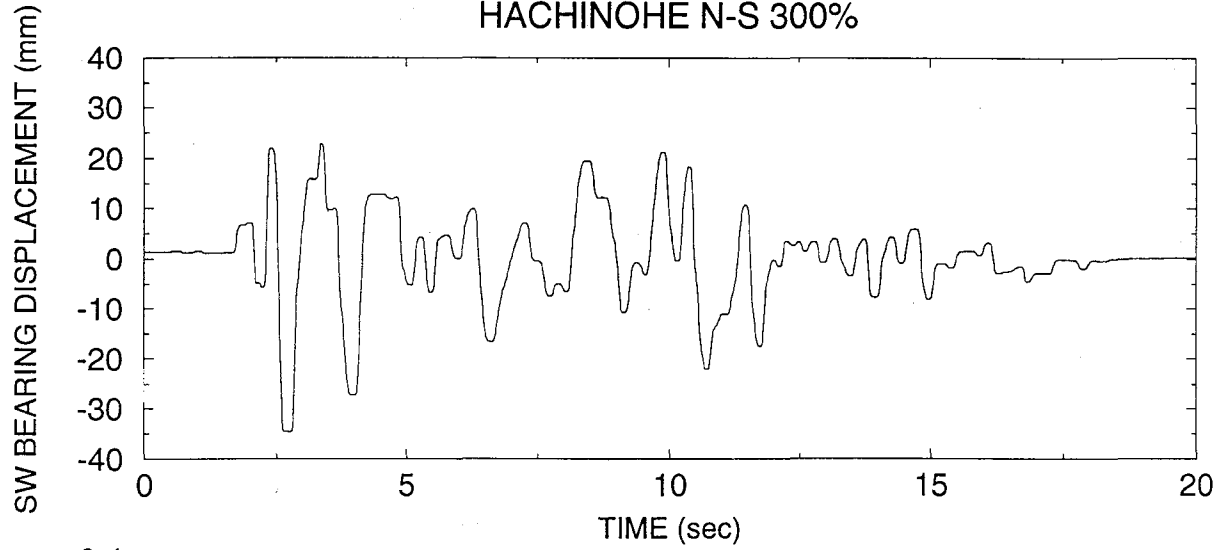
SYSTEM T2-No.3, TEST No. RHHRUN46  
PACOIMA S74W 100%



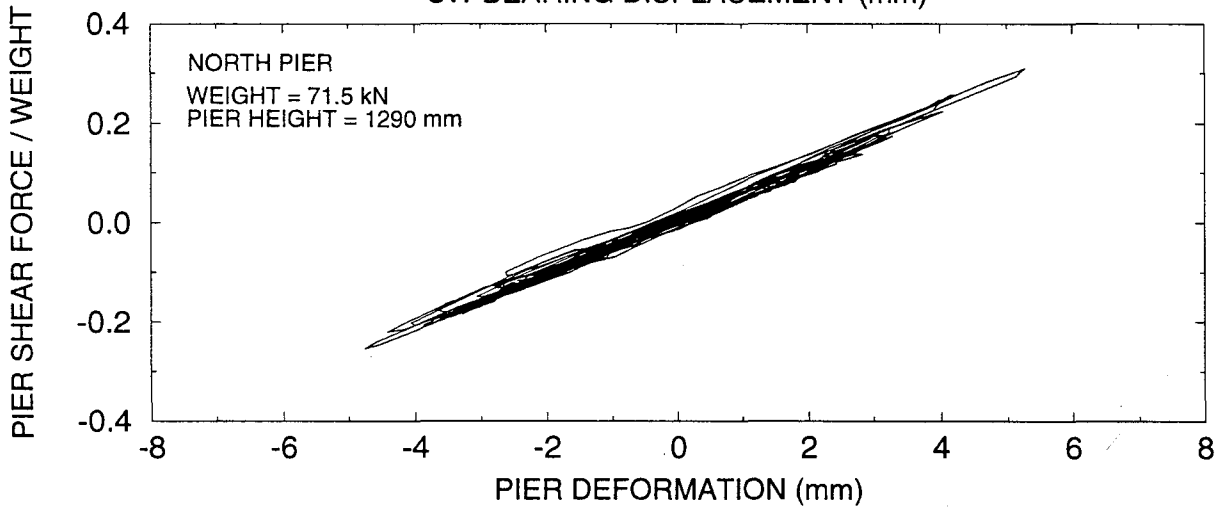
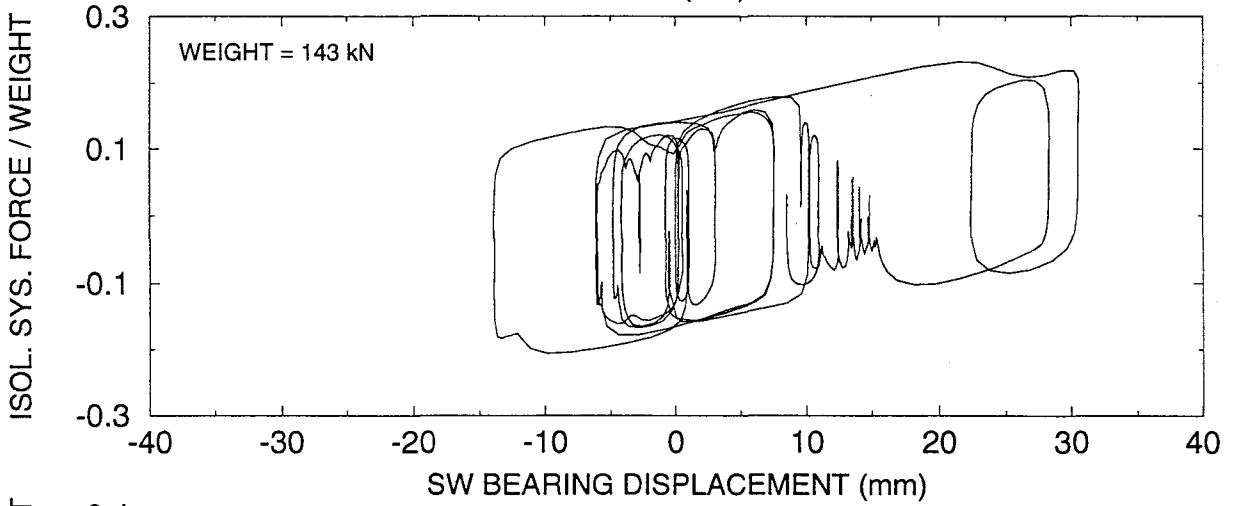
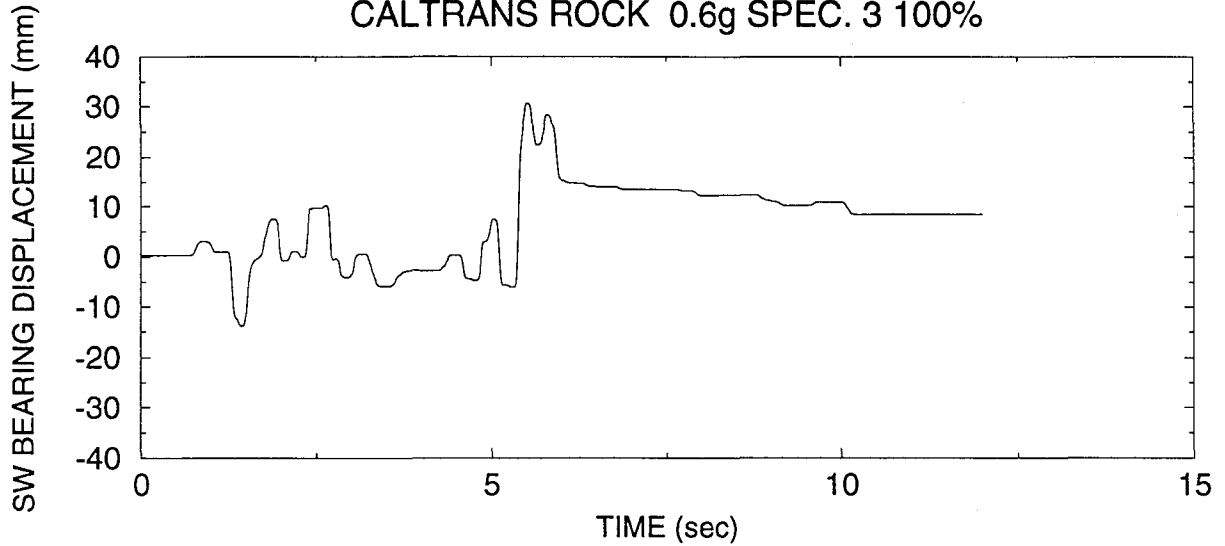
SYSTEM T2-No.3, TEST No. RHHRUN47  
HACHINOHE N-S 100%



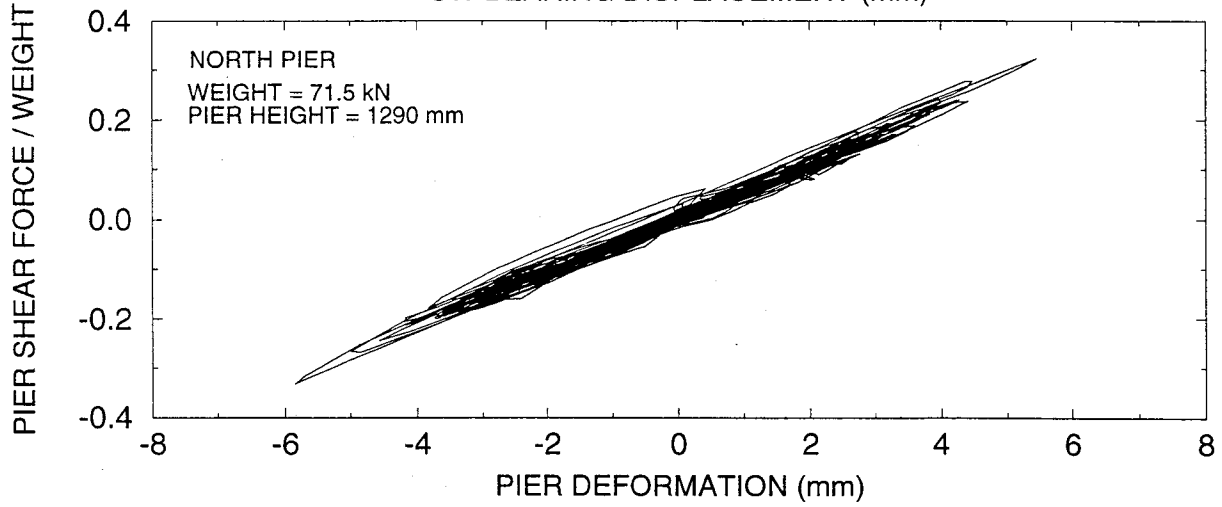
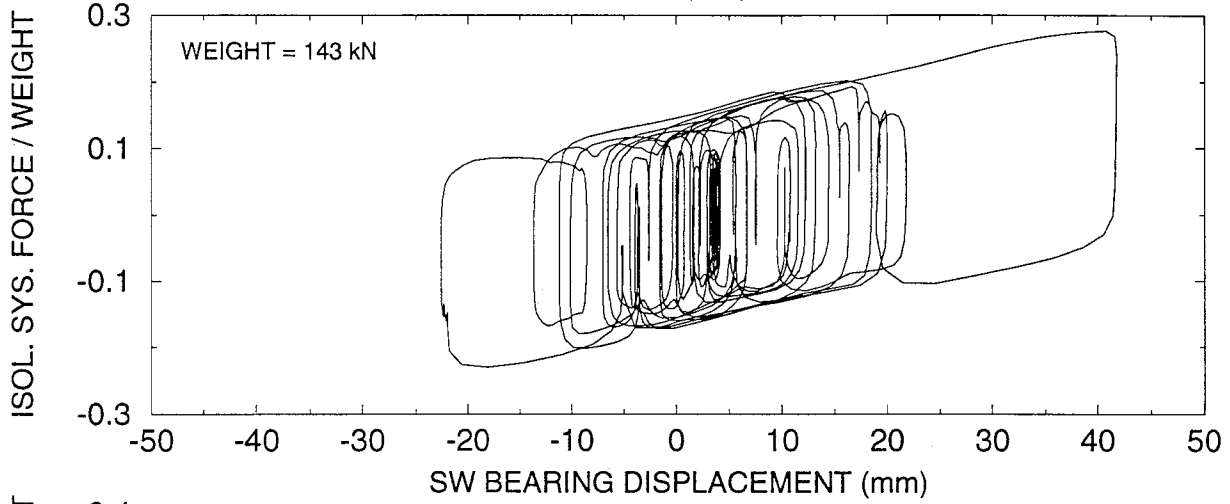
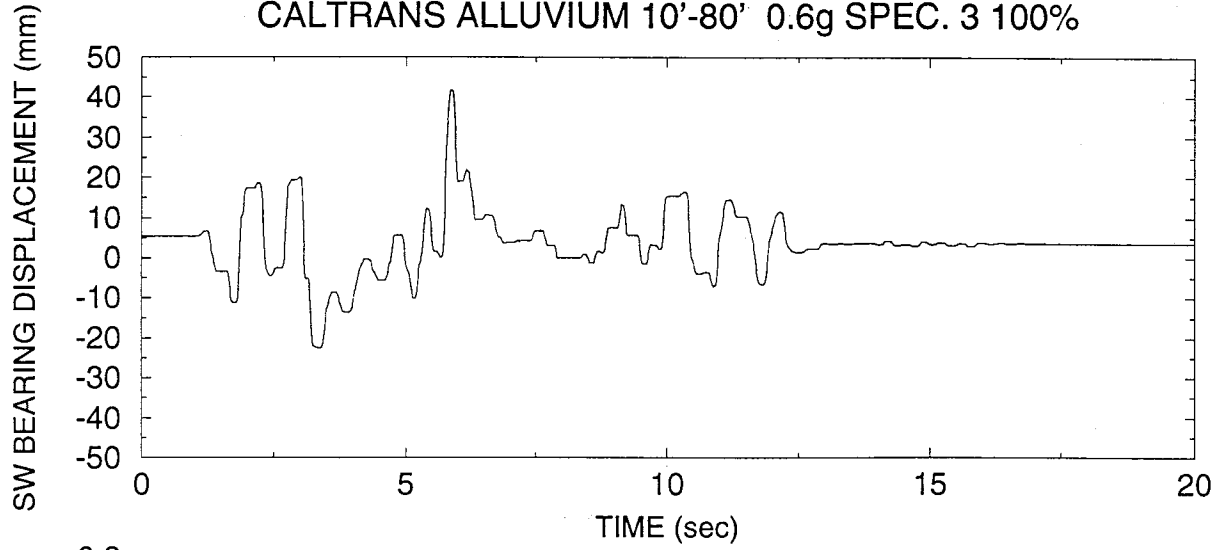
SYSTEM T2-No.3, TEST No. RHHRUN50  
HACHINOHE N-S 300%



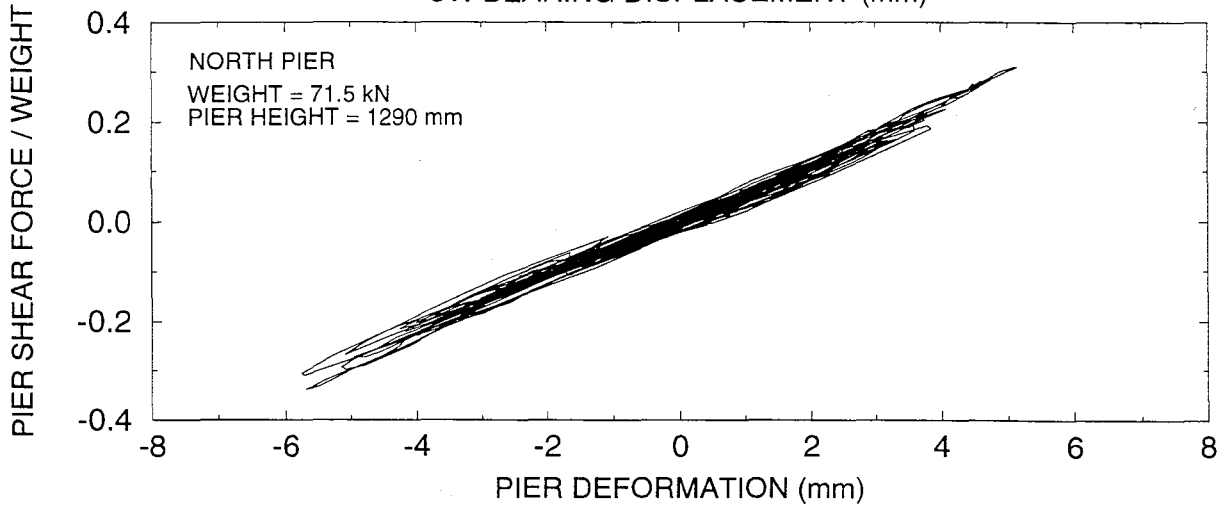
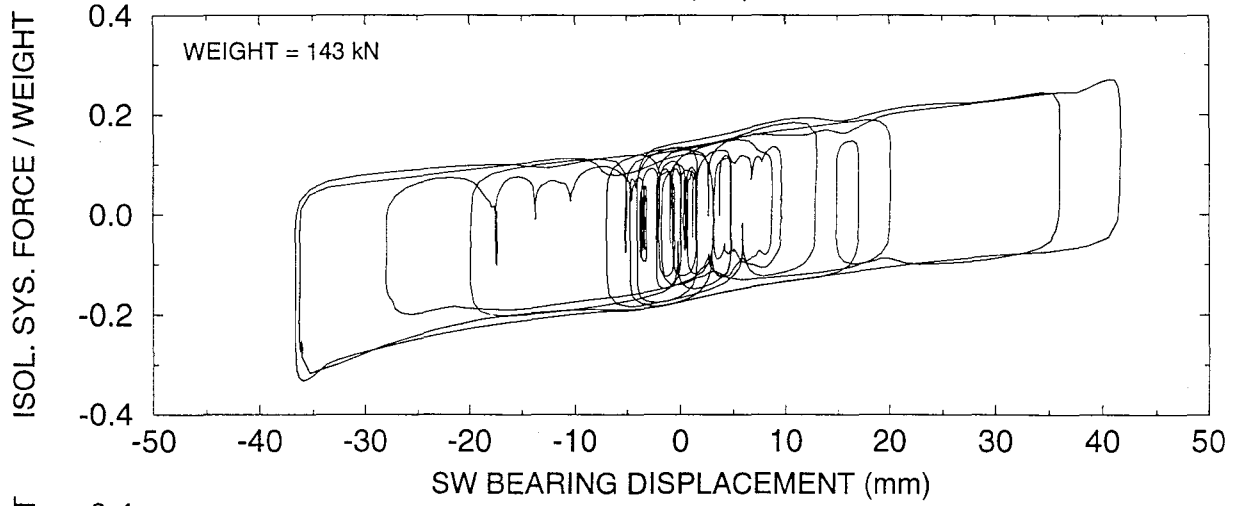
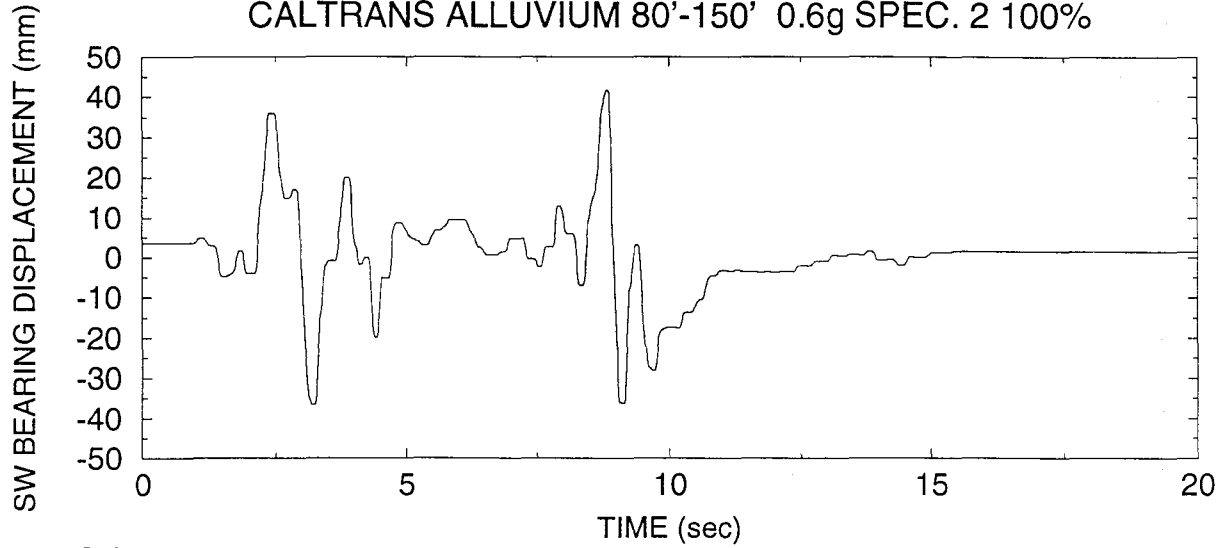
SYSTEM T2-No.3, TEST No. RHHRUN51  
CALTRANS ROCK 0.6g SPEC. 3 100%



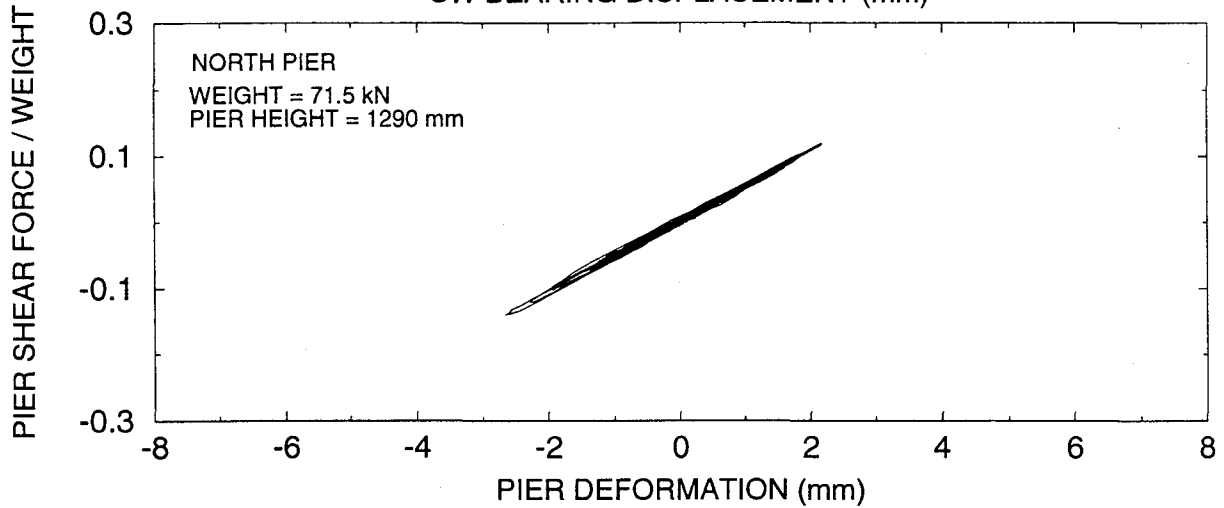
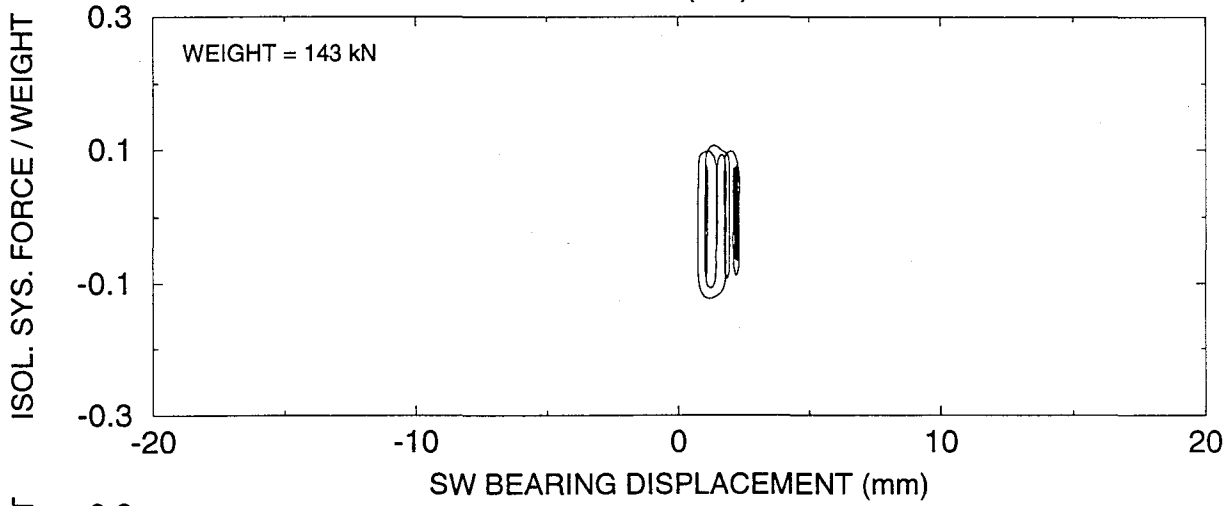
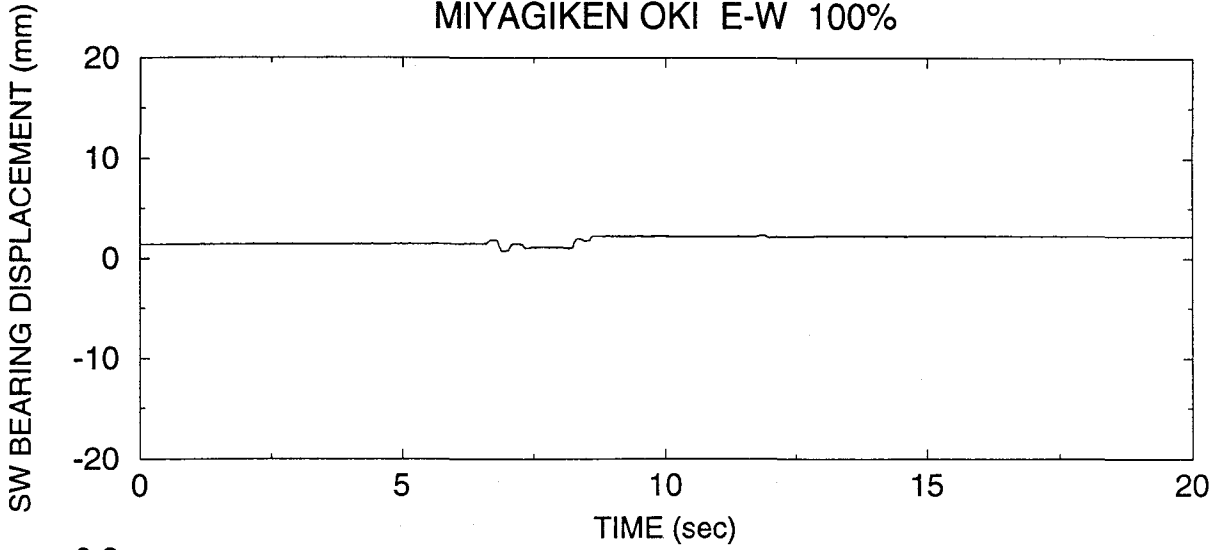
SYSTEM T2-No.3, TEST No. RHHRUN52  
CALTRANS ALLUVIUM 10'-80' 0.6g SPEC. 3 100%



SYSTEM T2-No.3, TEST No. RHHRUN53  
CALTRANS ALLUVIUM 80'-150' 0.6g SPEC. 2 100%

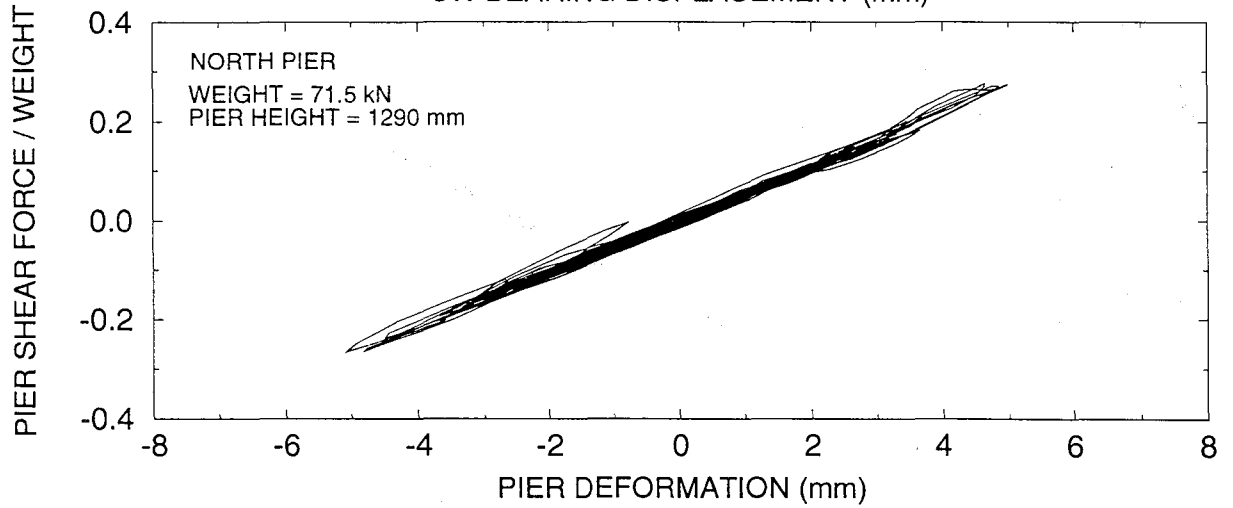
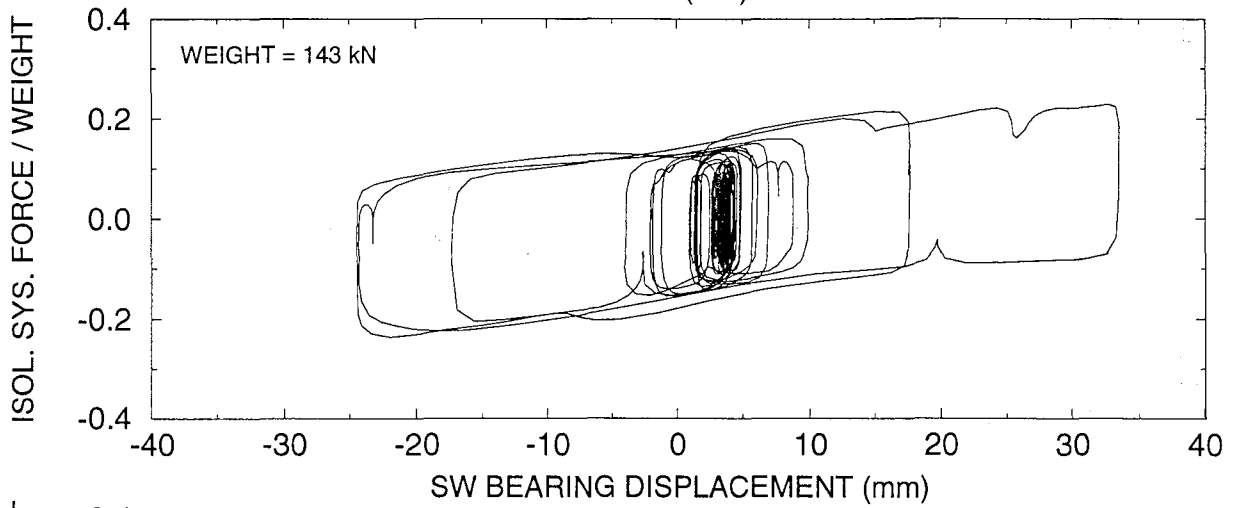
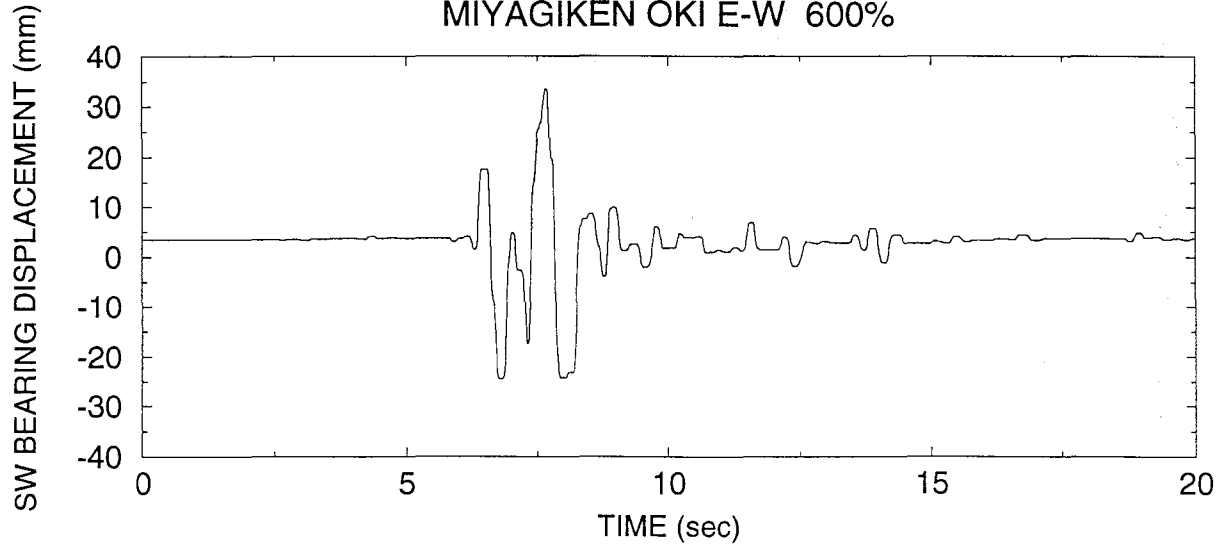


SYSTEM T2-No.3, TEST No. RHHRUN54  
MIYAGIKEN OKI E-W 100%

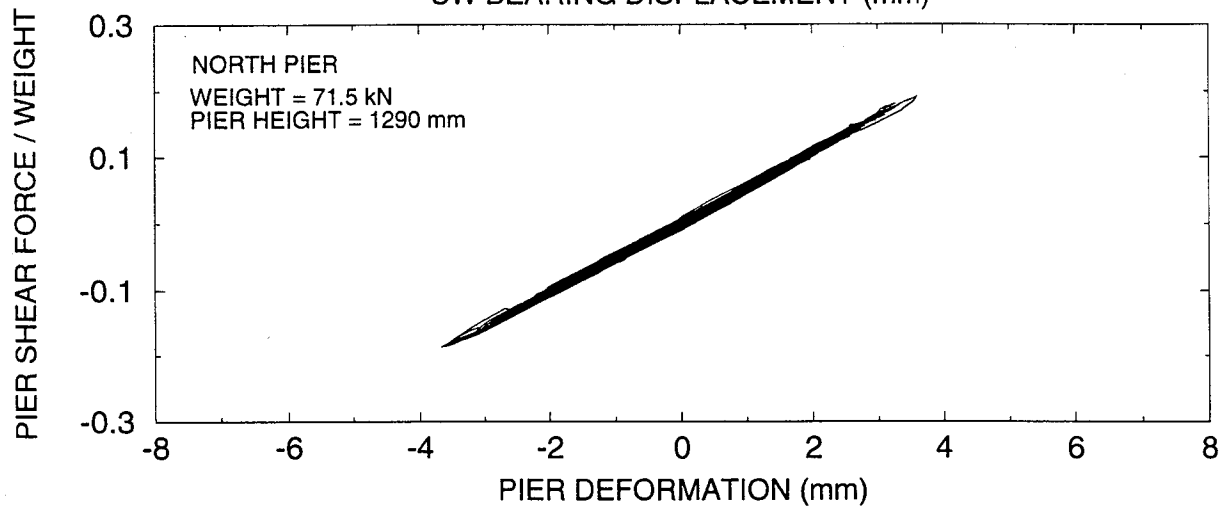
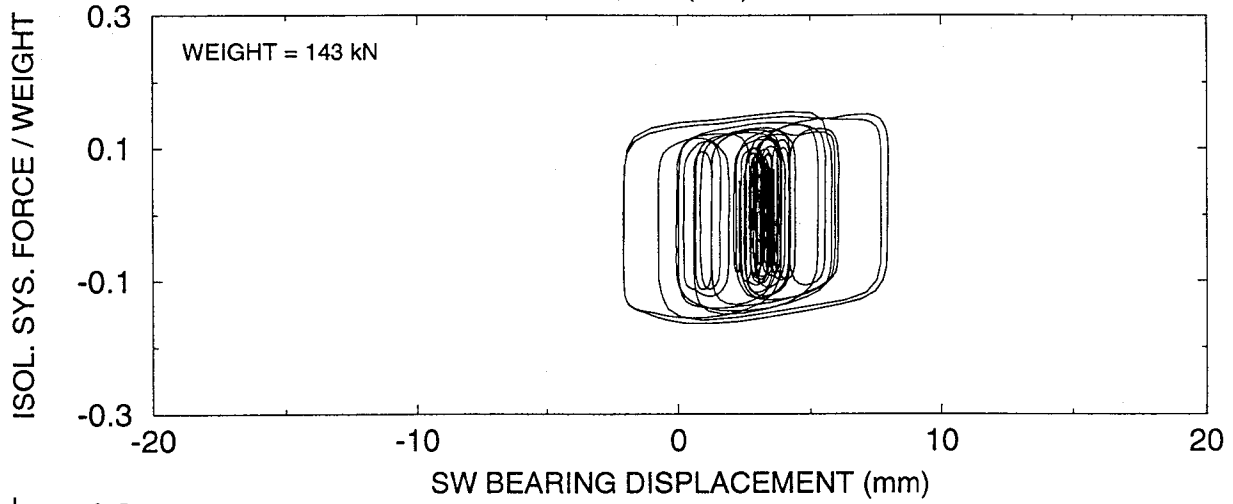
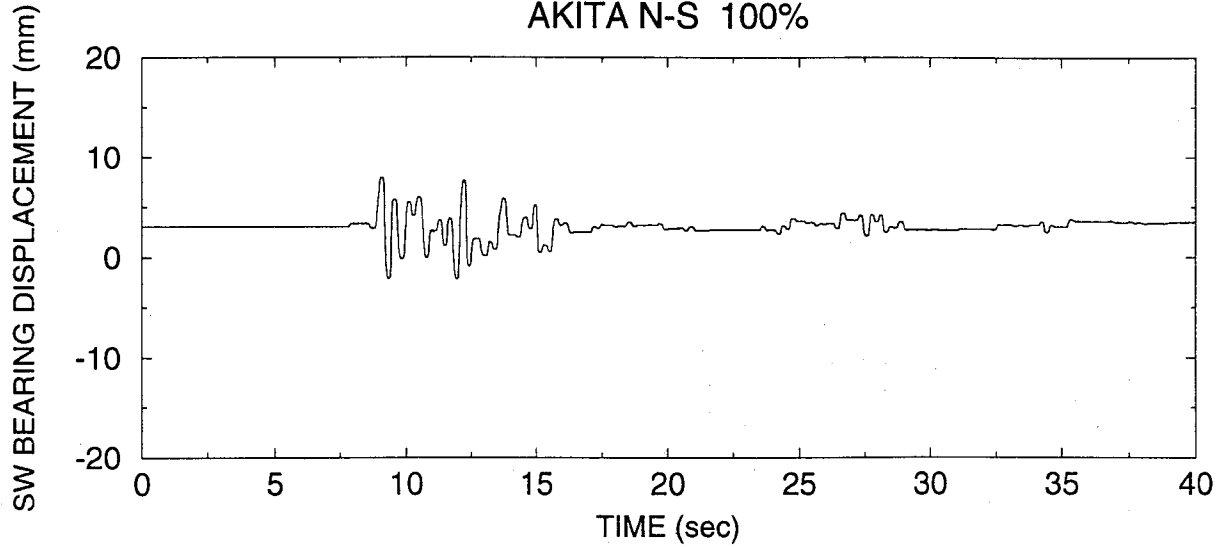




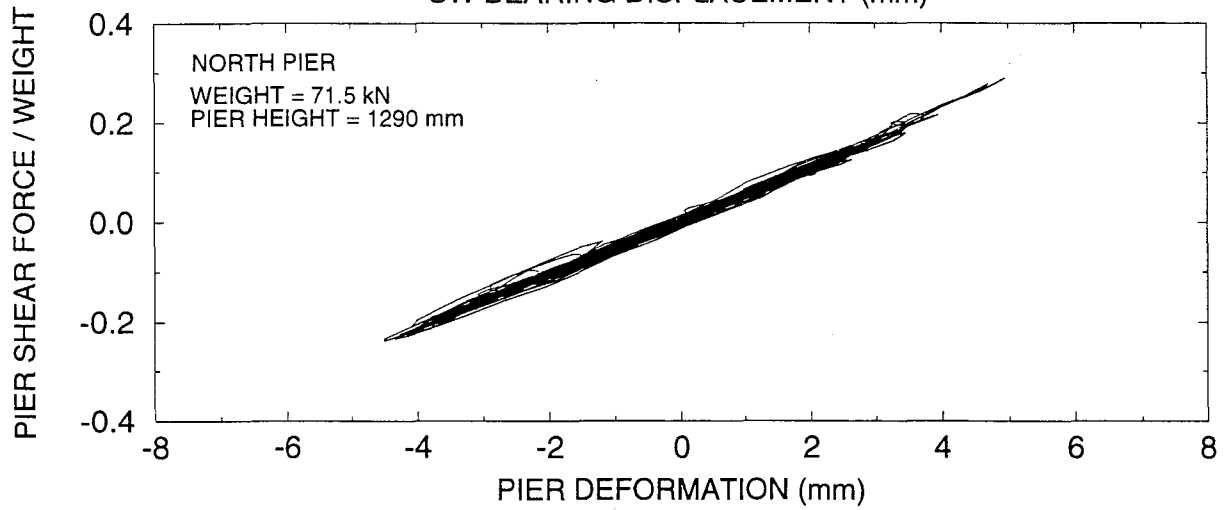
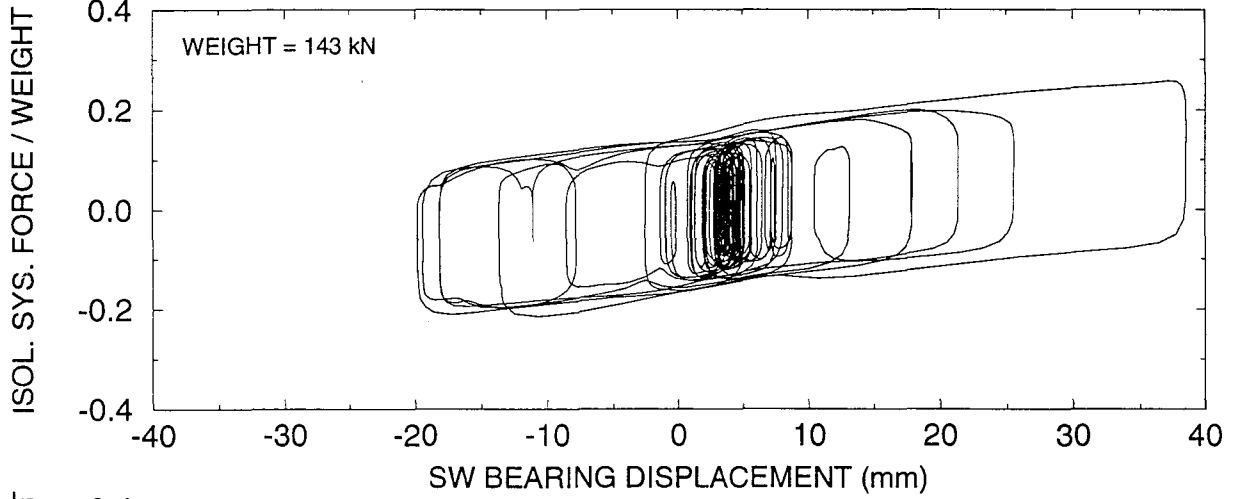
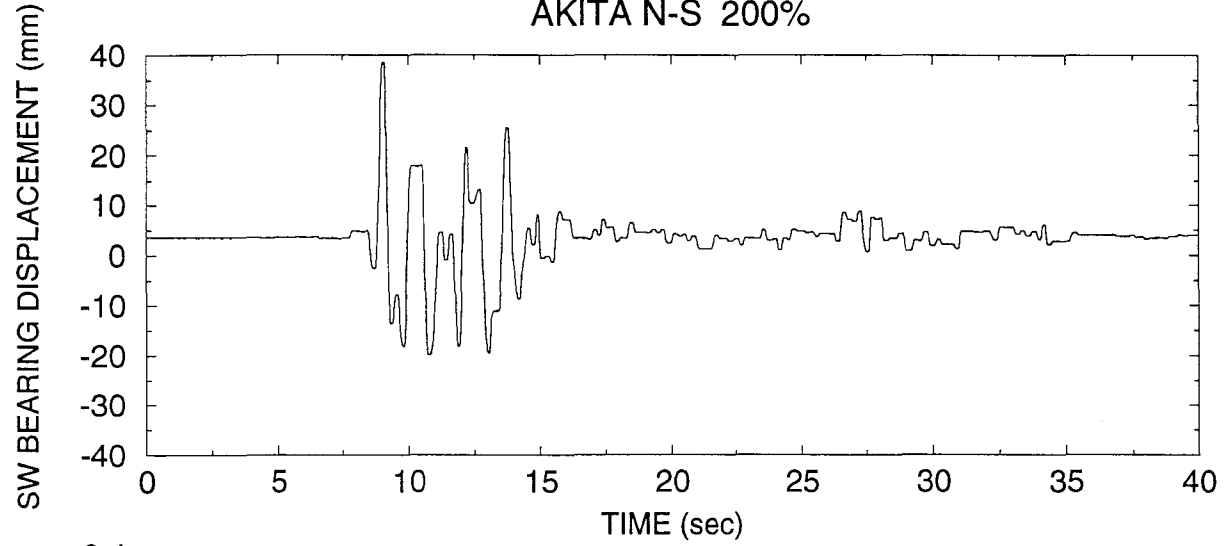
SYSTEM T2-No.3, TEST No. RHHRUN56  
MIYAGIKEN OKI E-W 600%



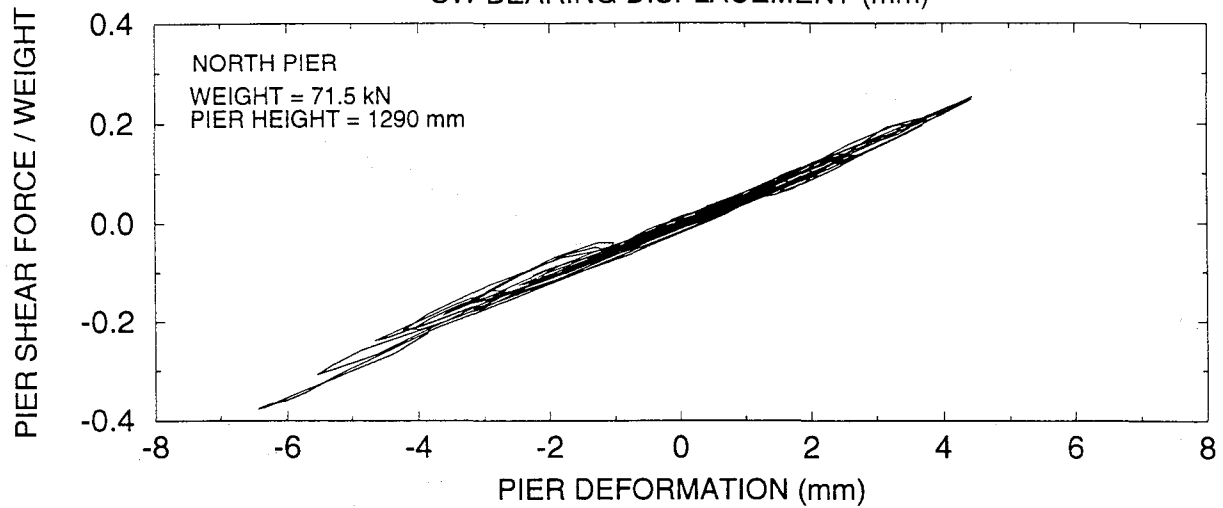
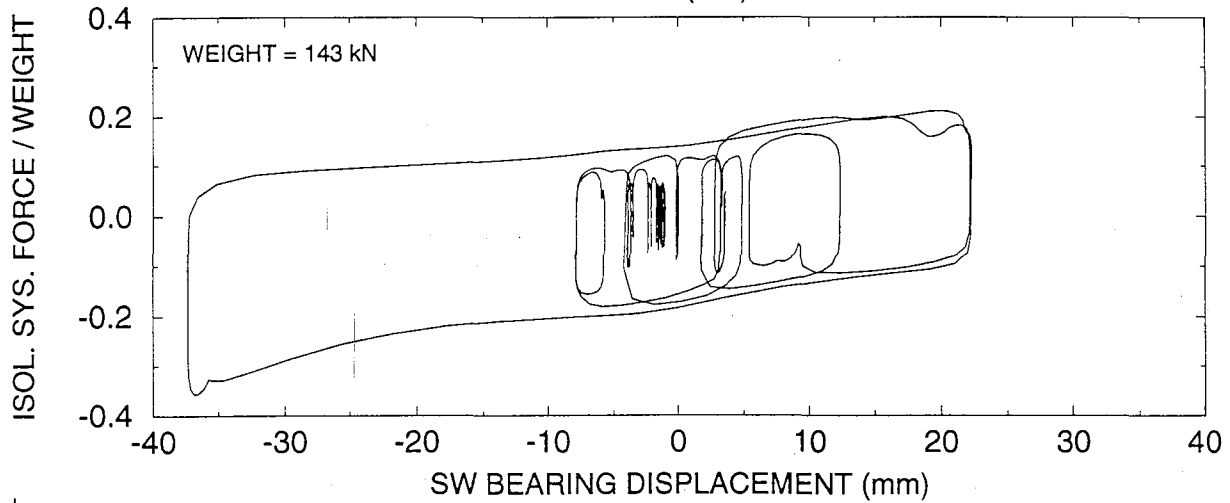
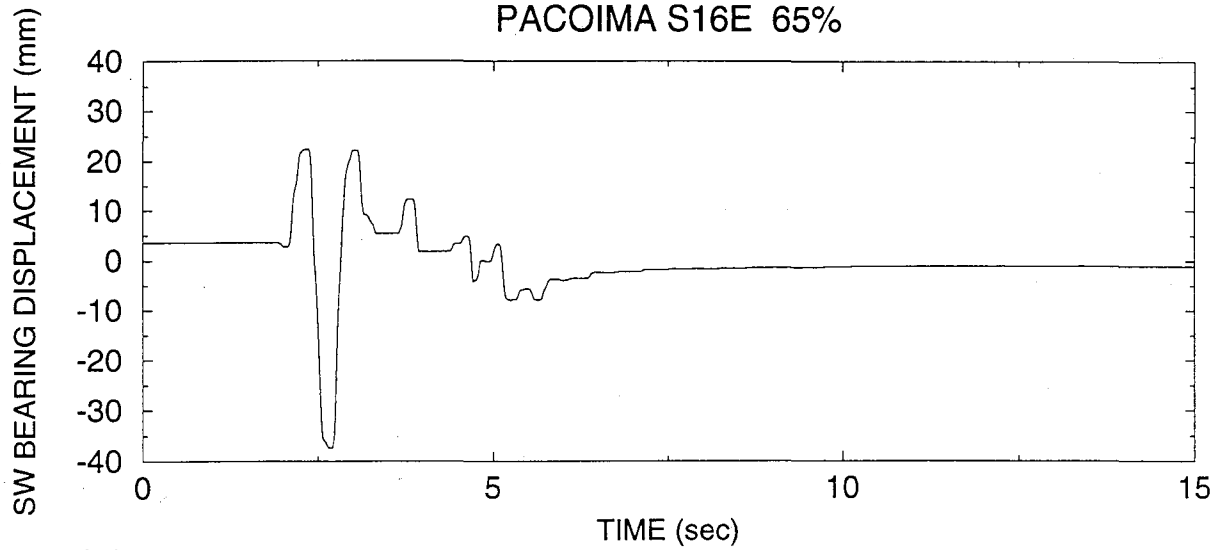
SYSTEM T2-No.3, TEST No. RHHRUN57  
AKITA N-S 100%



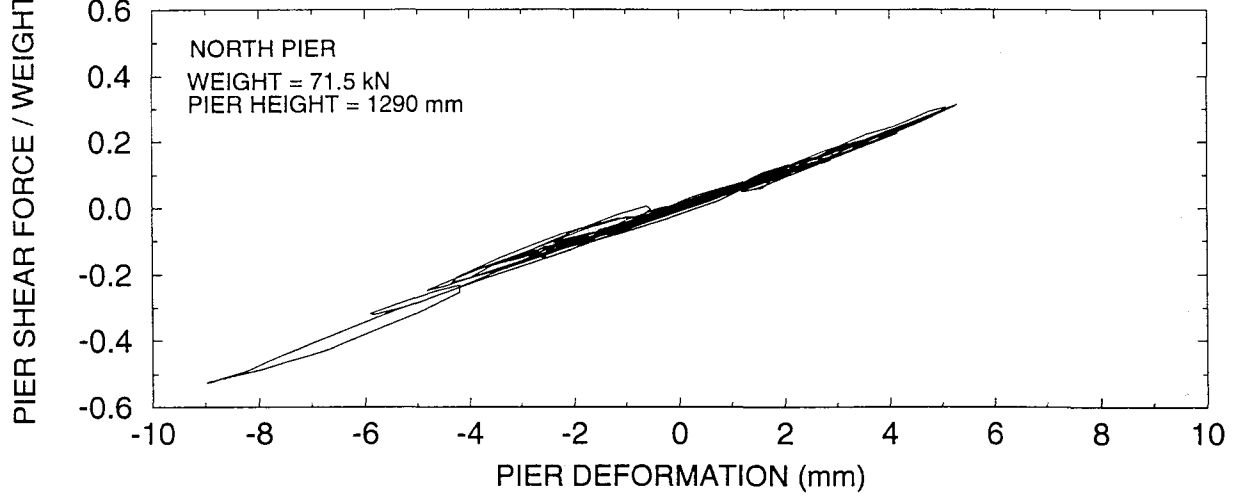
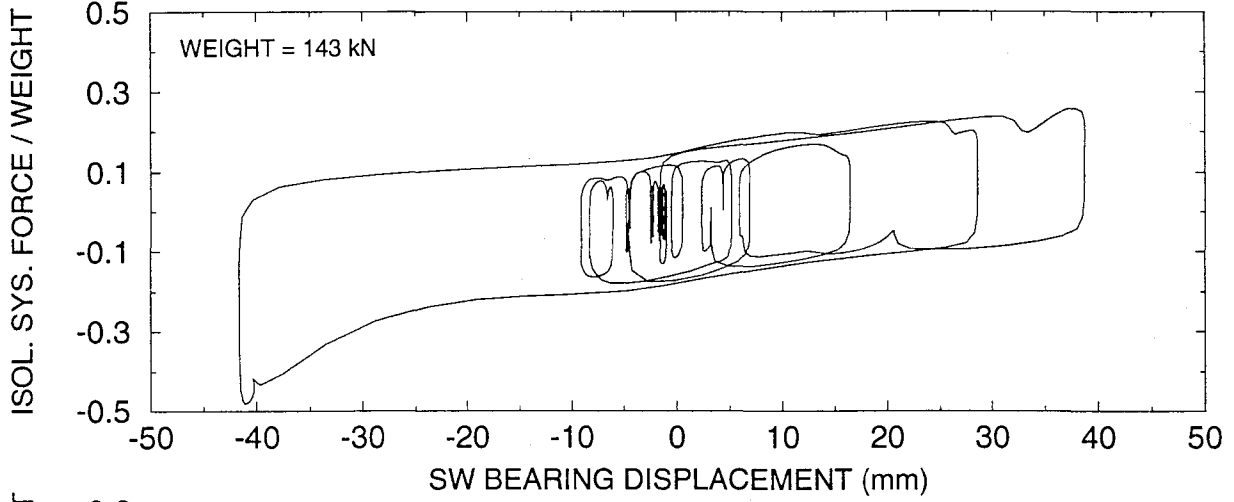
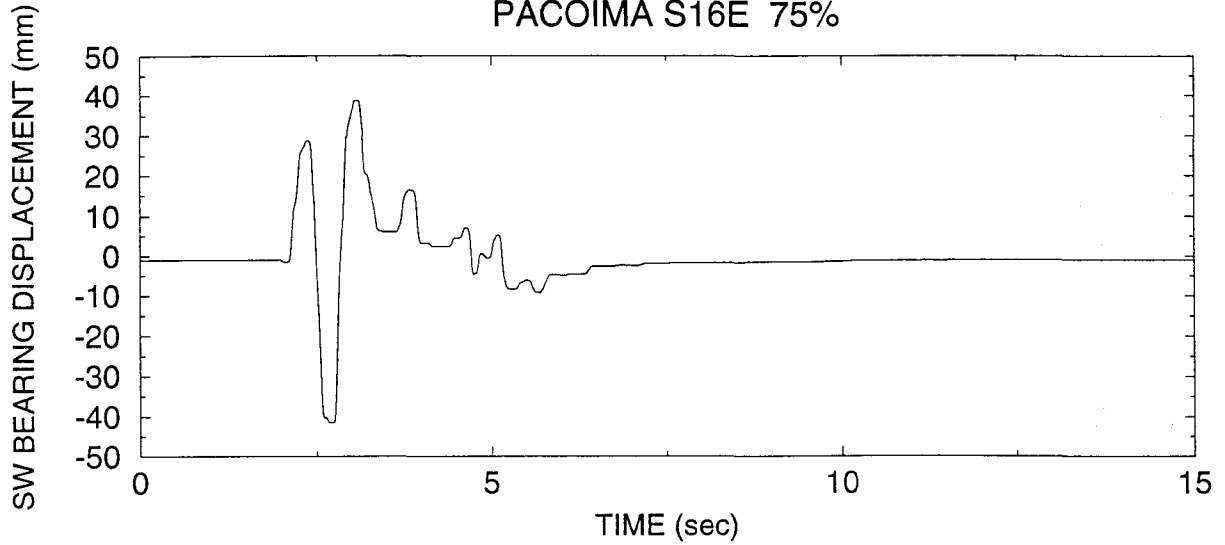
SYSTEM T2-No.3, TEST No. RHHRUN58  
AKITA N-S 200%



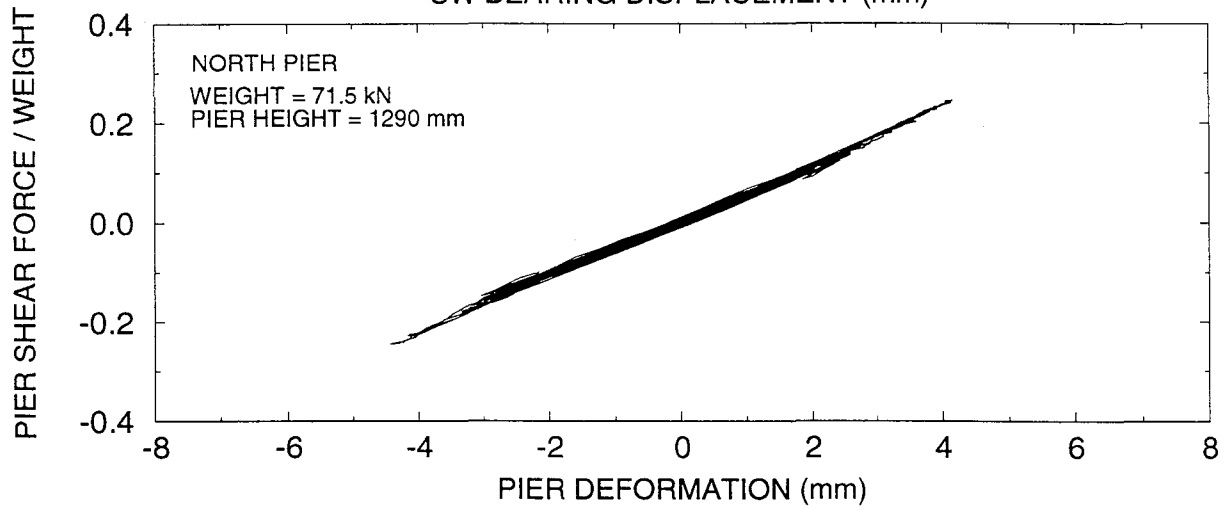
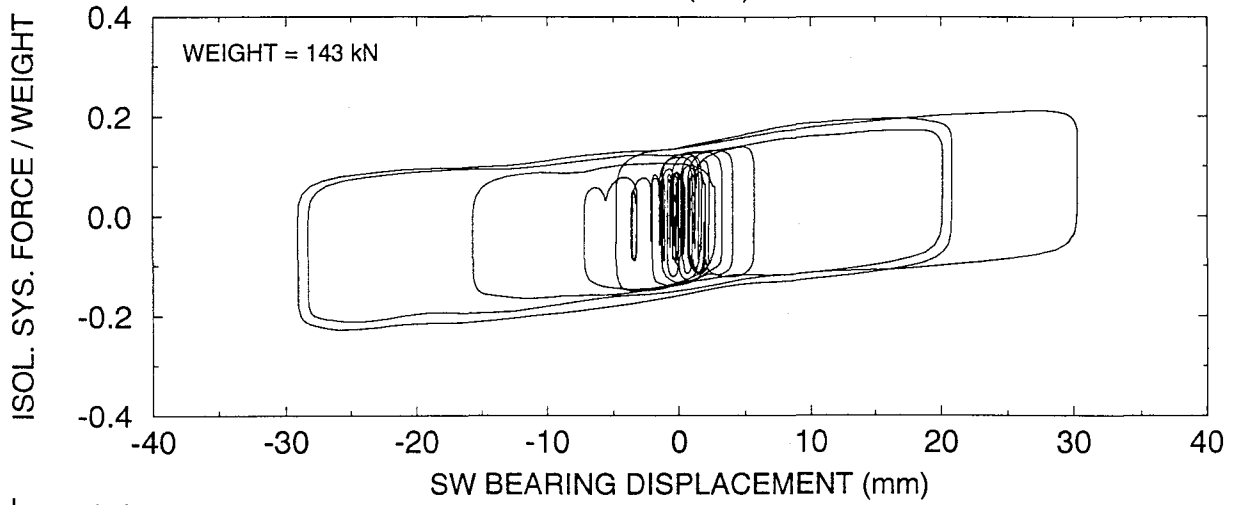
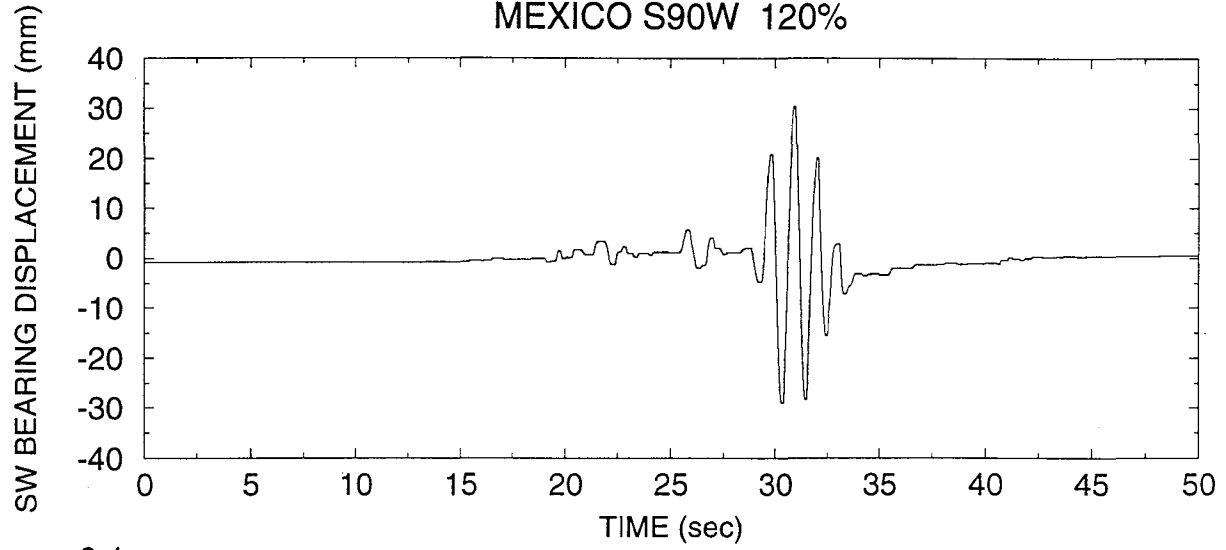
SYSTEM T2-No.3, TEST No. RHHRUN60  
PACOIMA S16E 65%



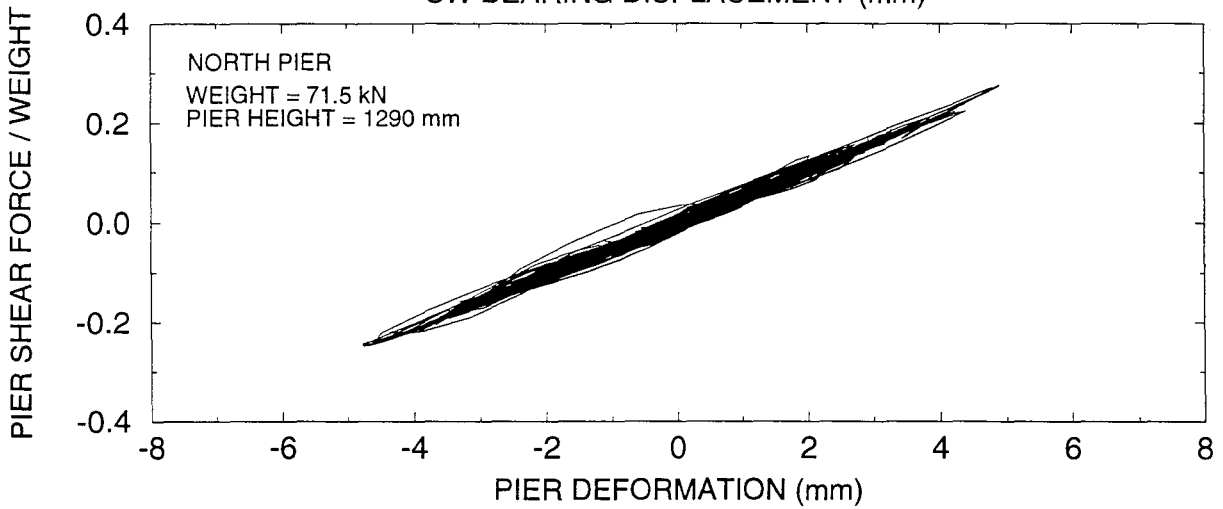
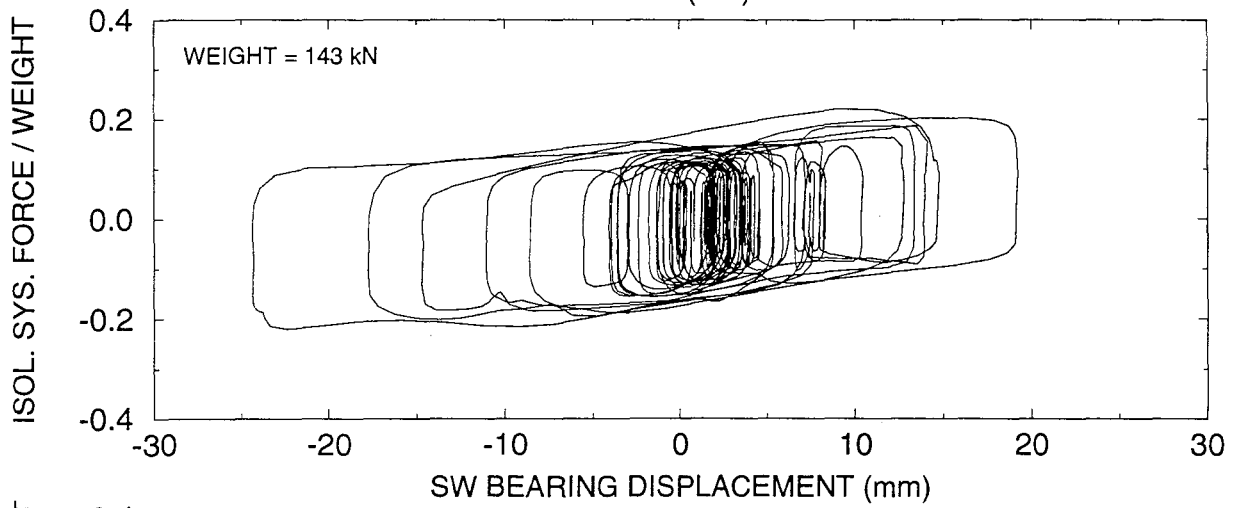
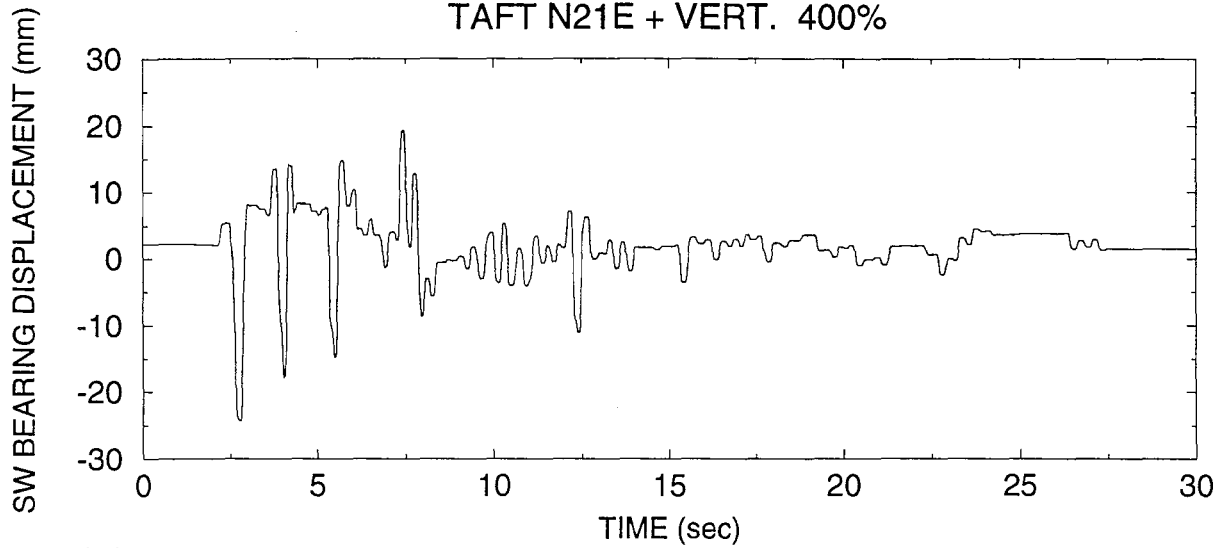
SYSTEM T2-No.3, TEST No. RHHRUN61  
PACOIMA S16E 75%



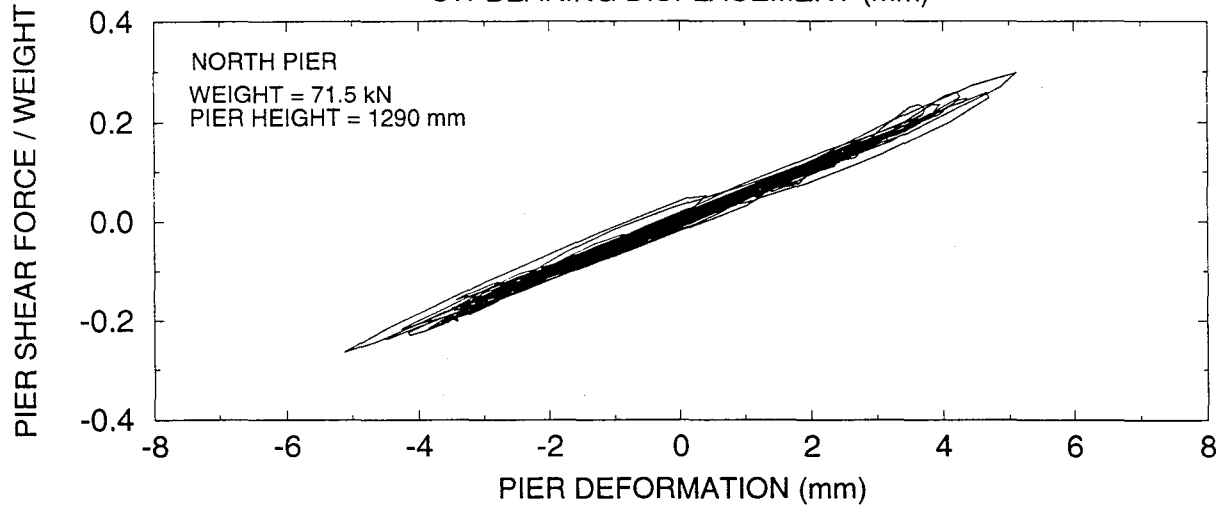
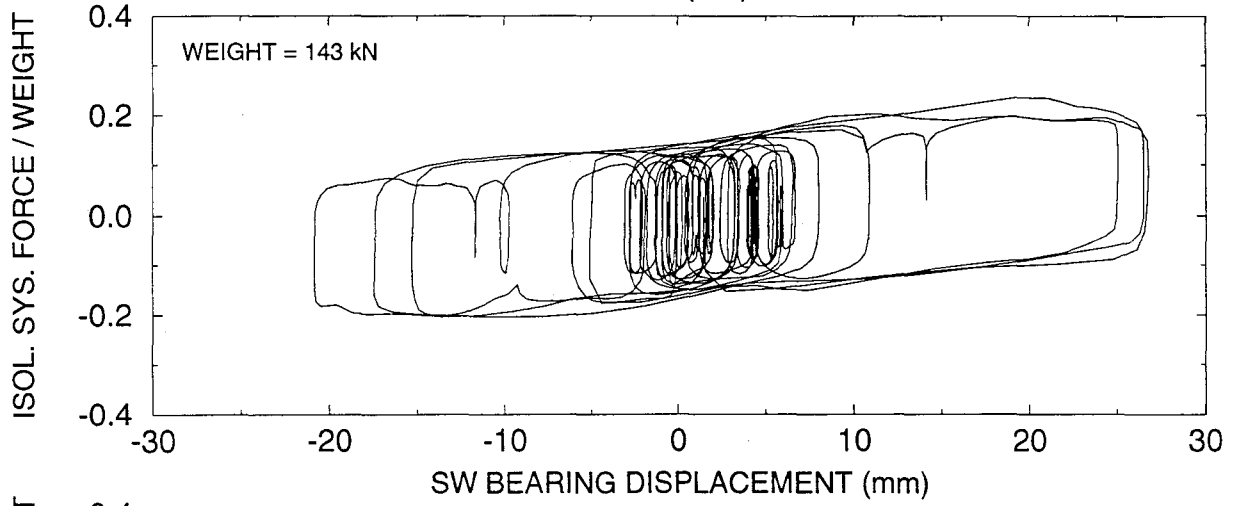
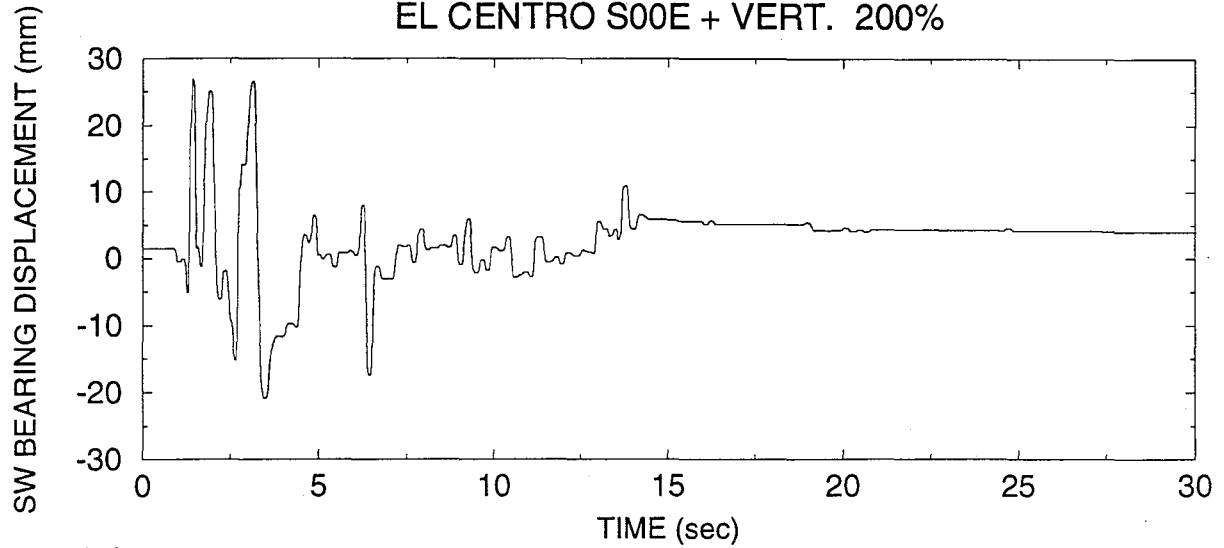
SYSTEM T2-No.3, TEST No. RHHRUN63  
MEXICO S90W 120%



SYSTEM T2-No.3, TEST No. RHHRUN64  
TAFT N21E + VERT. 400%

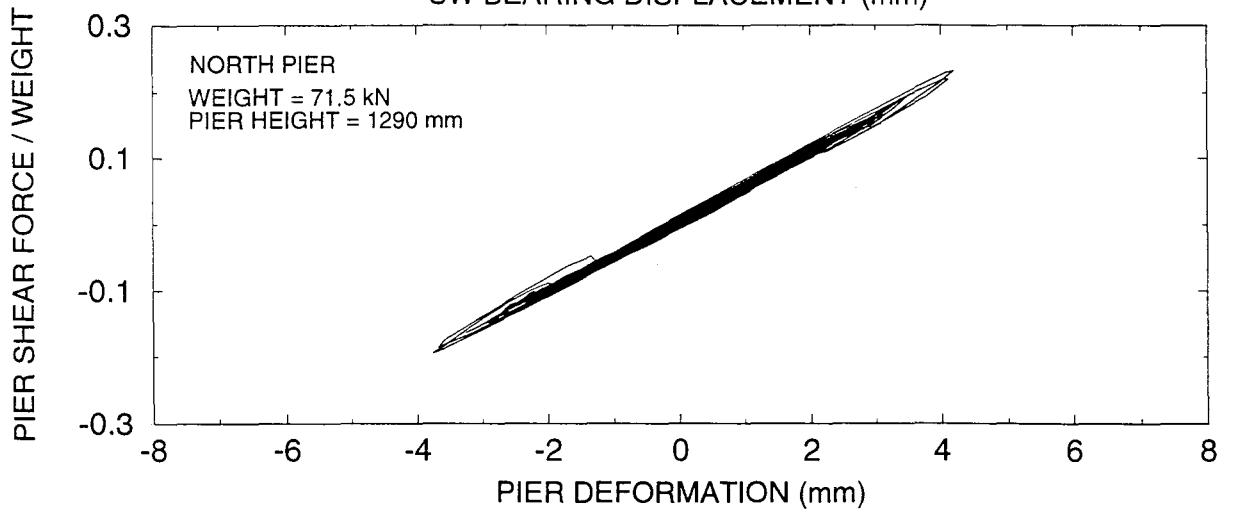
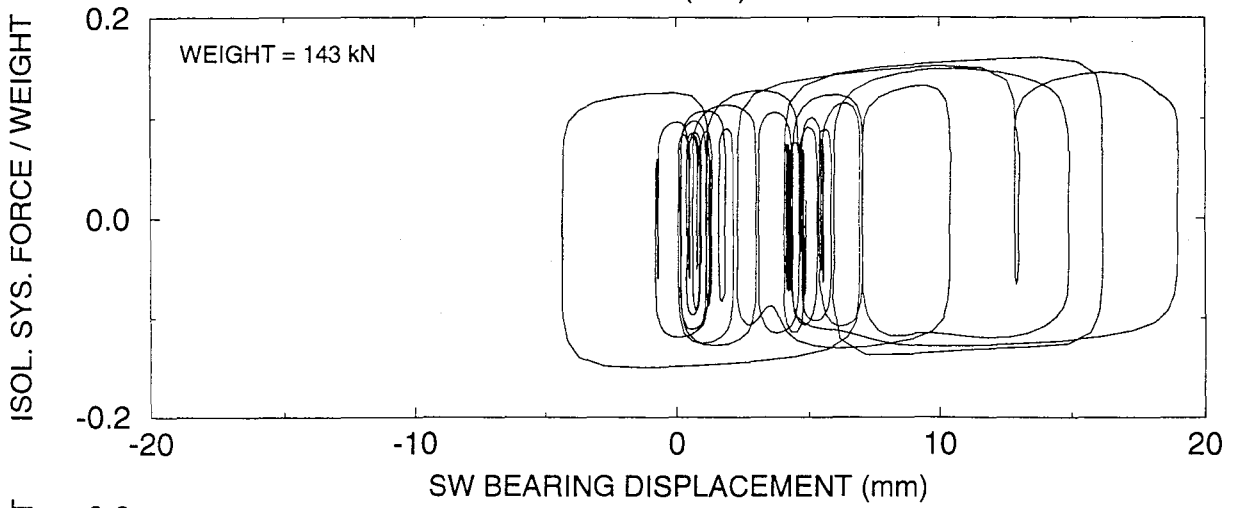
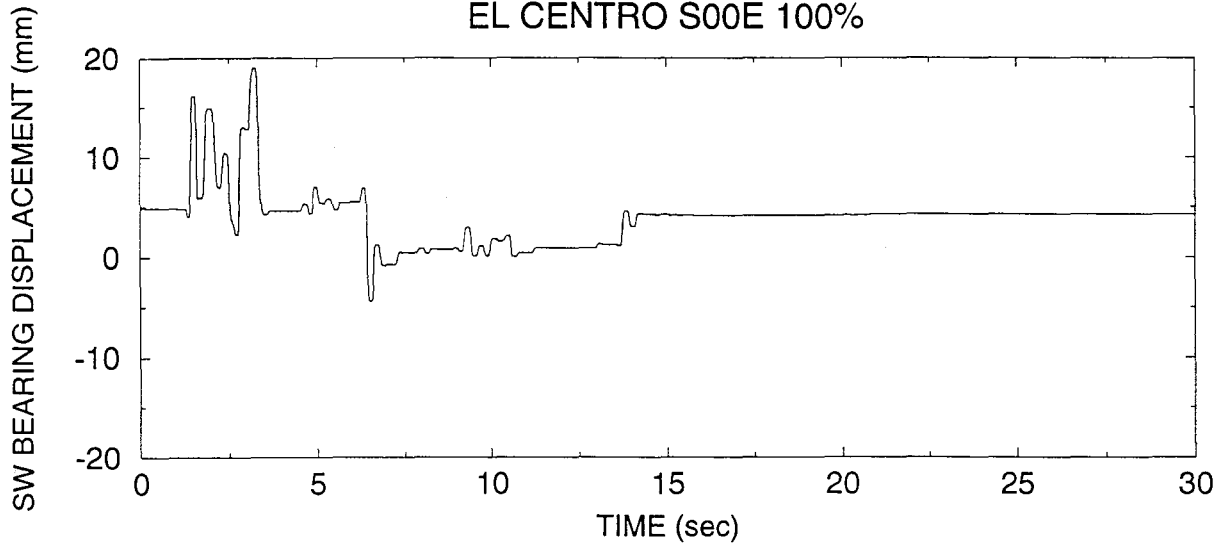


SYSTEM T2-No.3, TEST No. RHHRUN65  
EL CENTRO S00E + VERT. 200%

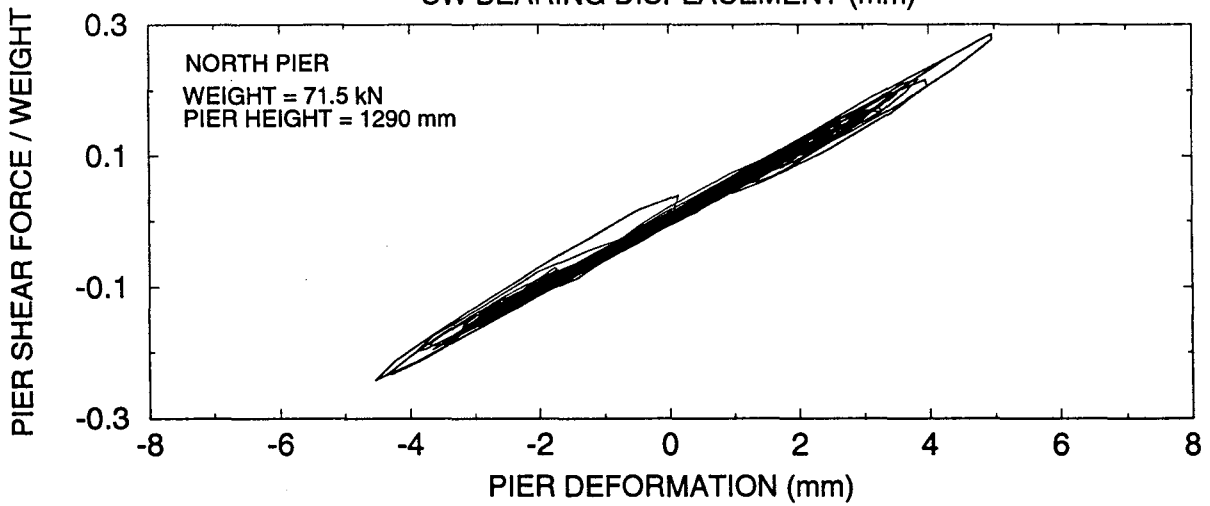
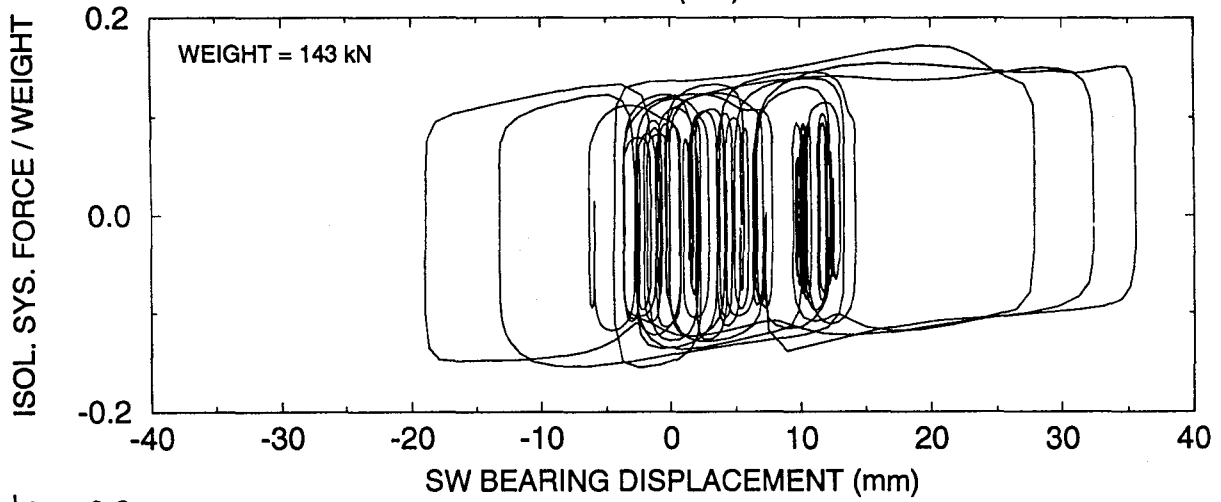
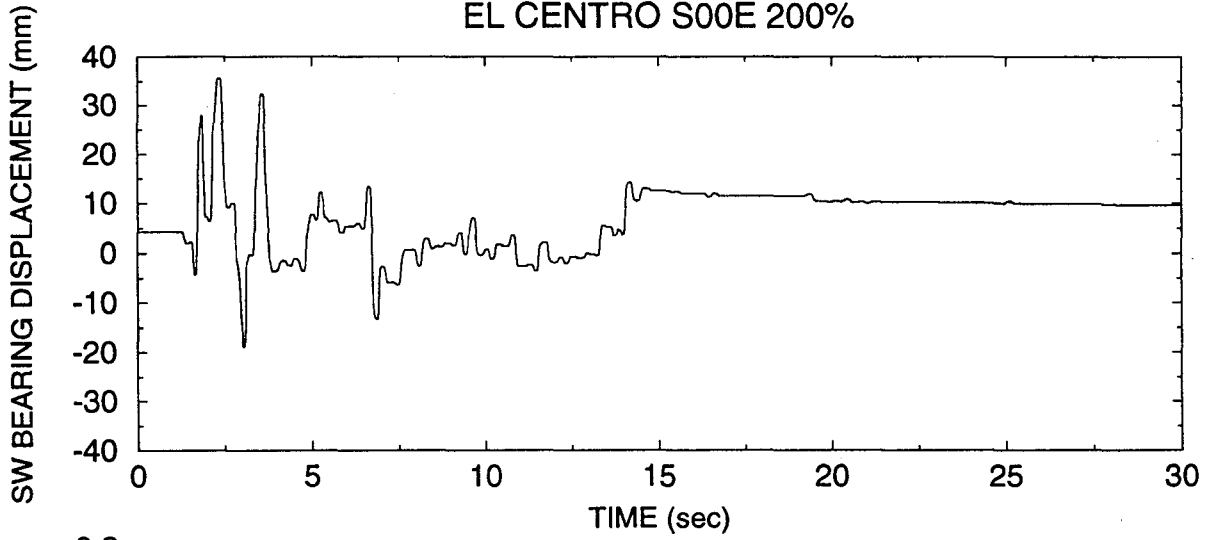




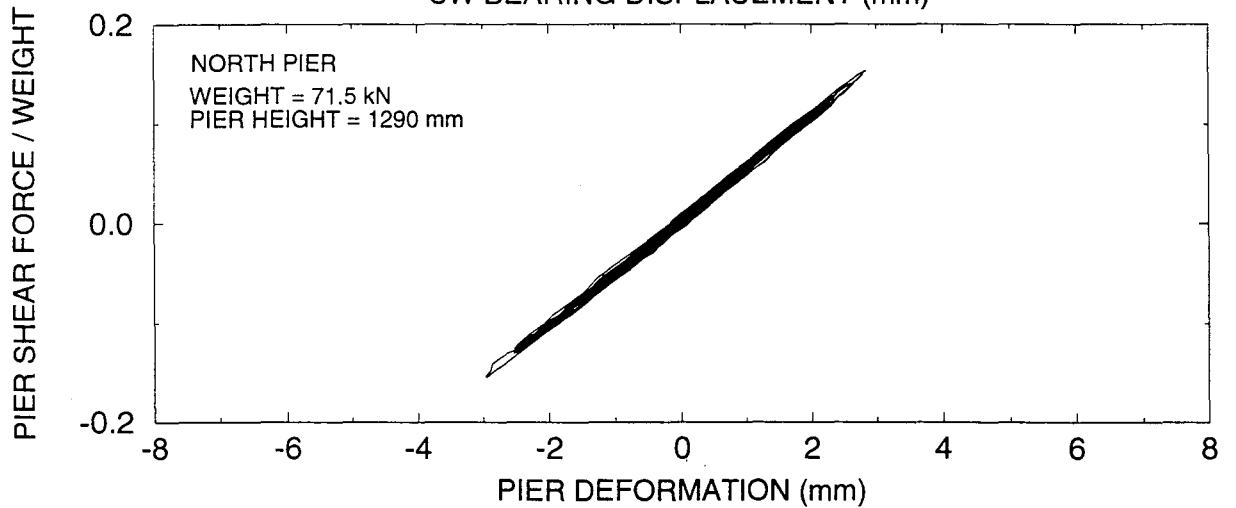
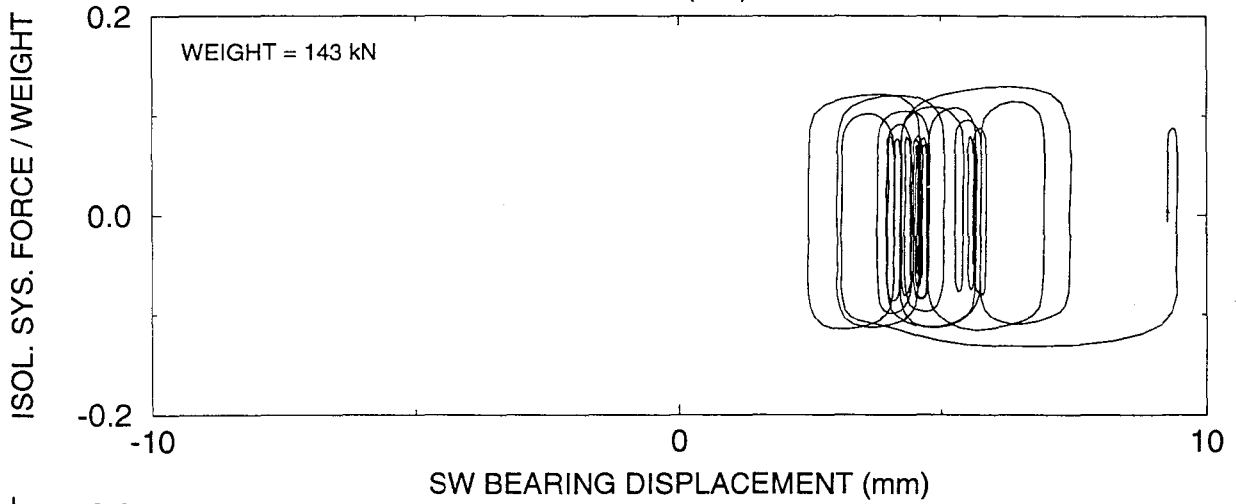
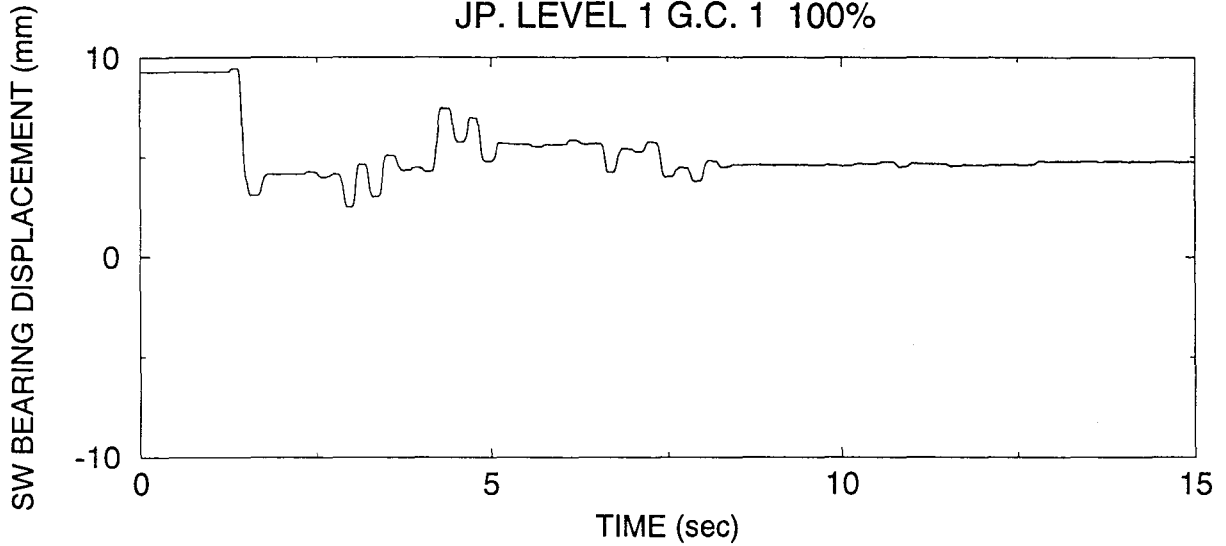
SYSTEM T2-No.1, TEST No. RSSRUN28  
EL CENTRO S00E 100%



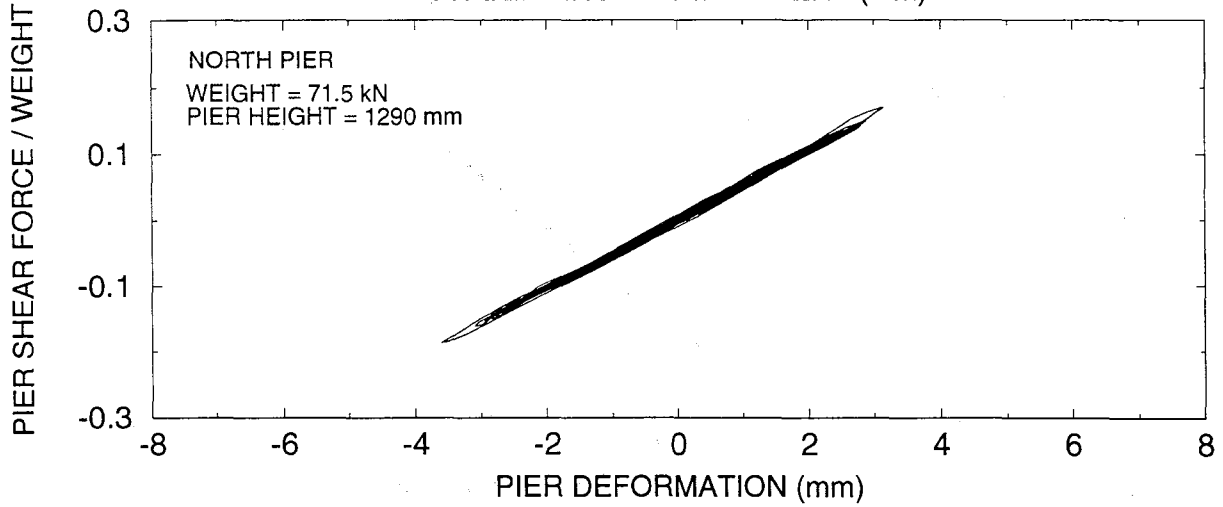
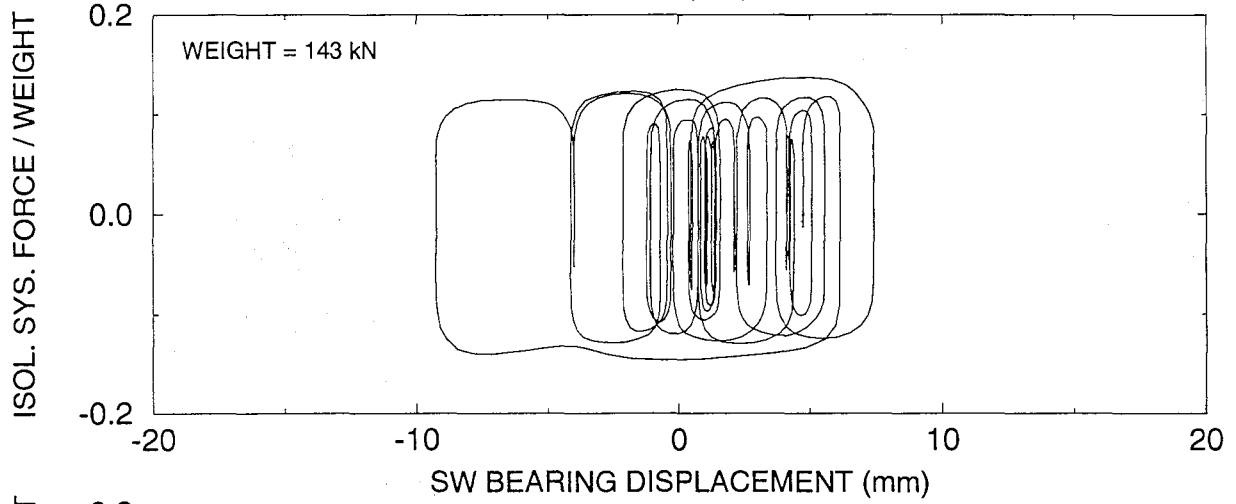
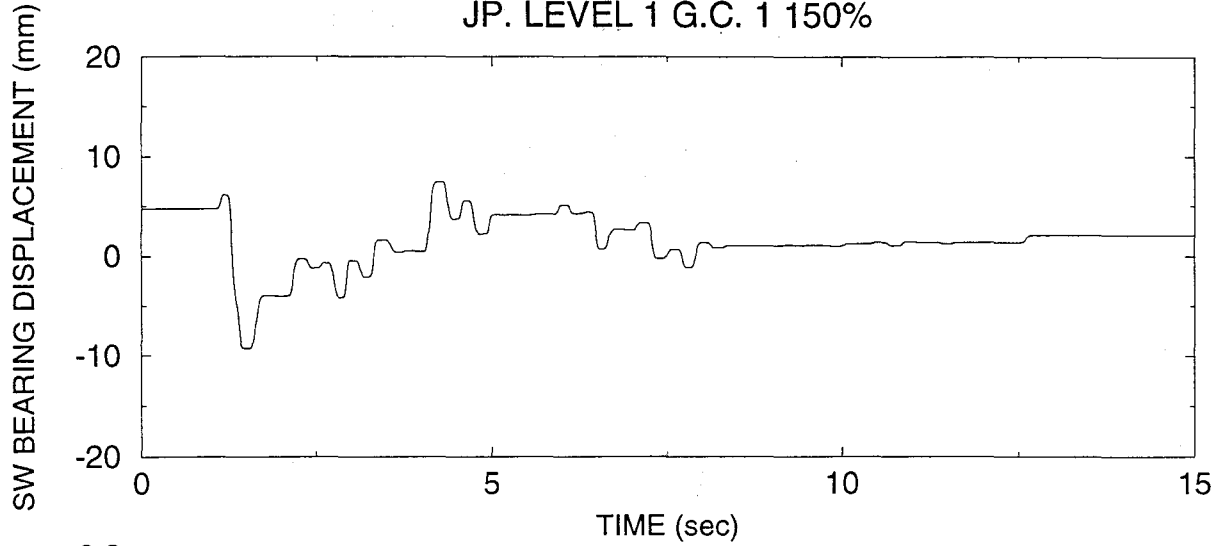
SYSTEM T2-No.1, TEST No. RSSRUN29  
EL CENTRO S00E 200%



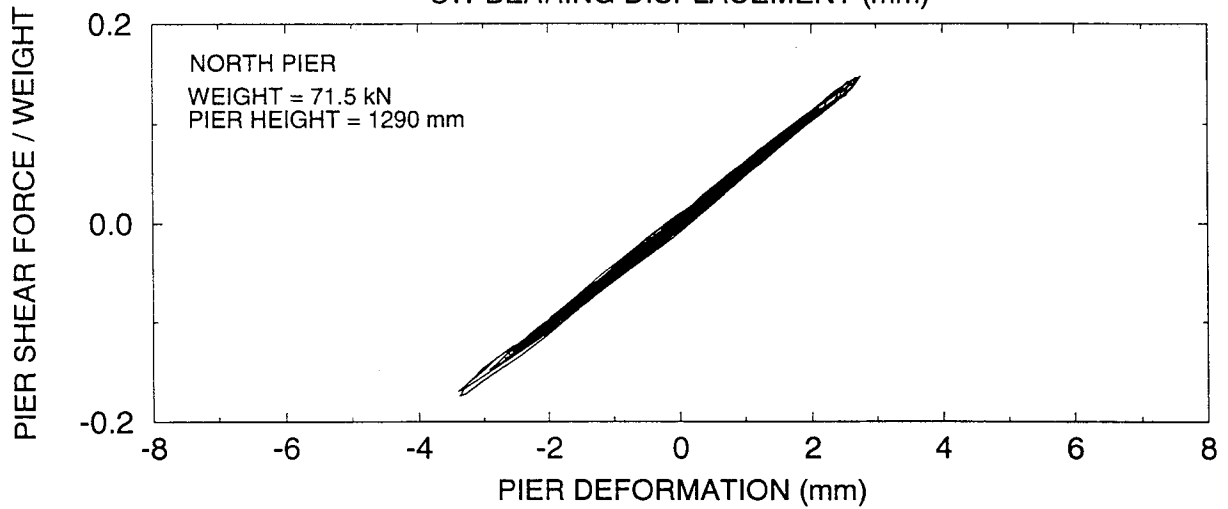
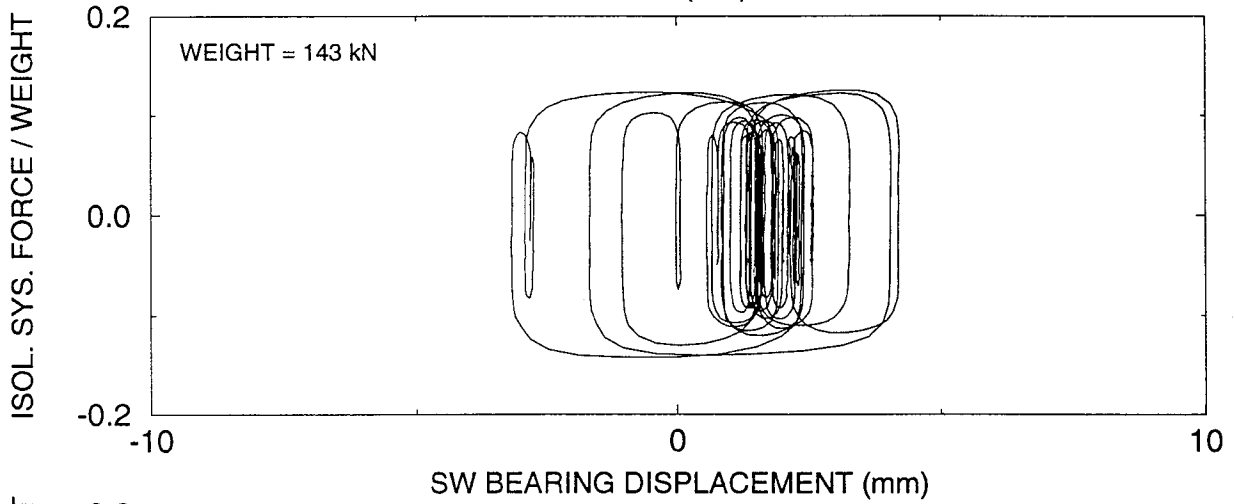
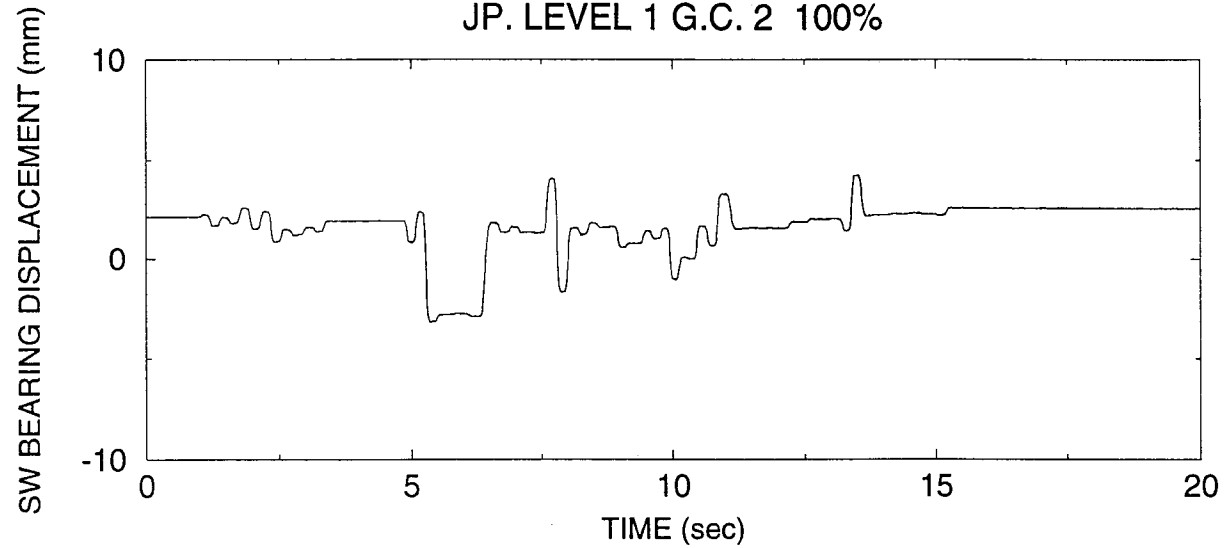
SYSTEM T2-No.1, TEST No. RSSRUN30  
JP. LEVEL 1 G.C. 1 100%



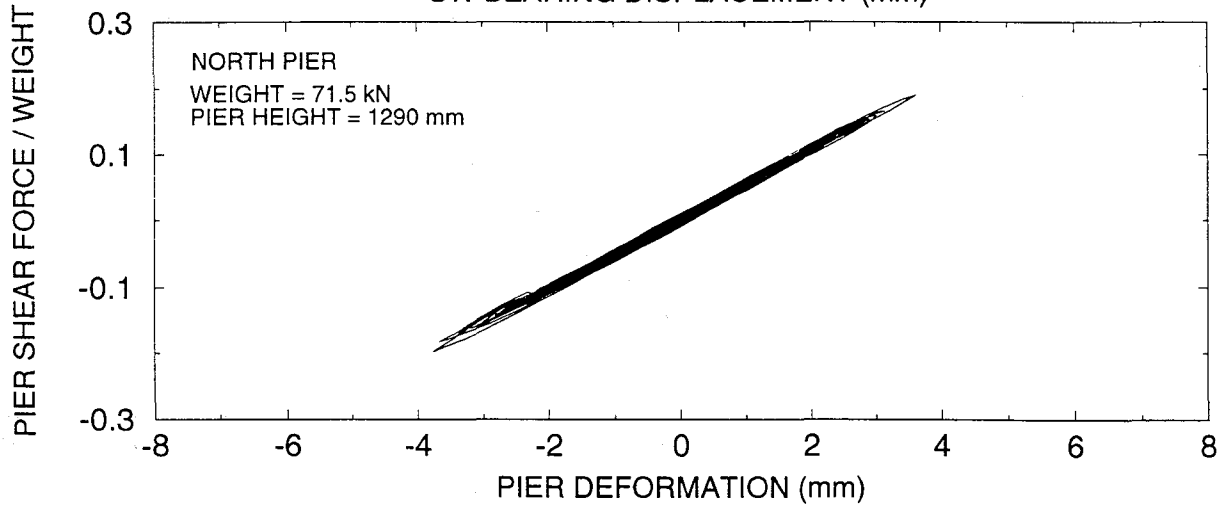
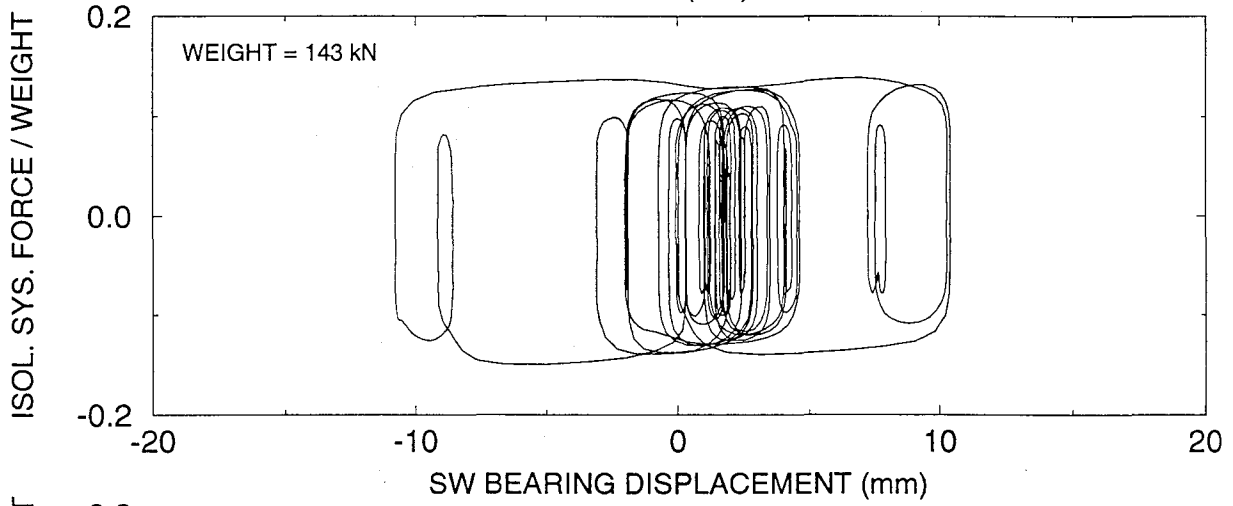
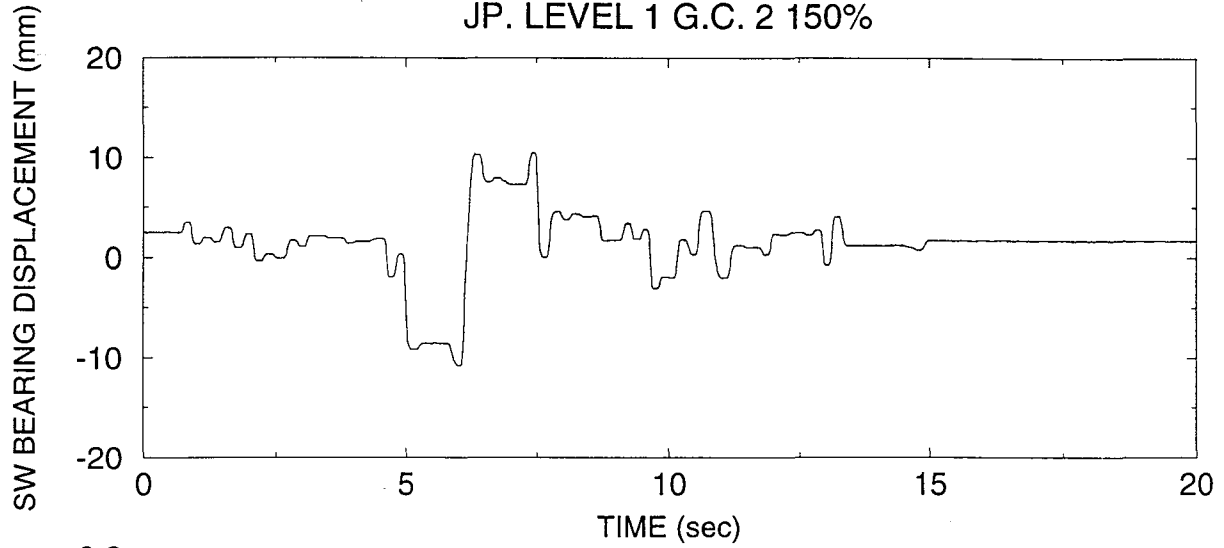
SYSTEM T2-No.1, TEST No. RSSRUN31  
JP. LEVEL 1 G.C. 1 150%



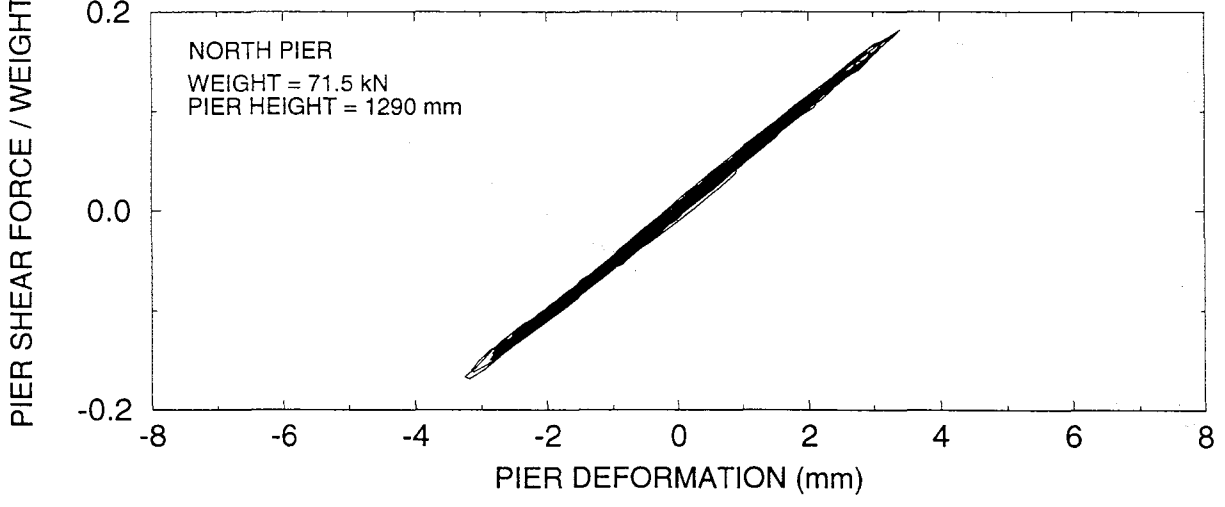
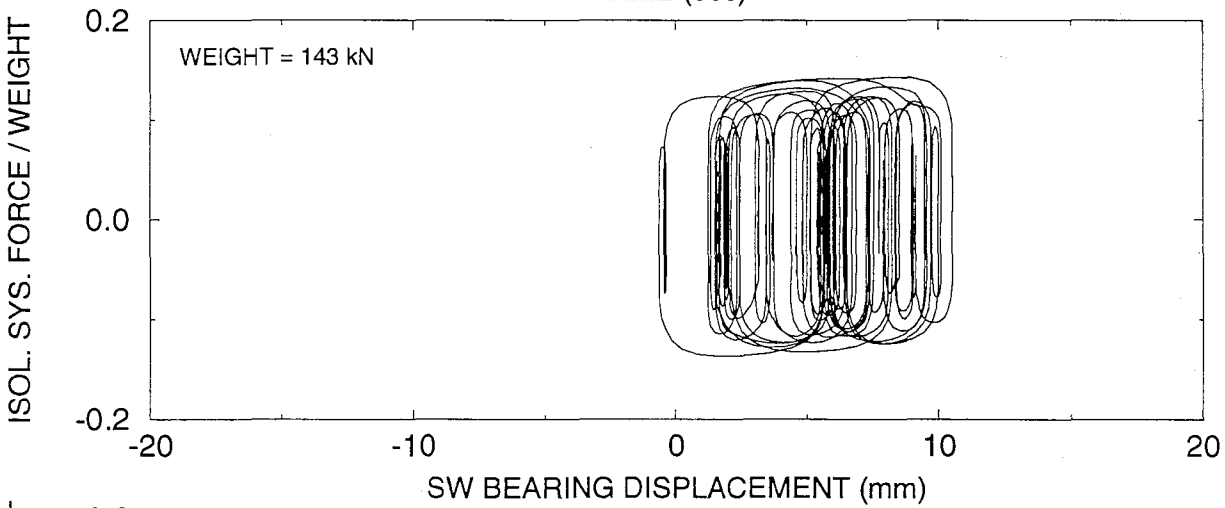
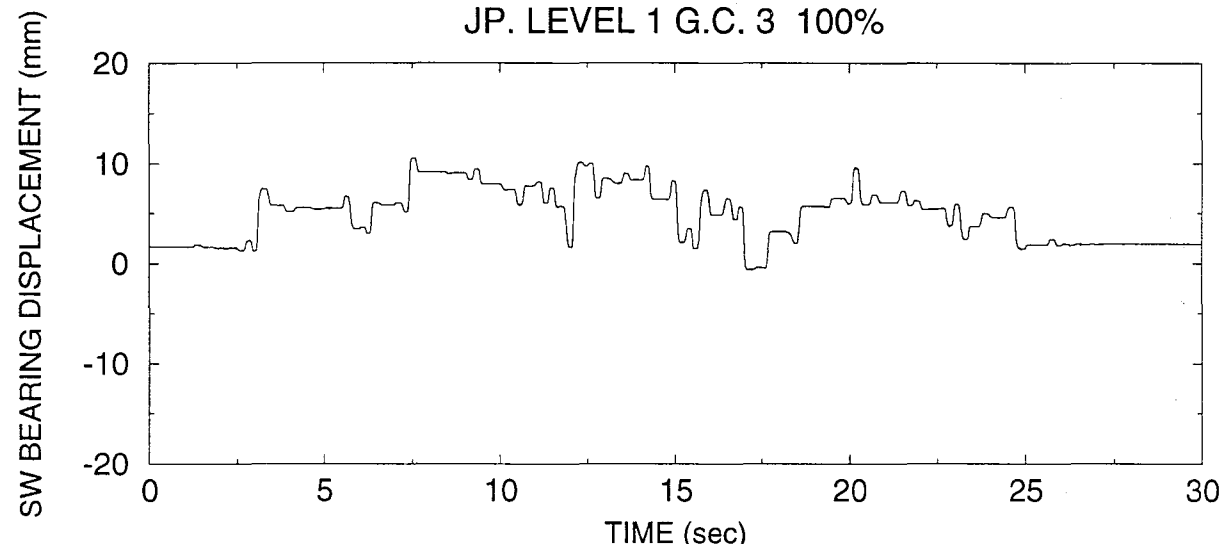
SYSTEM T2-No.1, TEST No. RSSRUN32  
JP. LEVEL 1 G.C. 2 100%



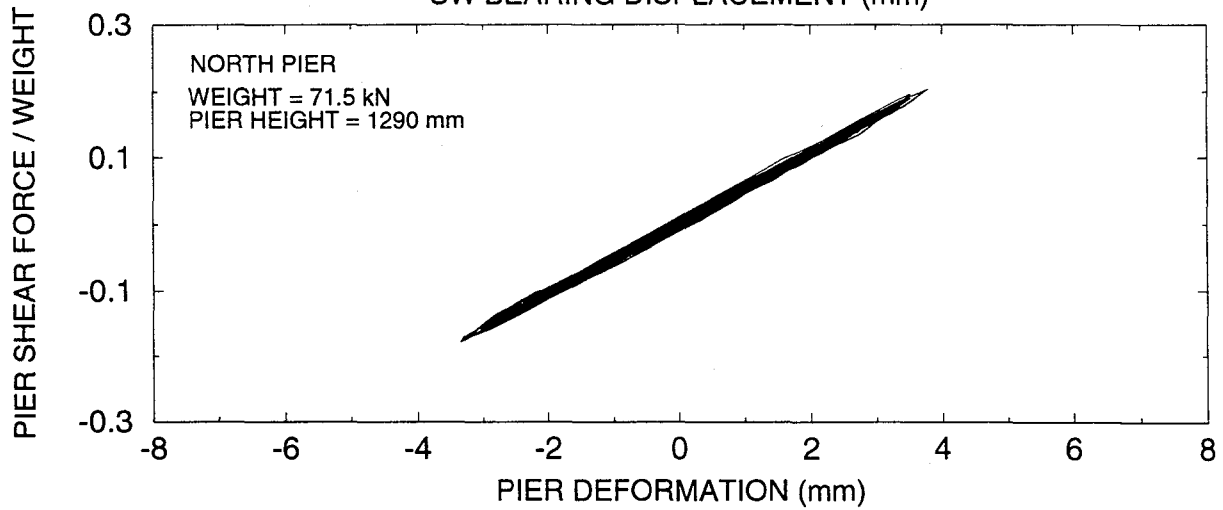
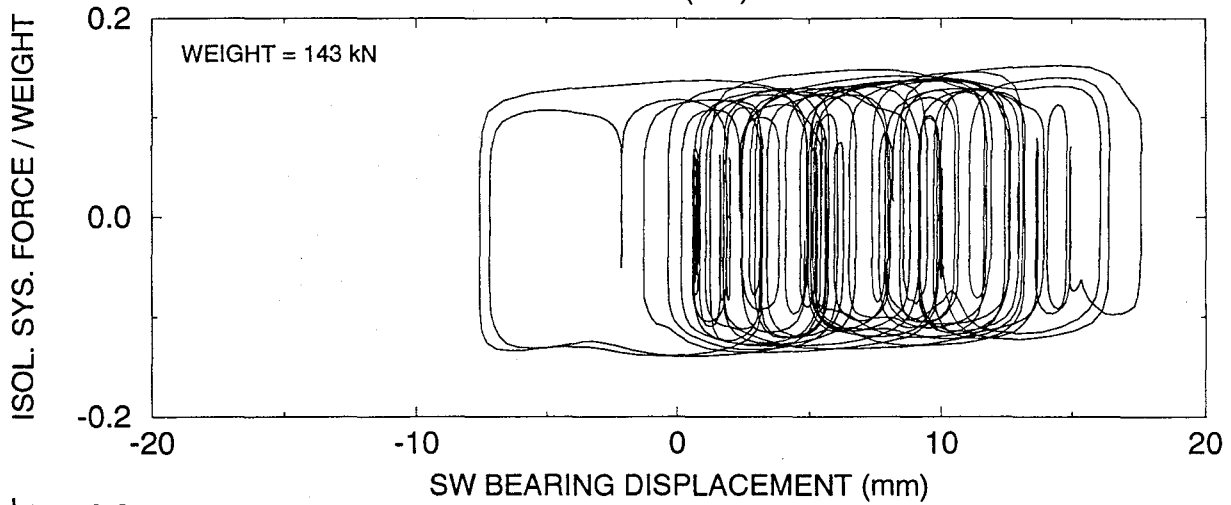
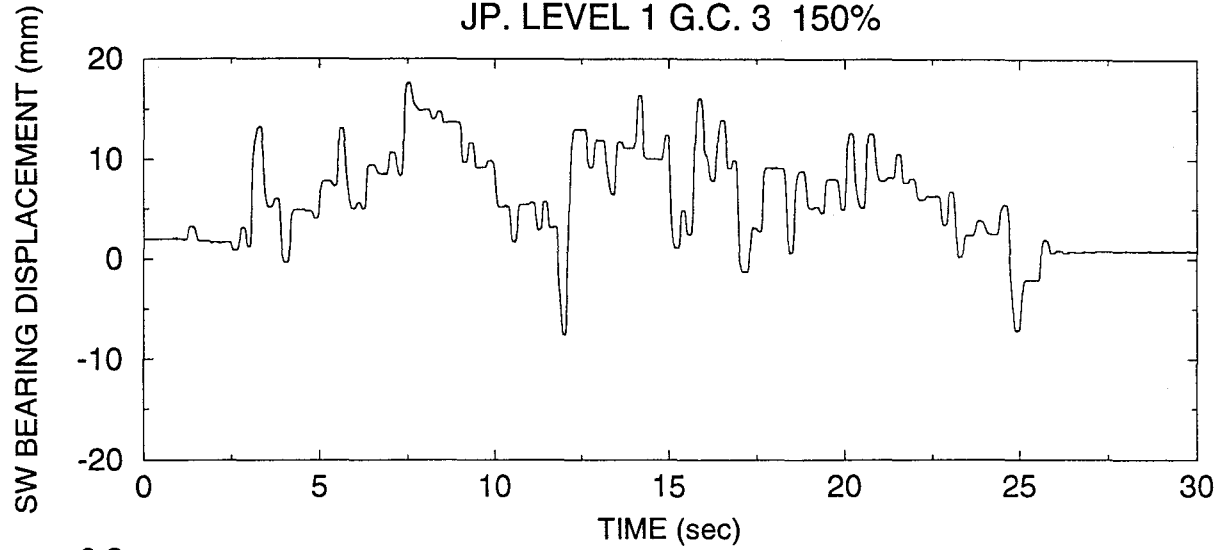
SYSTEM T2-No.1, TEST No. RSSRUN33  
JP. LEVEL 1 G.C. 2 150%



SYSTEM T2-No.1, TEST No. RSSRUN34  
JP. LEVEL 1 G.C. 3 100%

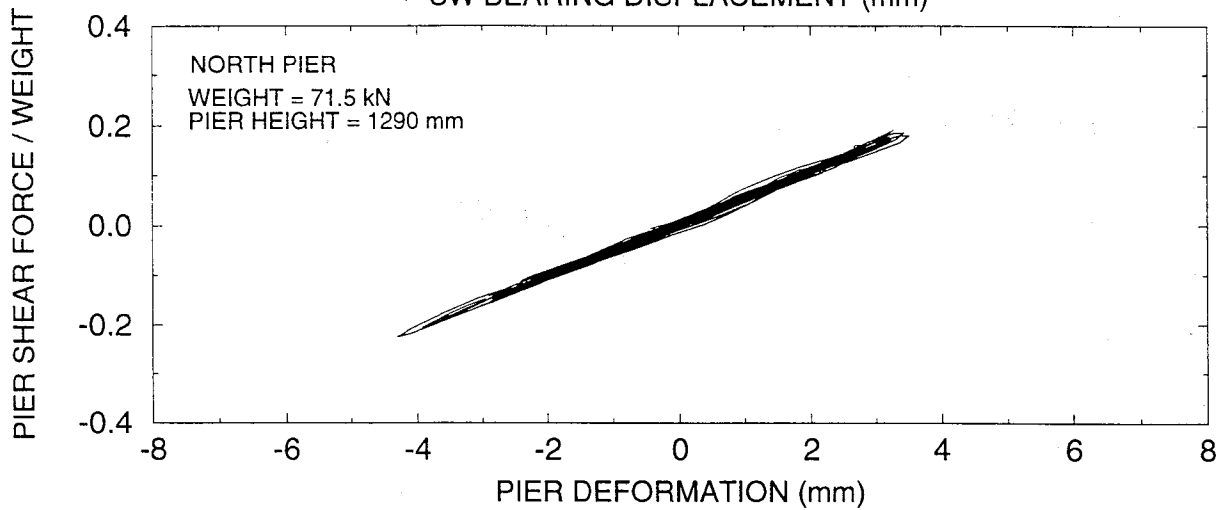
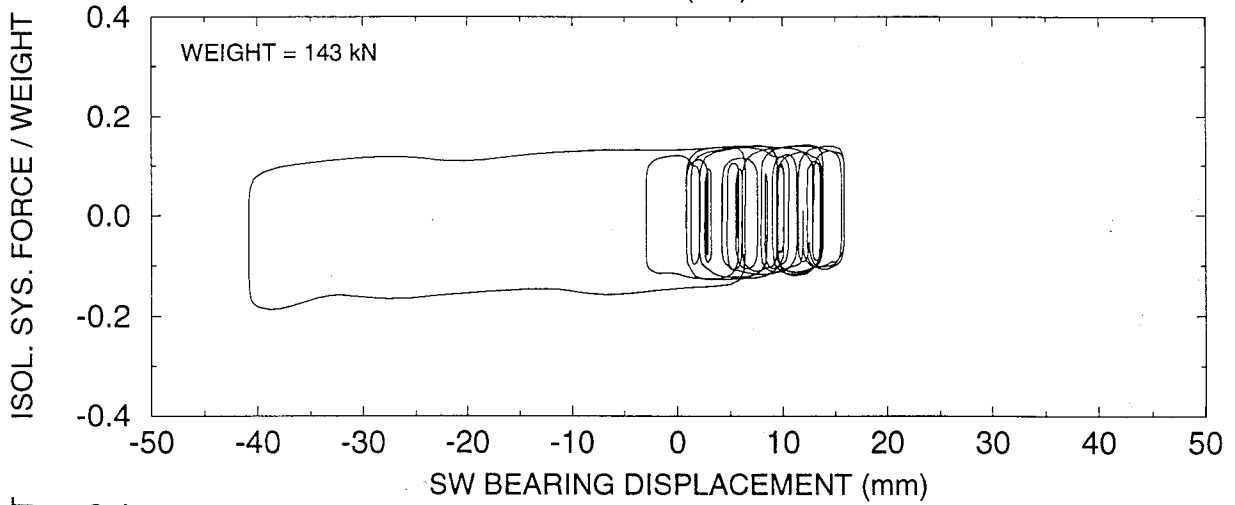
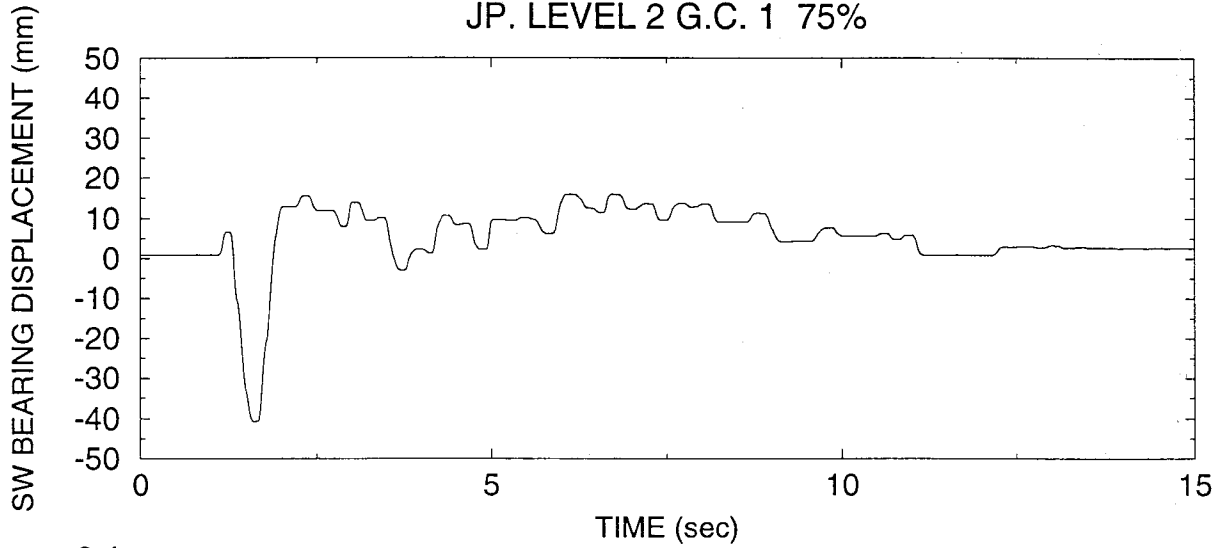


SYSTEM T2-No.1, TEST No. RSSRUN35  
JP. LEVEL 1 G.C. 3 150%

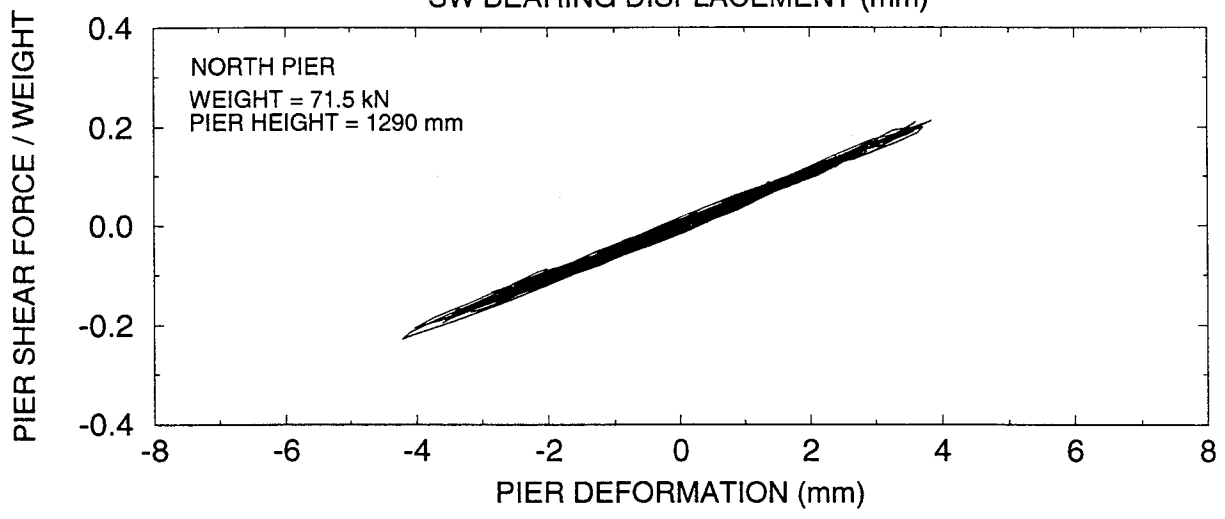
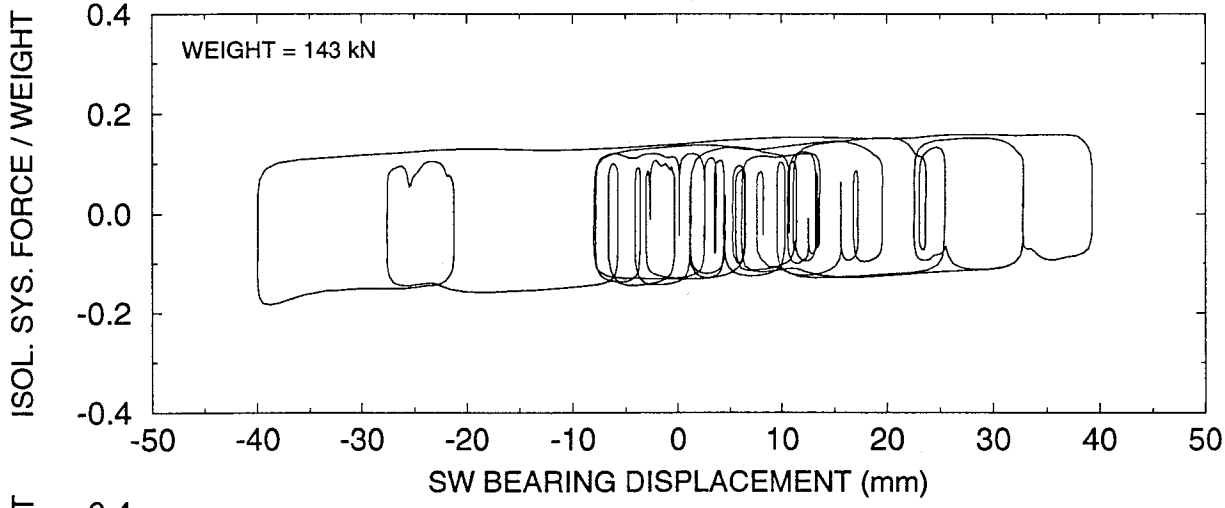
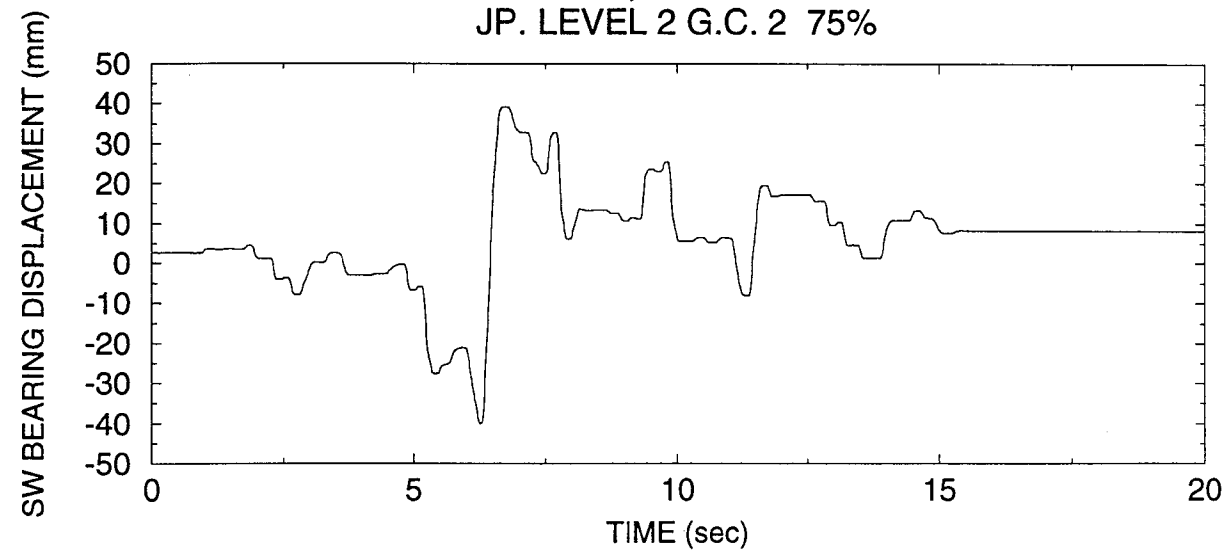




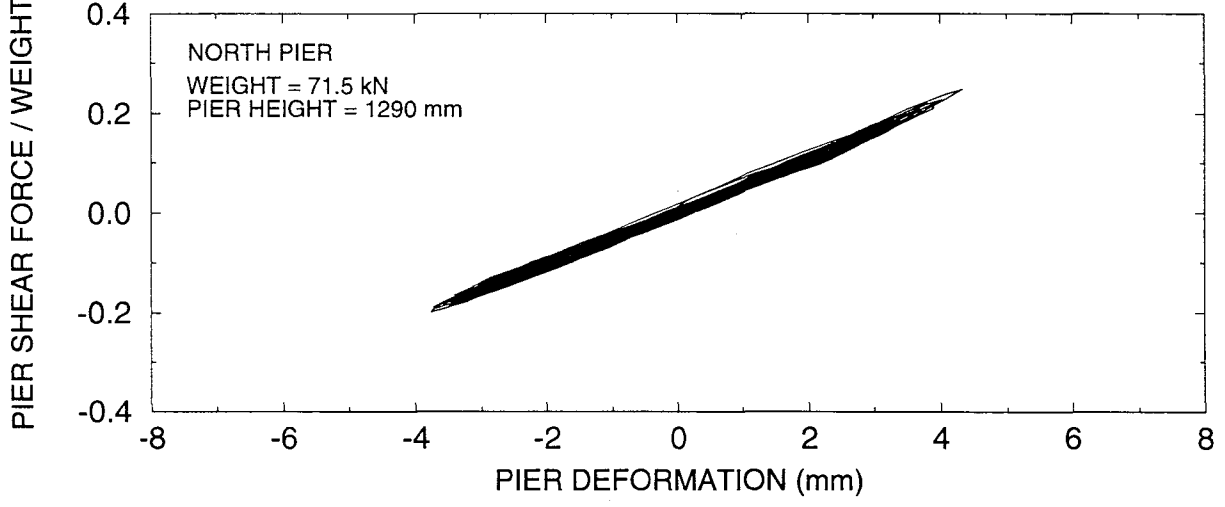
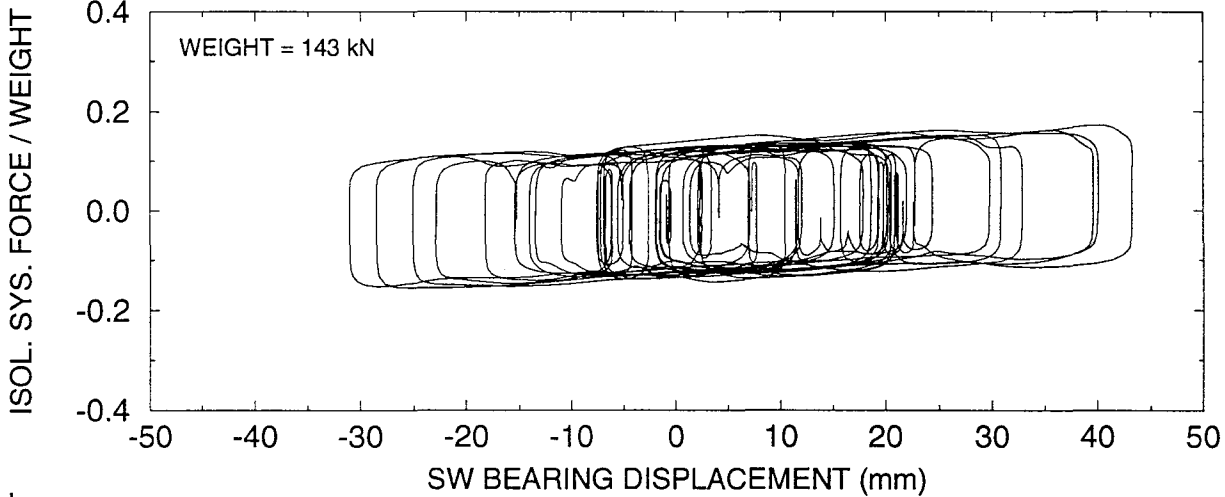
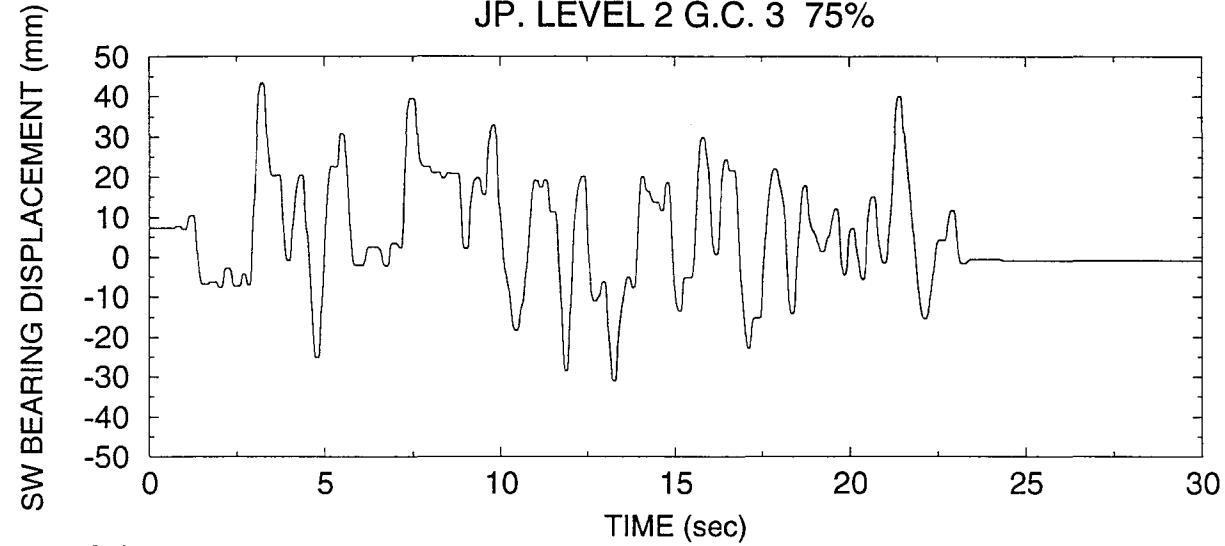
SYSTEM T2-No.1, TEST No. RSSRUN36  
JP. LEVEL 2 G.C. 1 75%



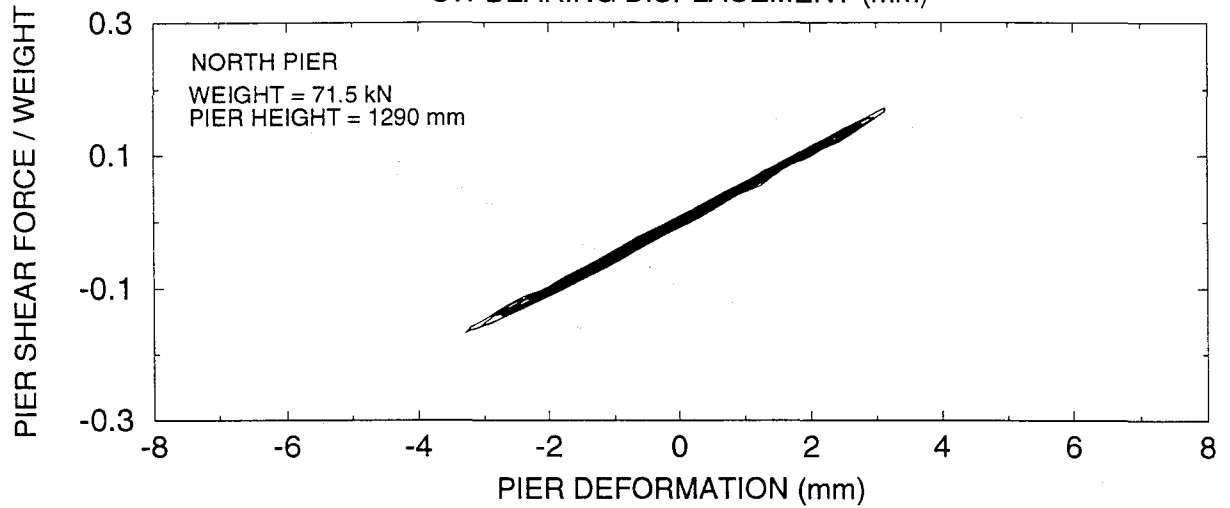
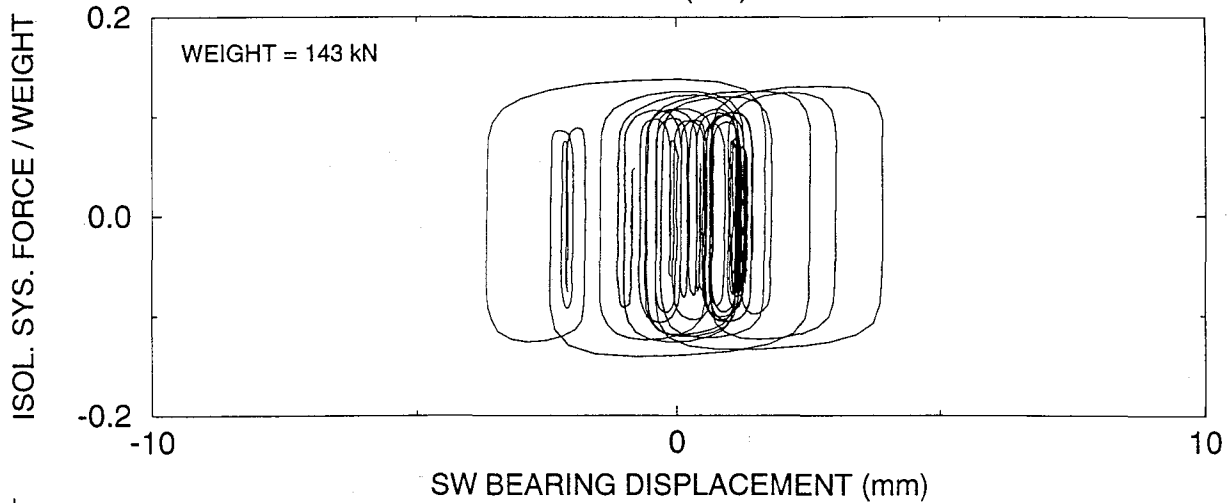
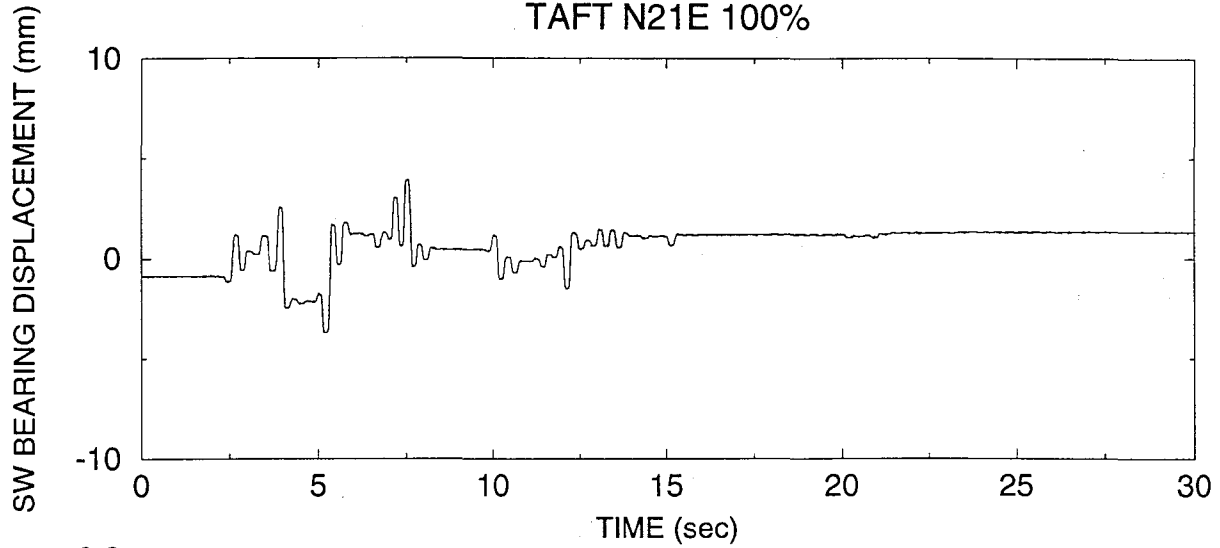
SYSTEM T2-No.1, TEST No. RSSRUN37  
JP. LEVEL 2 G.C. 2 75%



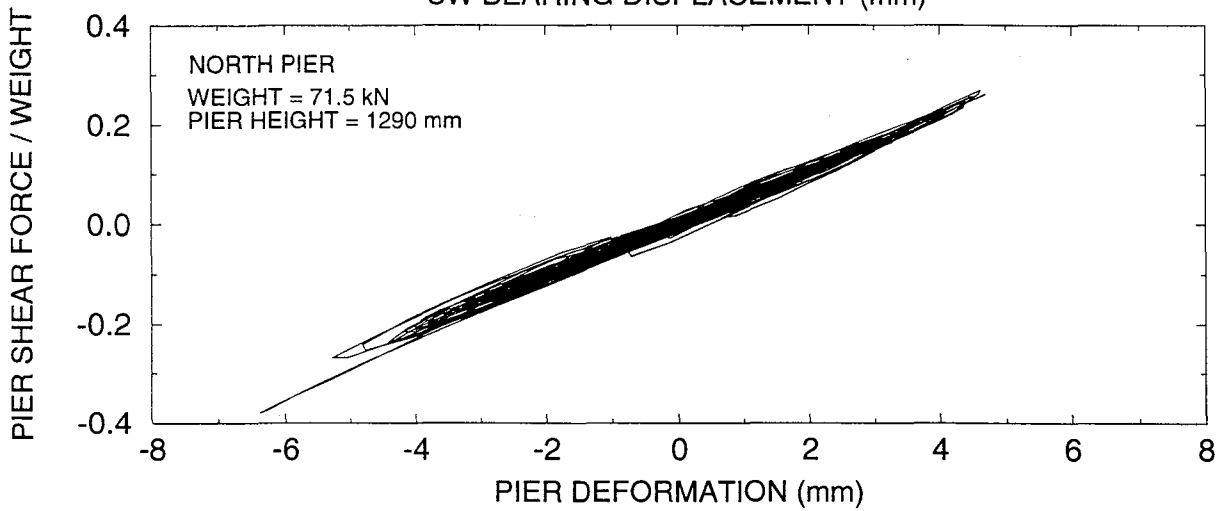
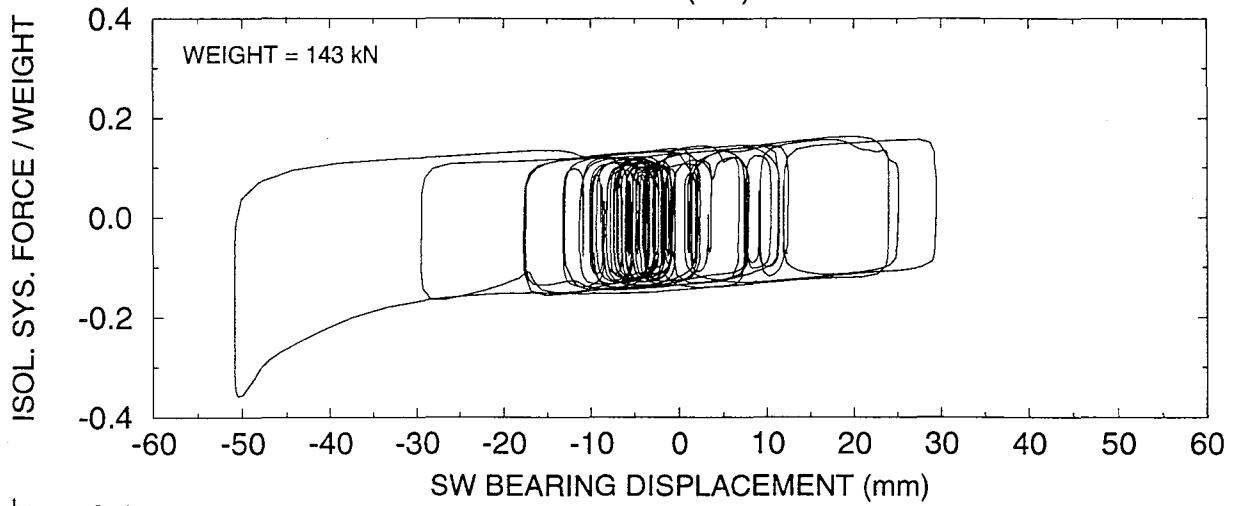
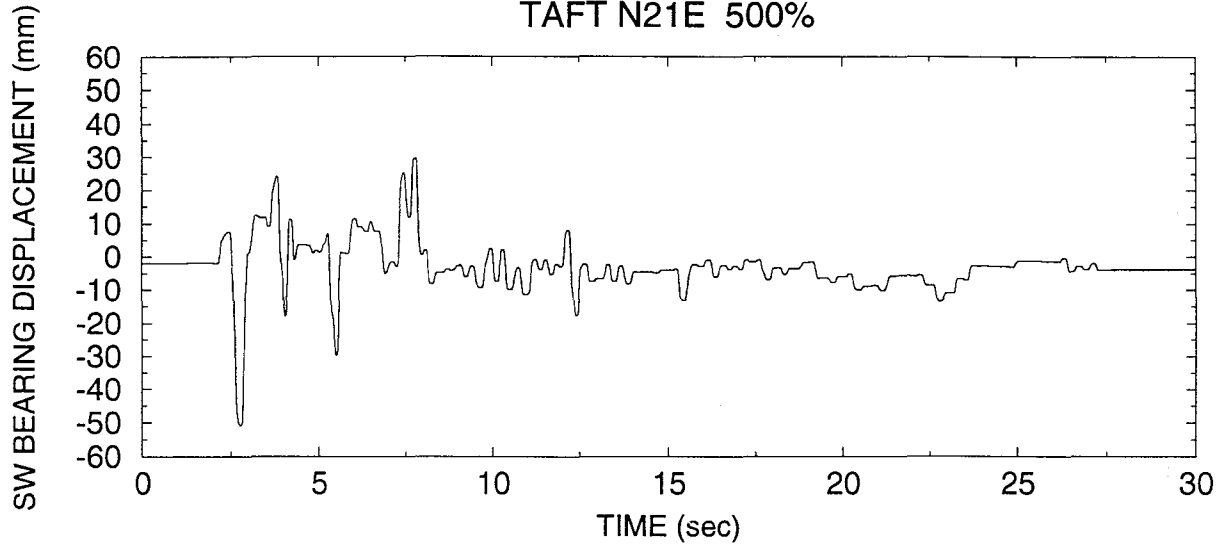
SYSTEM T2-No.1, TEST No. RSSRUN38  
JP. LEVEL 2 G.C. 3 75%



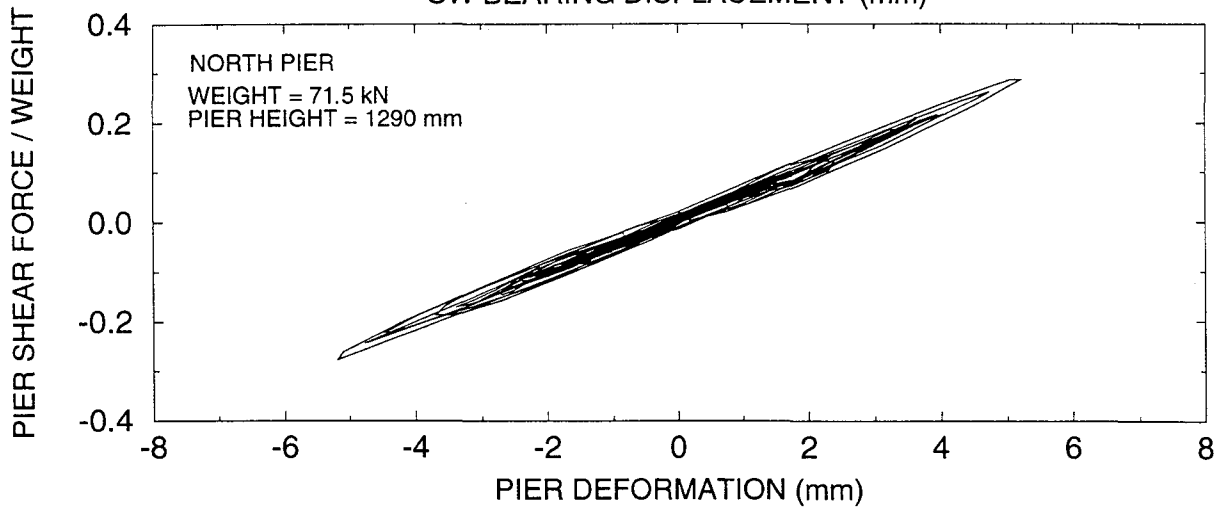
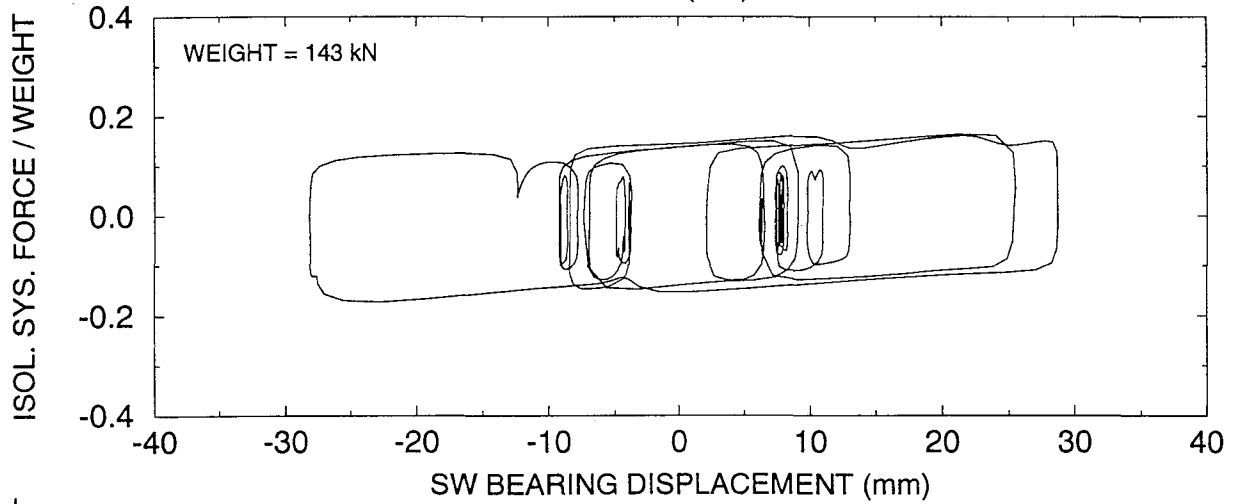
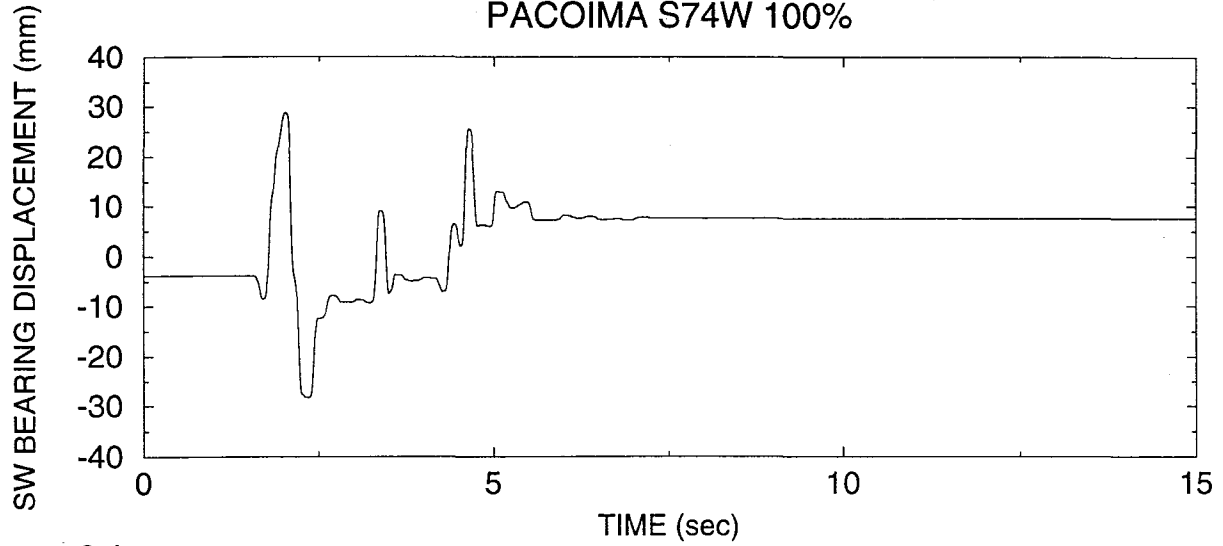
SYSTEM T2-No.1, TEST No. RSSRUN39  
TAFT N21E 100%



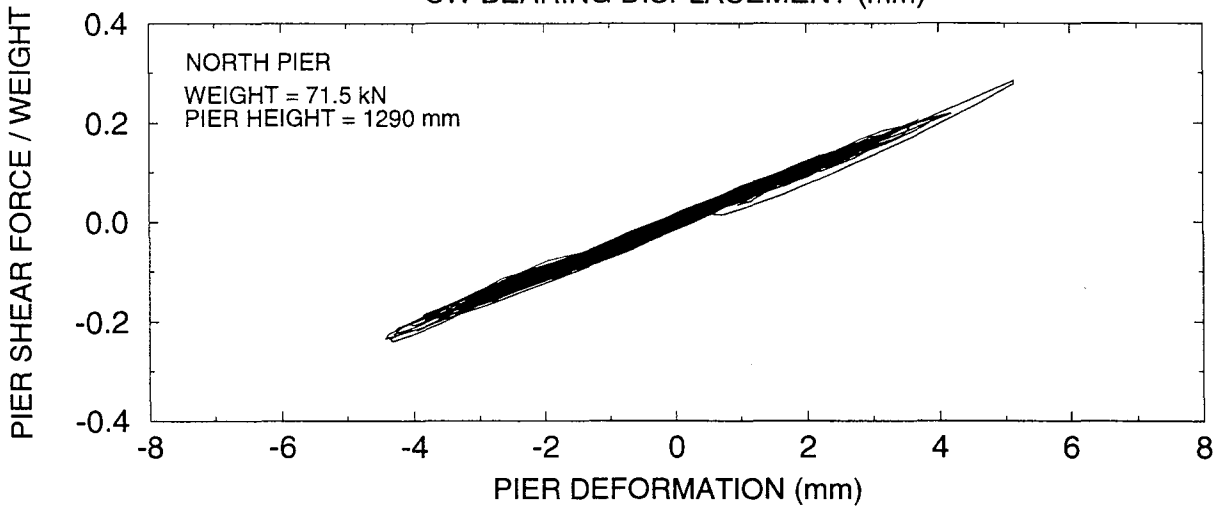
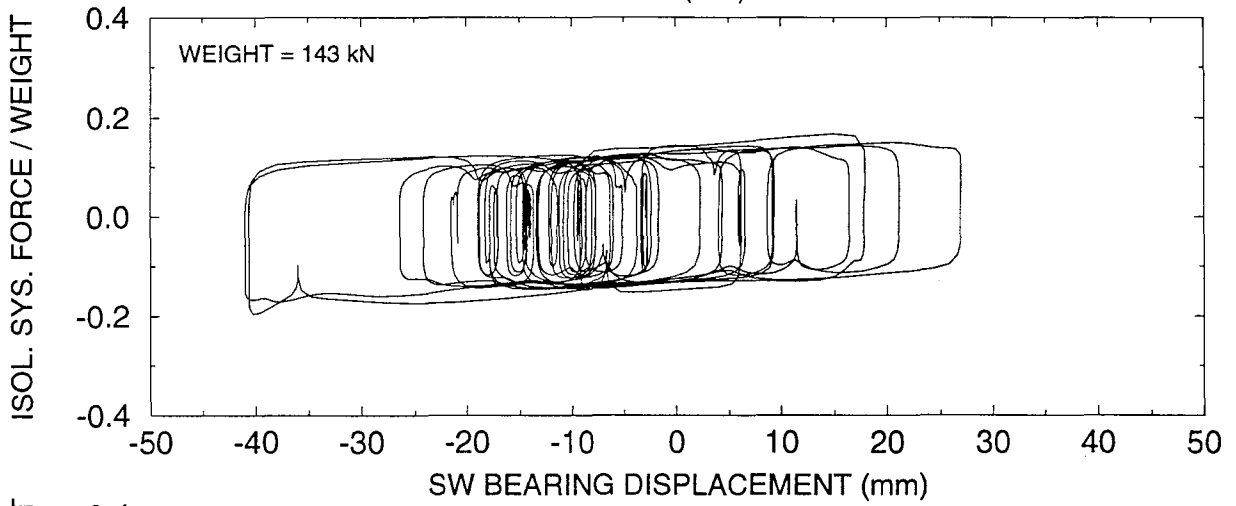
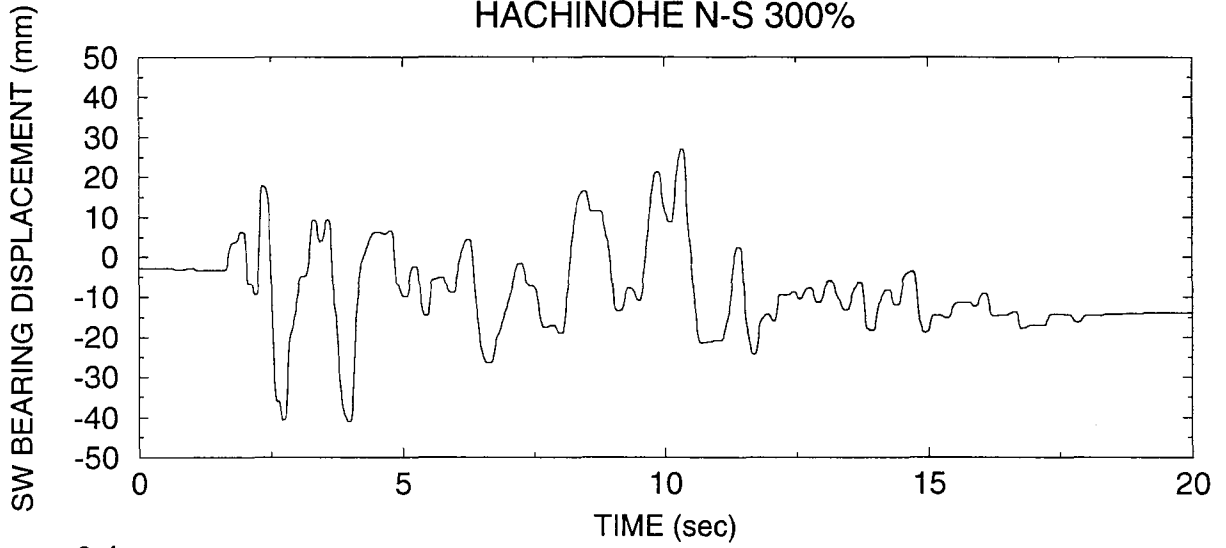
SYSTEM T2-No.1, TEST No. RSSRUN41  
TAFT N21E 500%



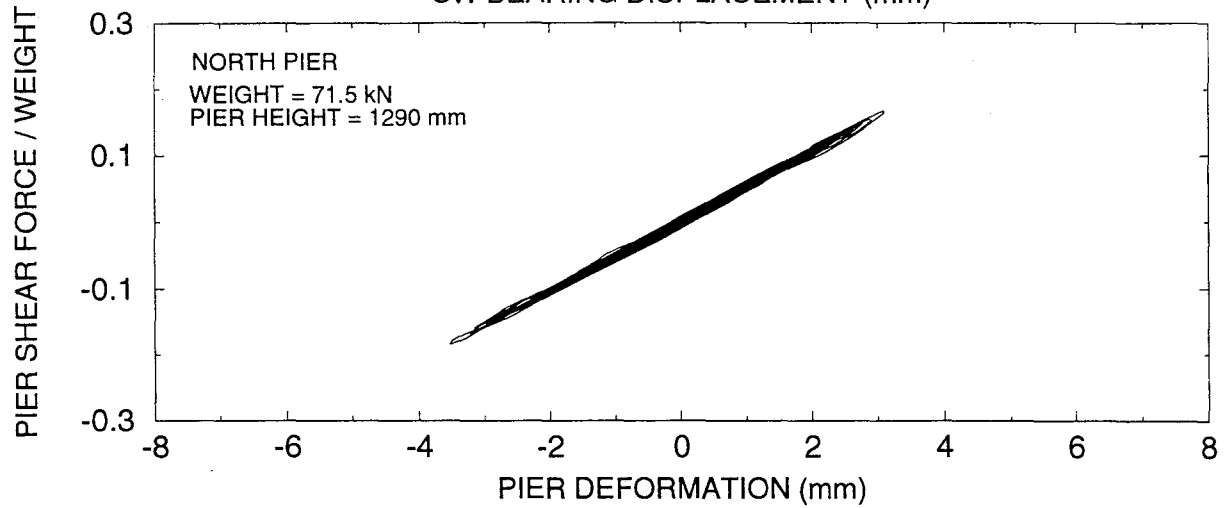
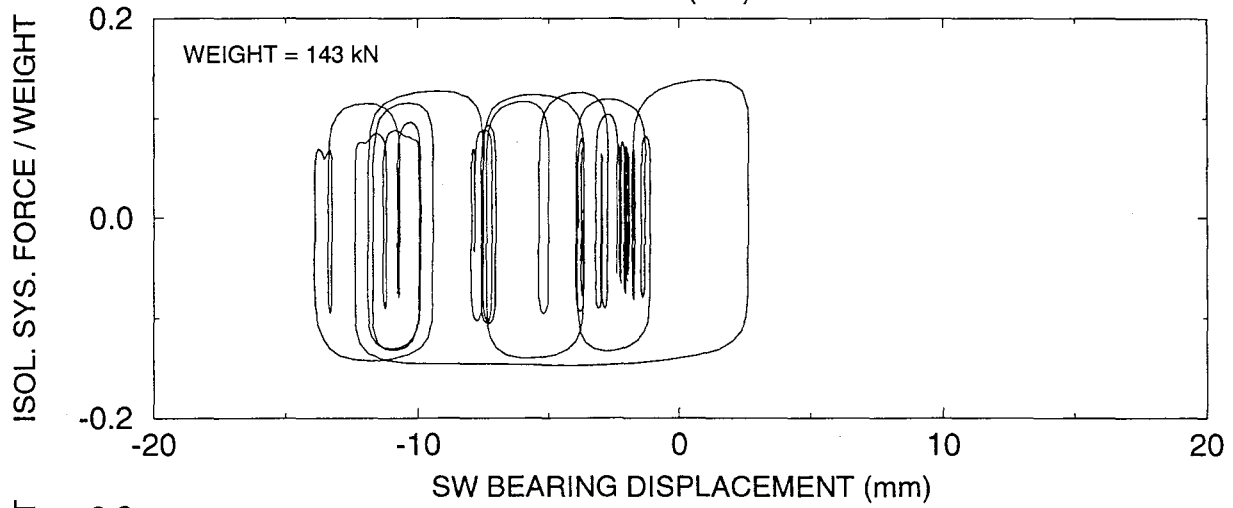
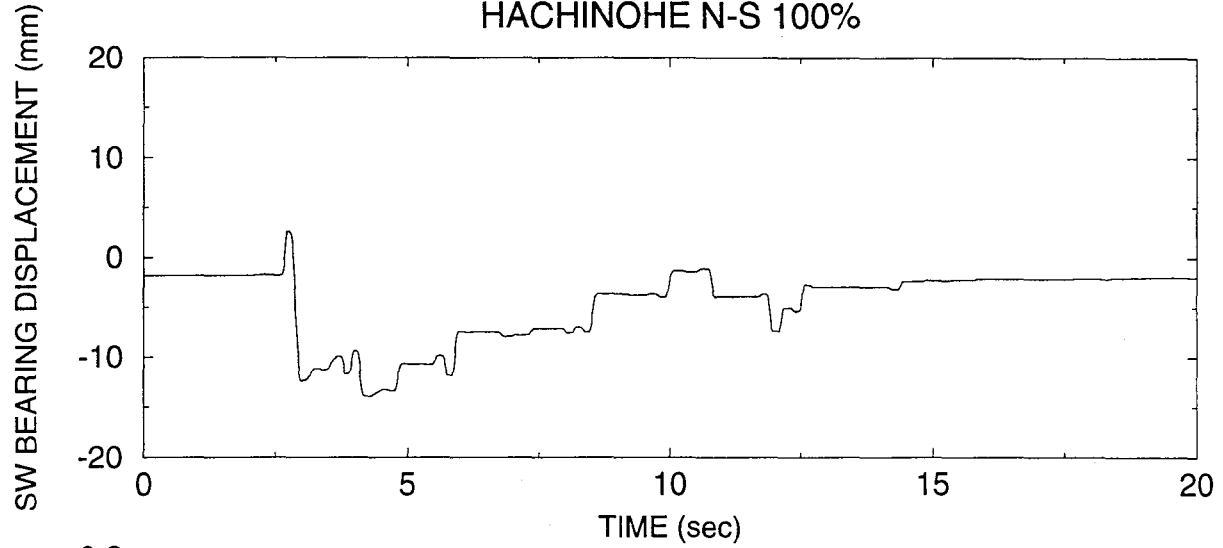
SYSTEM T2-No.1, TEST No. RSSRUN42  
PACOIMA S74W 100%



SYSTEM T2-No.1, TEST No. RSSRUN44  
HACHINOHE N-S 300%

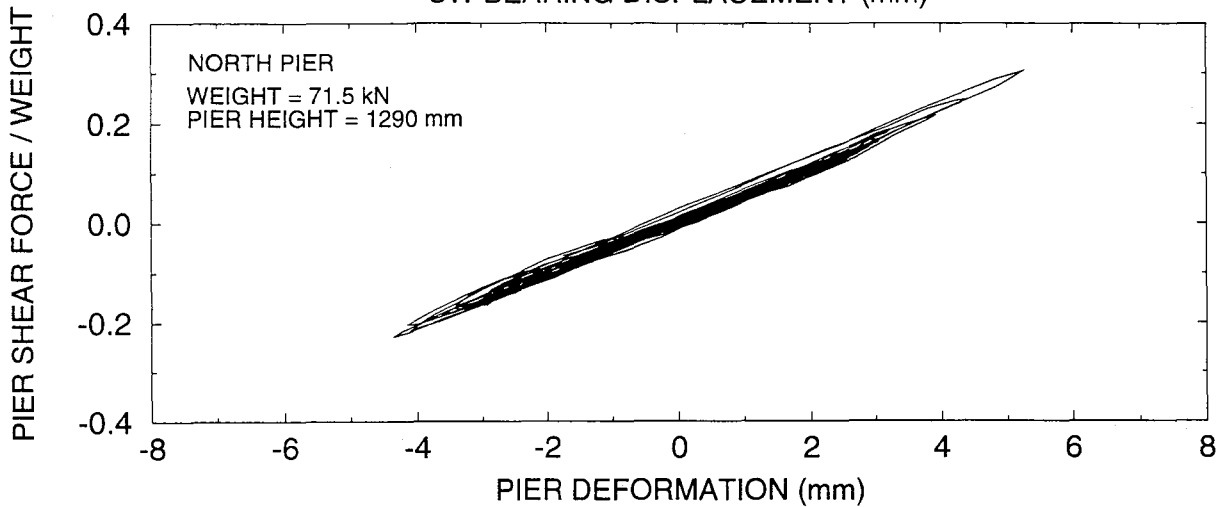
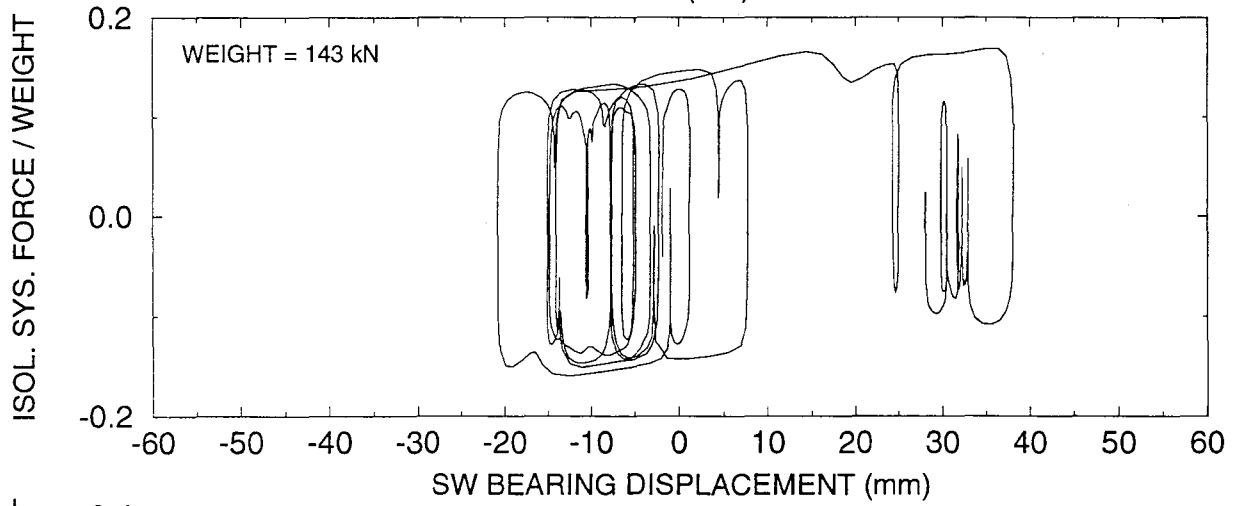
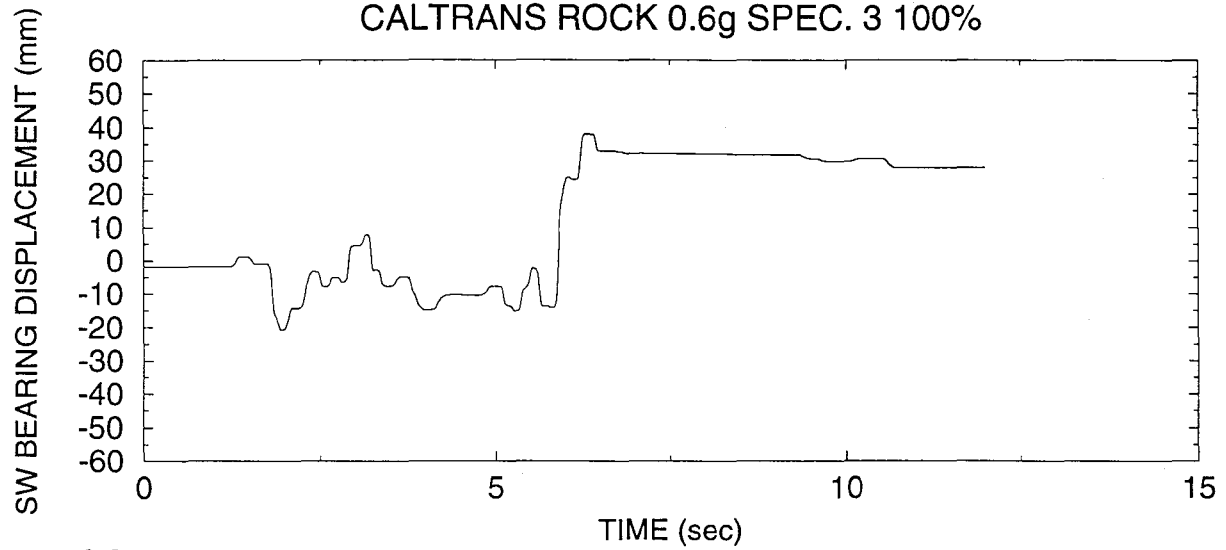


SYSTEM T2-No.1, TEST No. RSSRUN45  
HACHINOHE N-S 100%

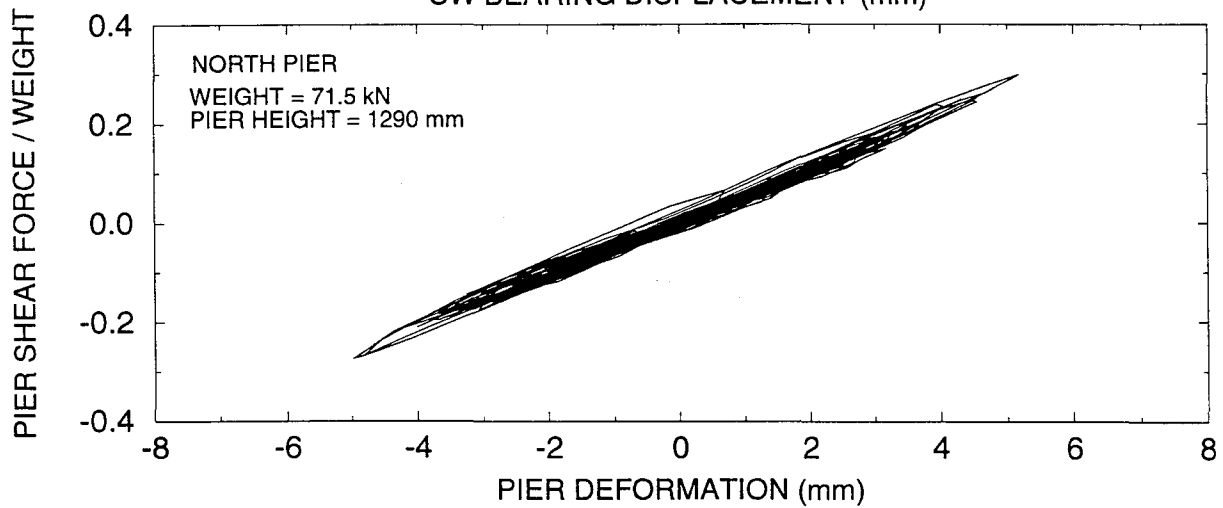
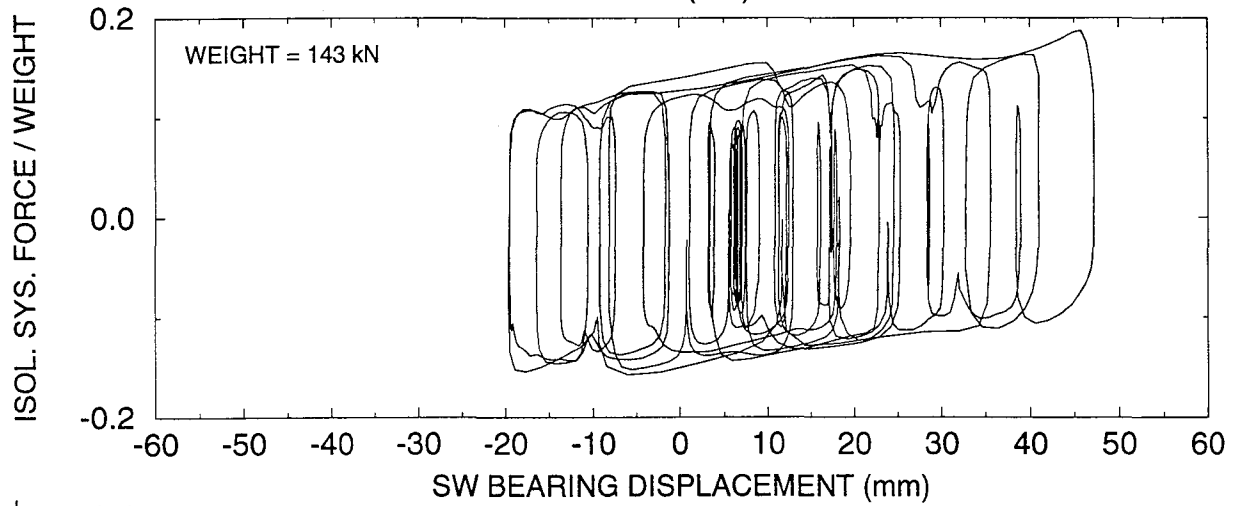
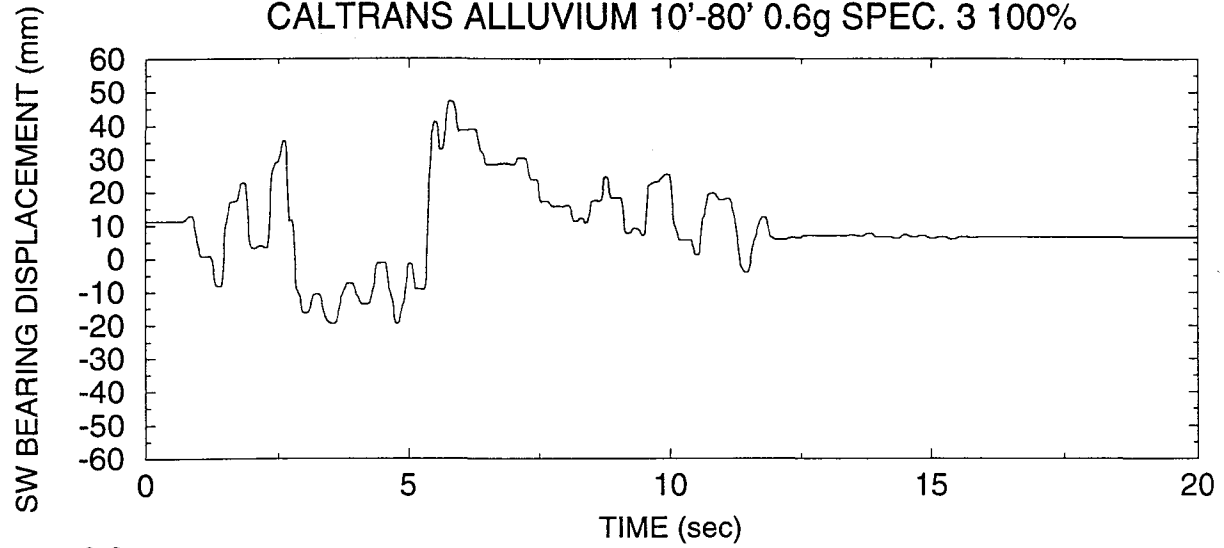




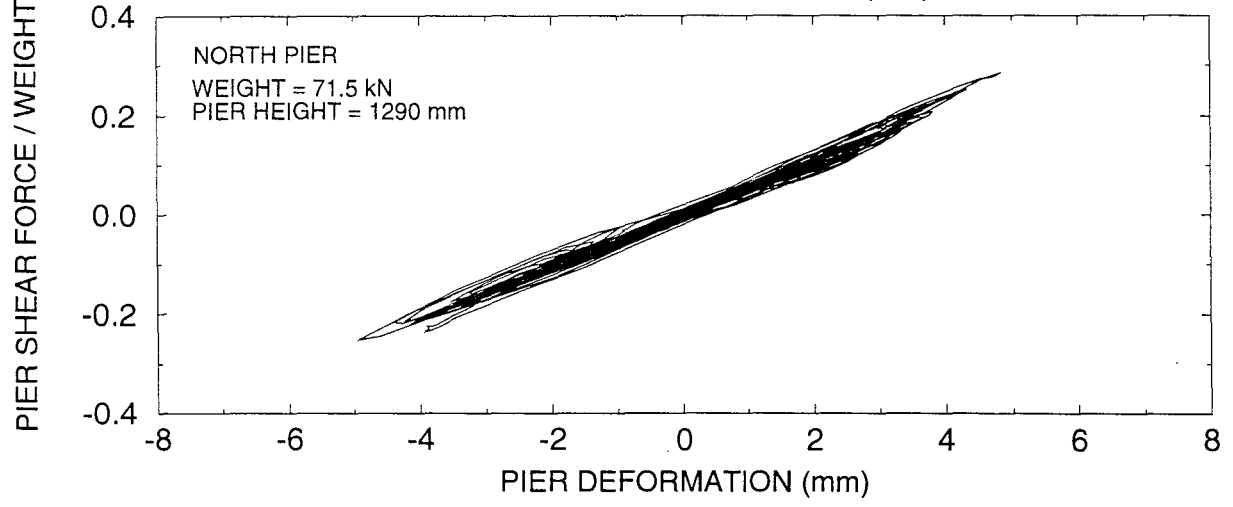
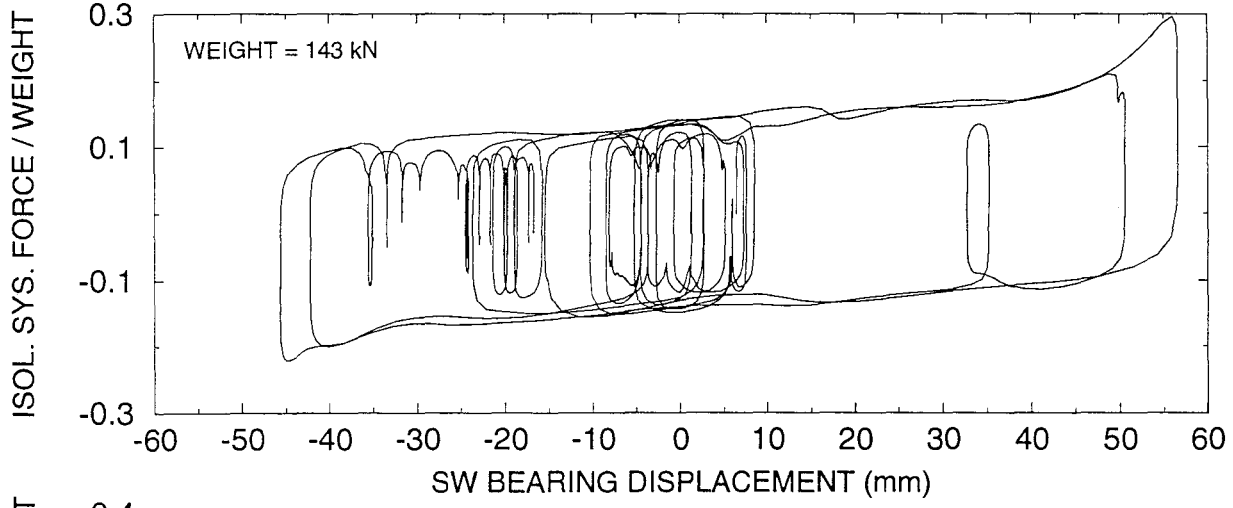
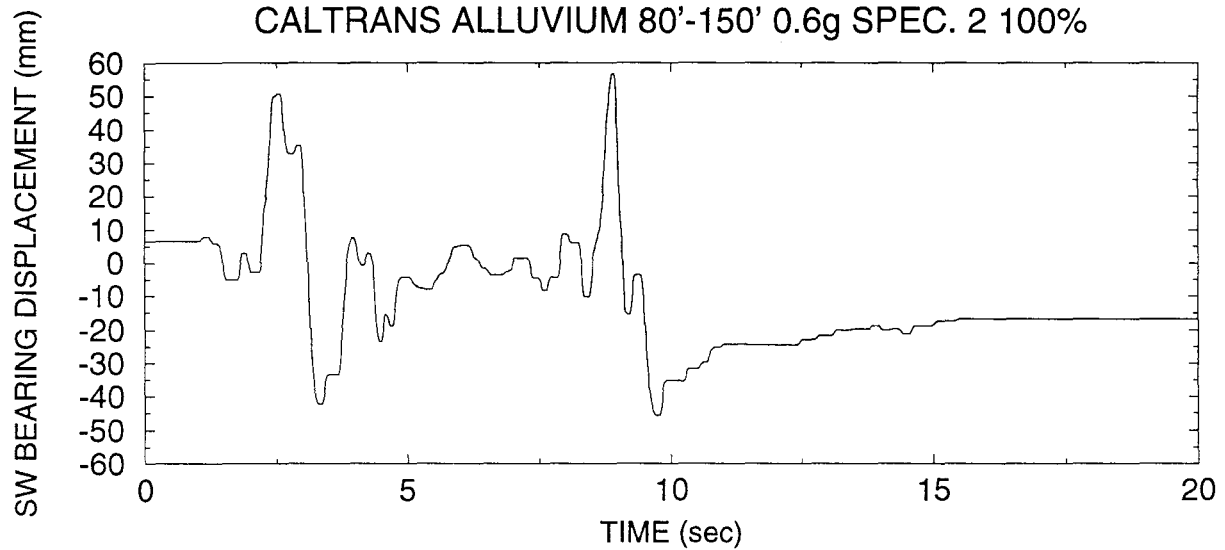
SYSTEM T2-No.1, TEST No. RSSRUN46  
CALTRANS ROCK 0.6g SPEC. 3 100%



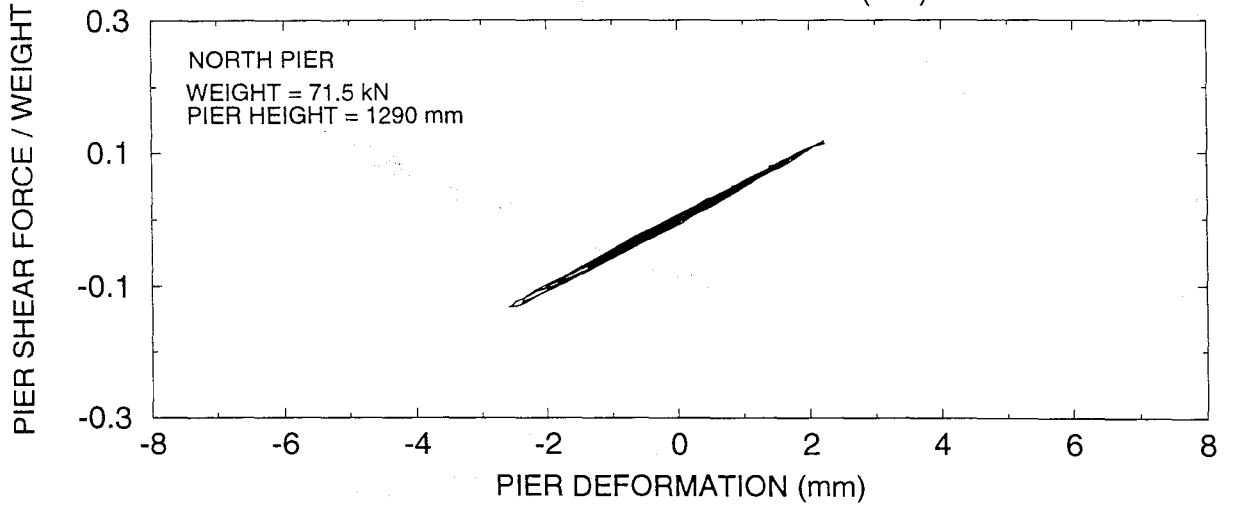
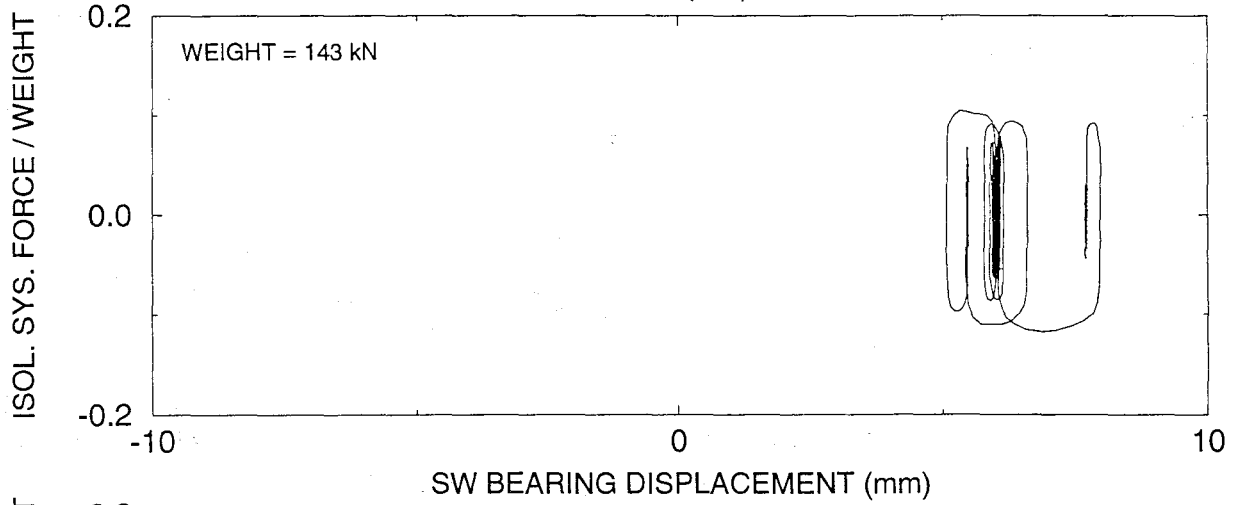
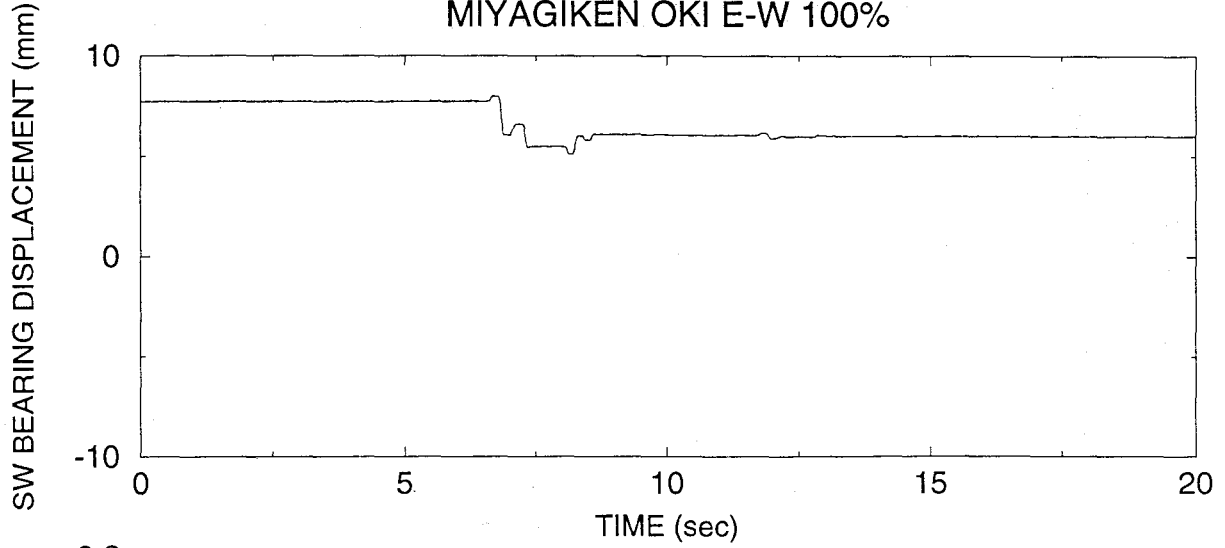
SYSTEM T2-No.1, TEST No. RSSRUN47  
CALTRANS ALLUVIUM 10'-80' 0.6g SPEC. 3 100%



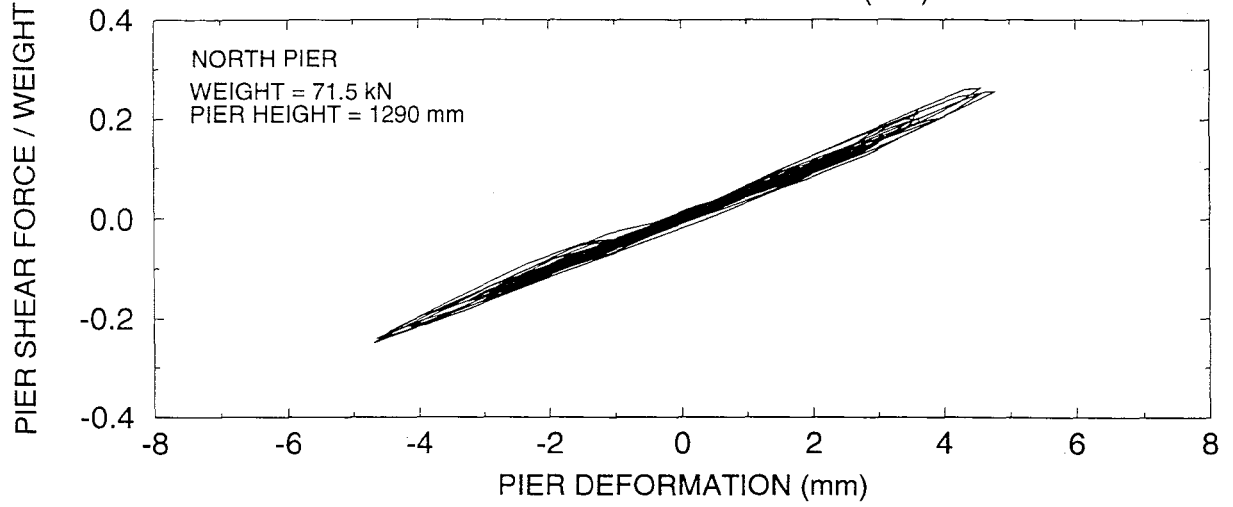
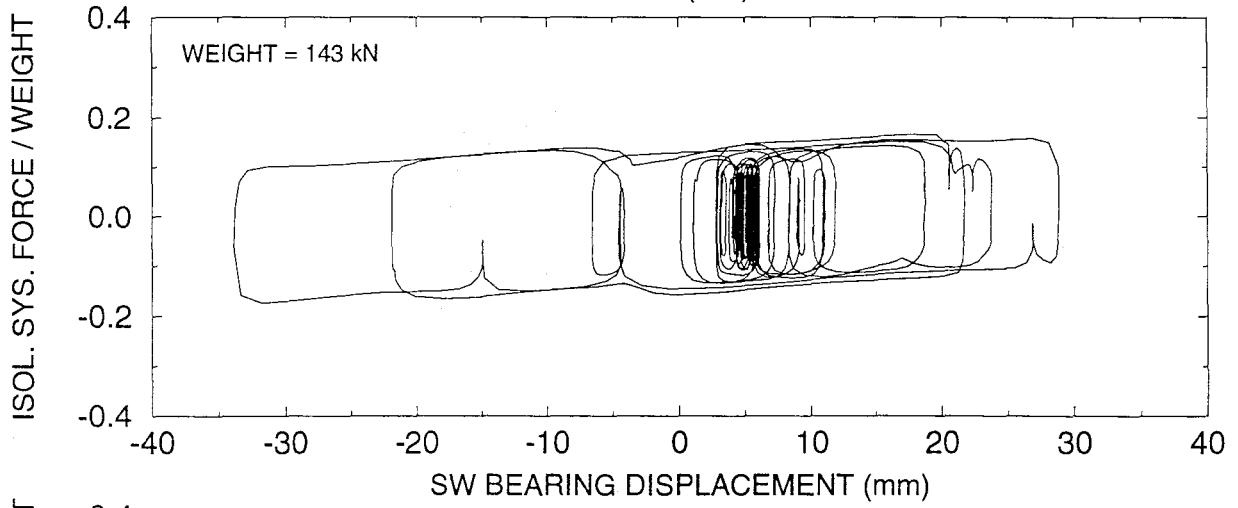
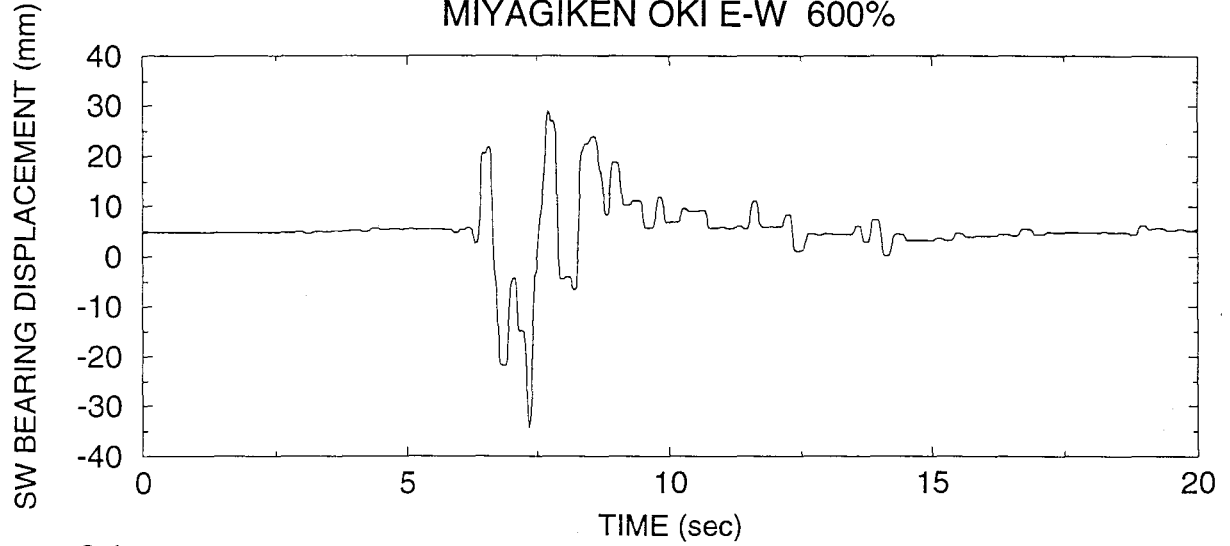
SYSTEM T2-No.1, TEST No. RSSRUN48  
CALTRANS ALLUVIUM 80'-150' 0.6g SPEC. 2 100%



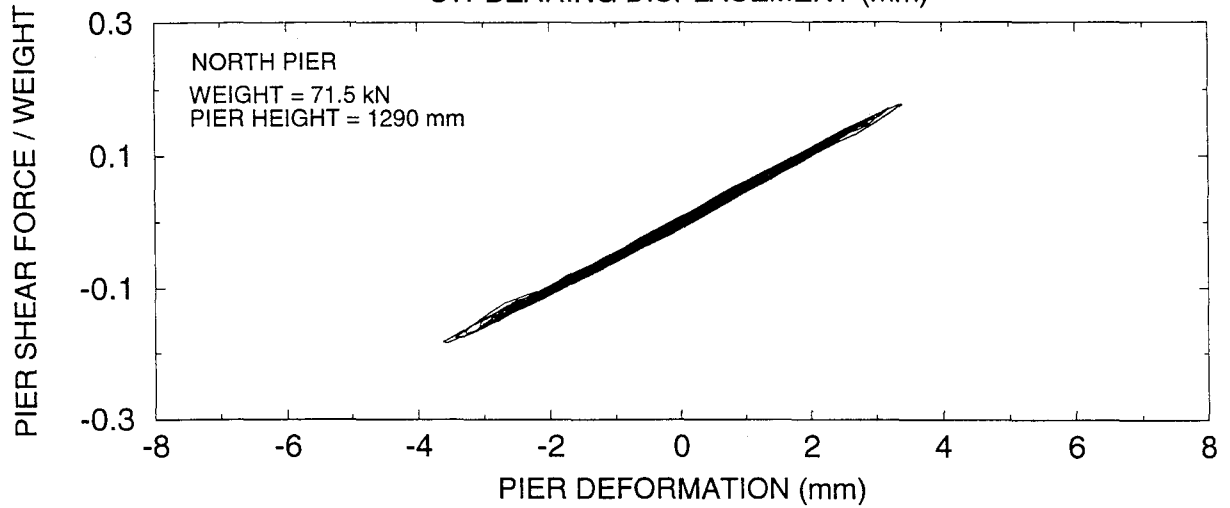
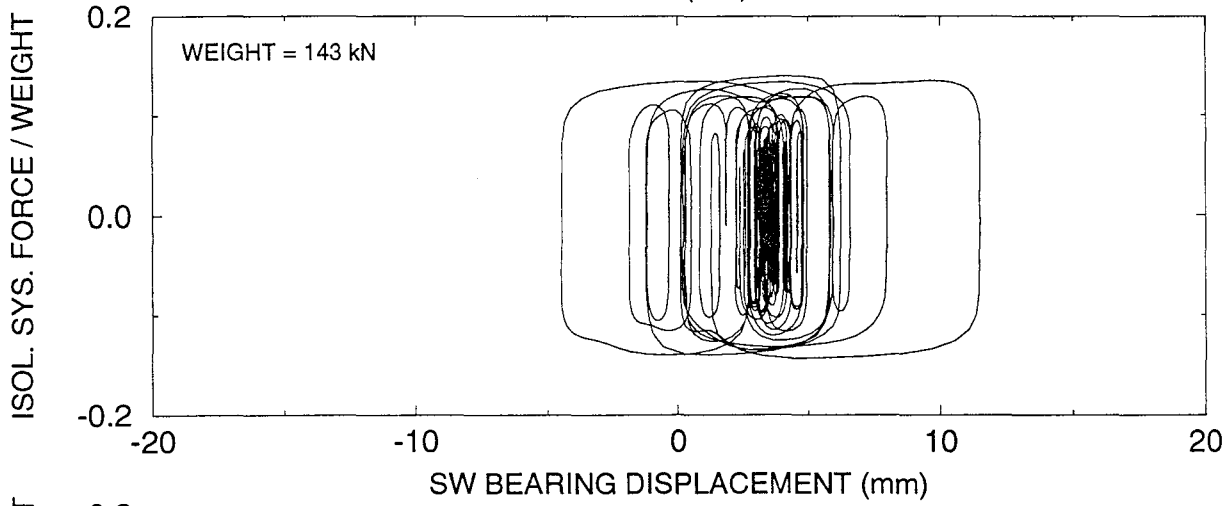
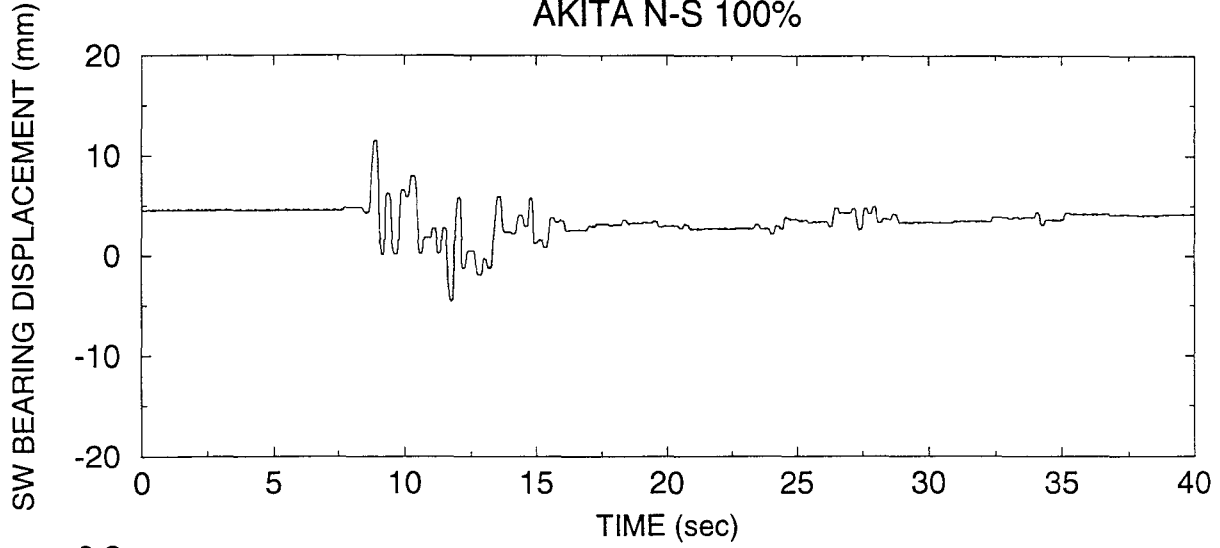
SYSTEM T2-No.1, TEST No. RSSRUN49  
MIYAGIKEN OKI E-W 100%



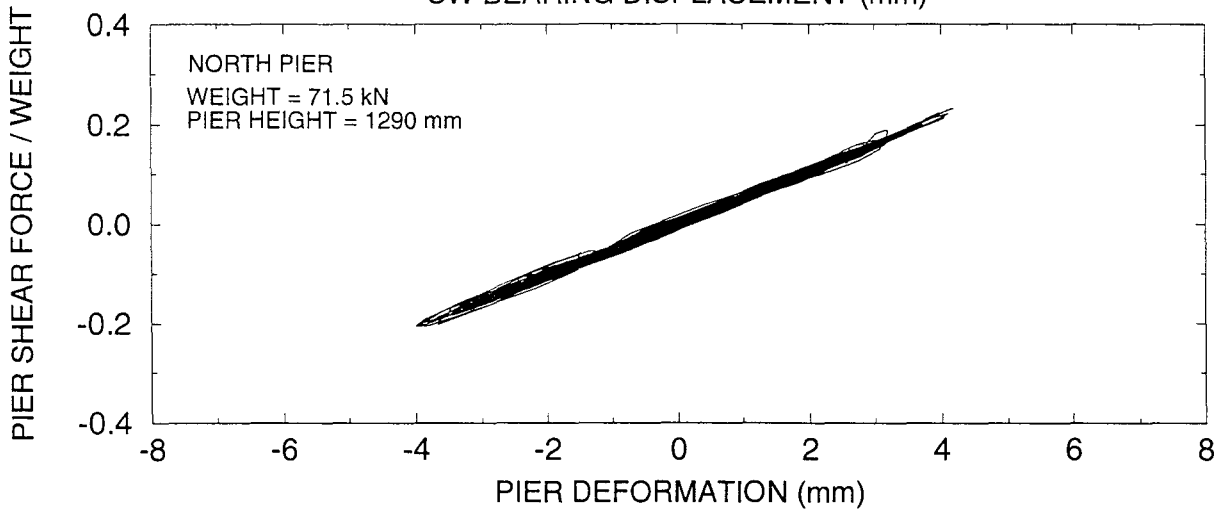
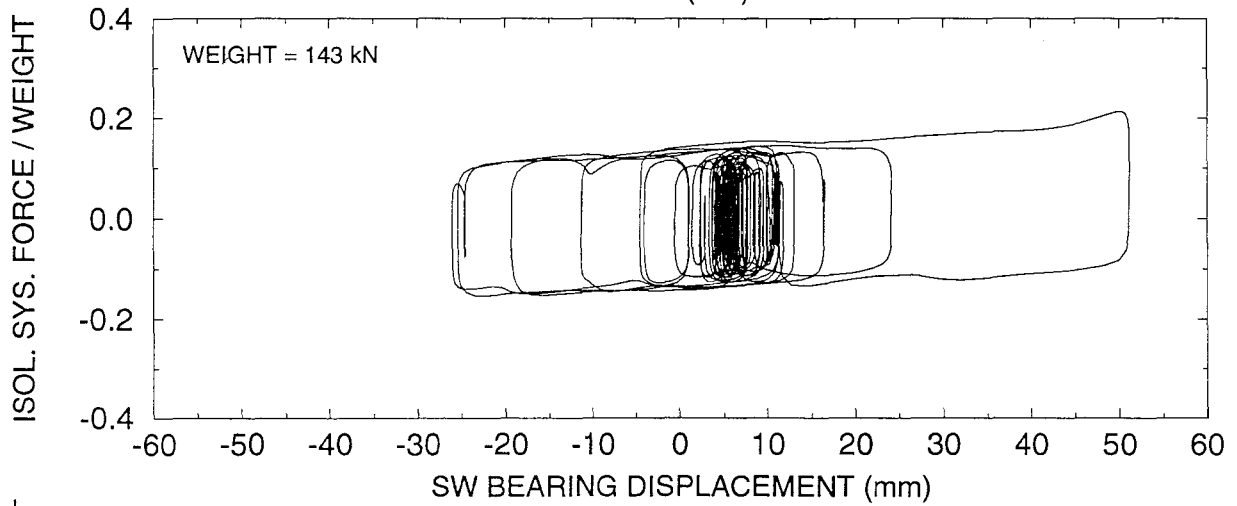
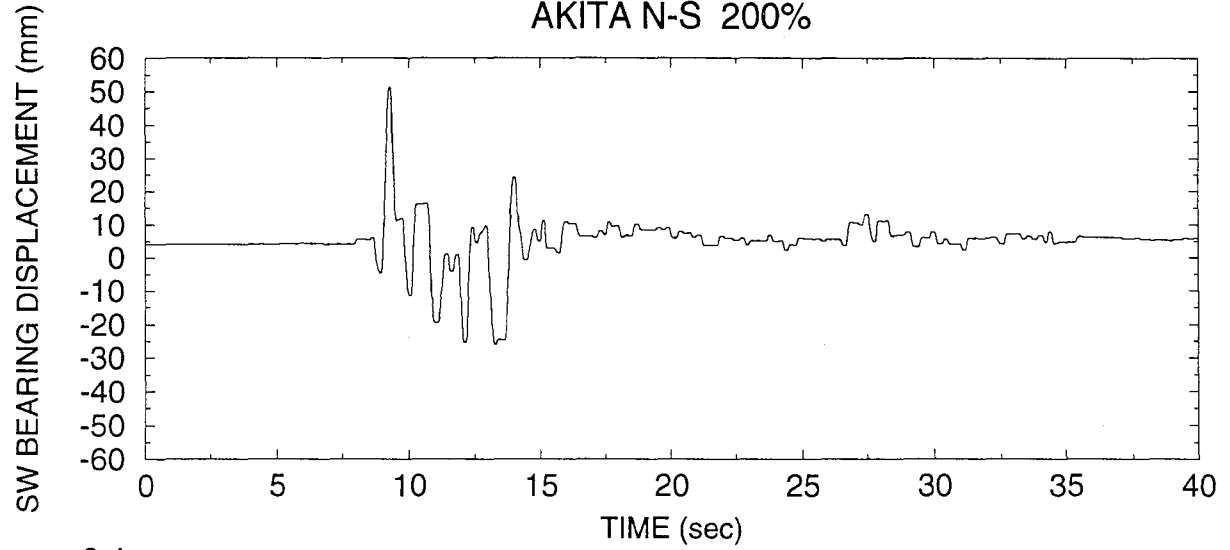
SYSTEM T2-No.1, TEST No. RSSRUN51  
MIYAGIKEN OKI E-W 600%



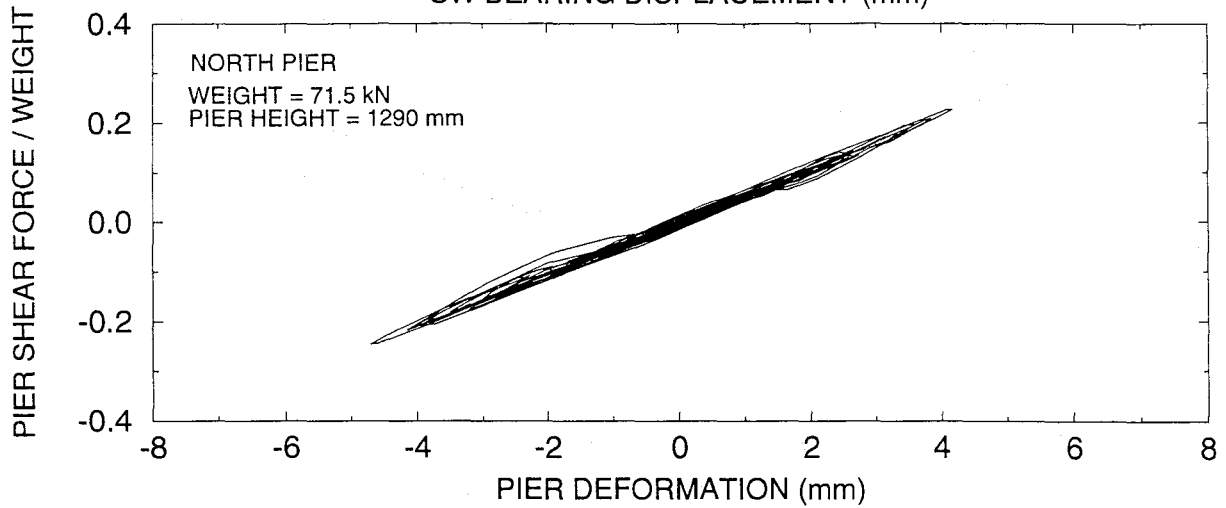
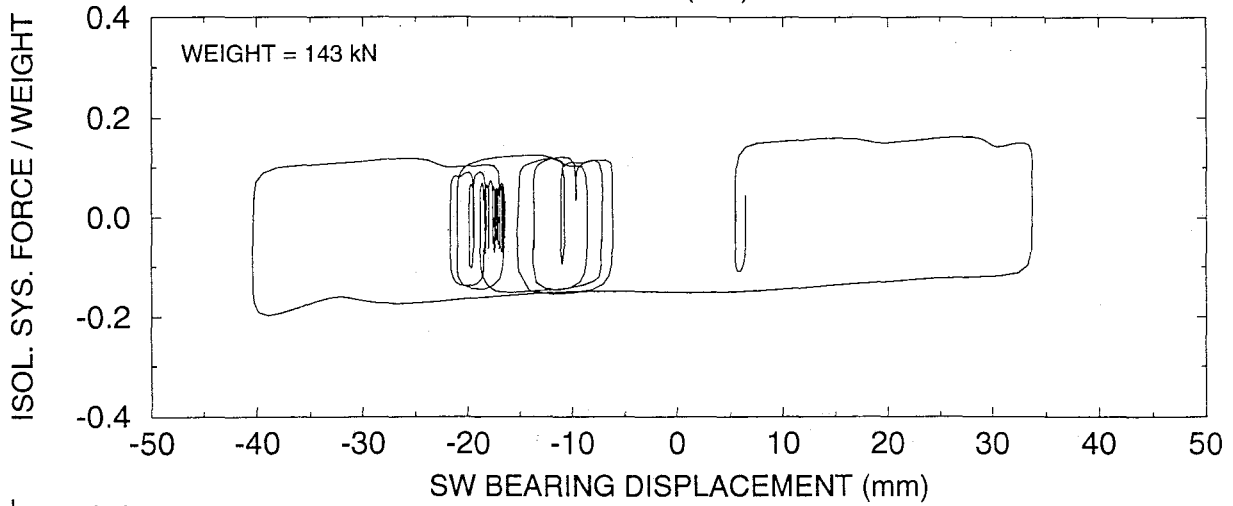
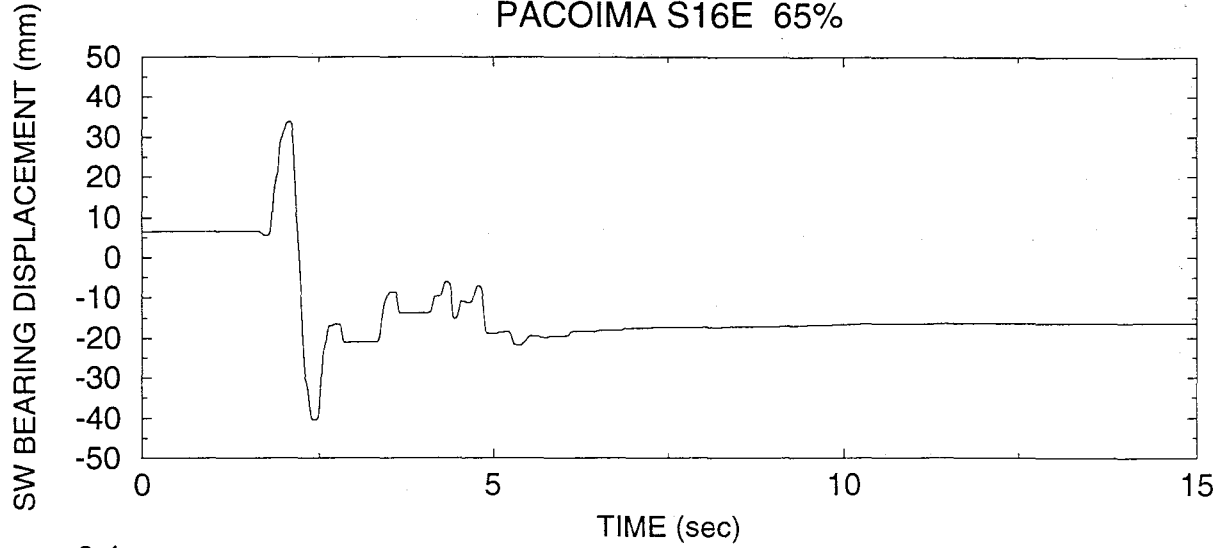
SYSTEM T2-No.1, TEST No. RSSRUN52  
AKITA N-S 100%



SYSTEM T2-No.1, TEST No. RSSRUN53  
AKITA N-S 200%

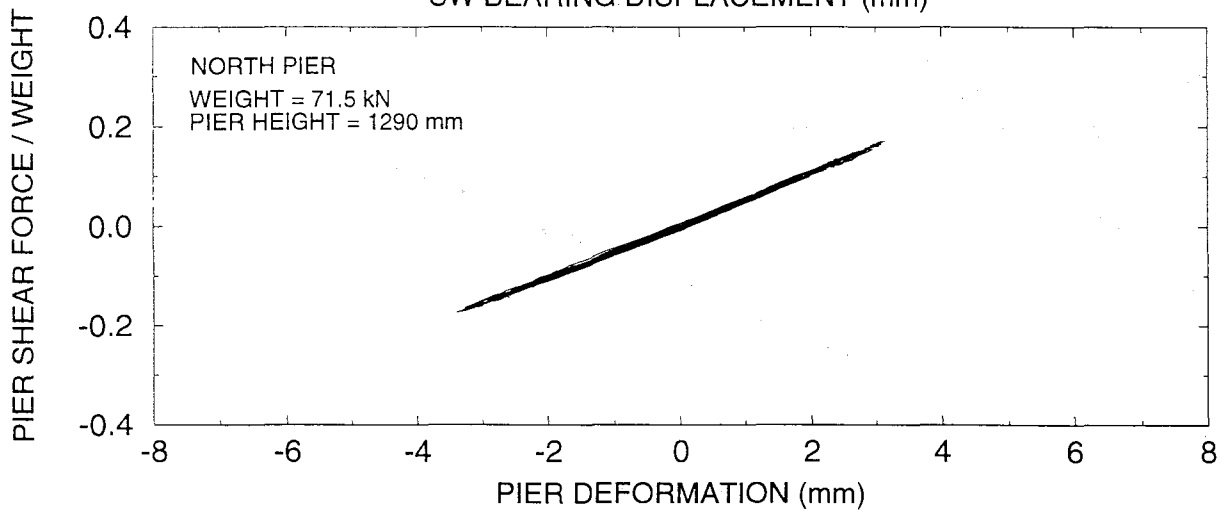
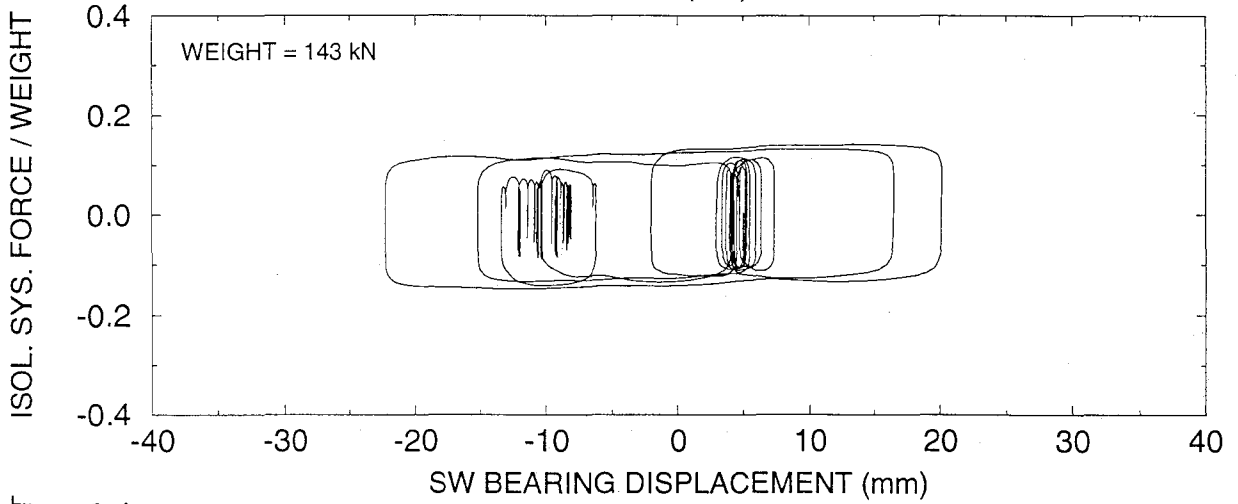
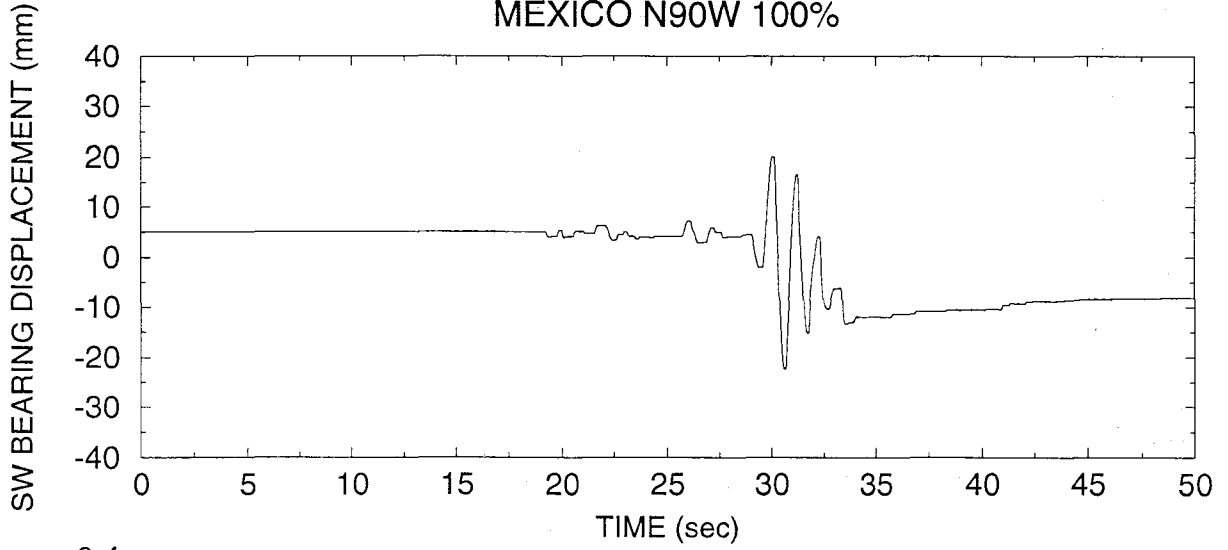


SYSTEM T2-No.1, TEST No. RSSRUN55  
PACOIMA S16E 65%

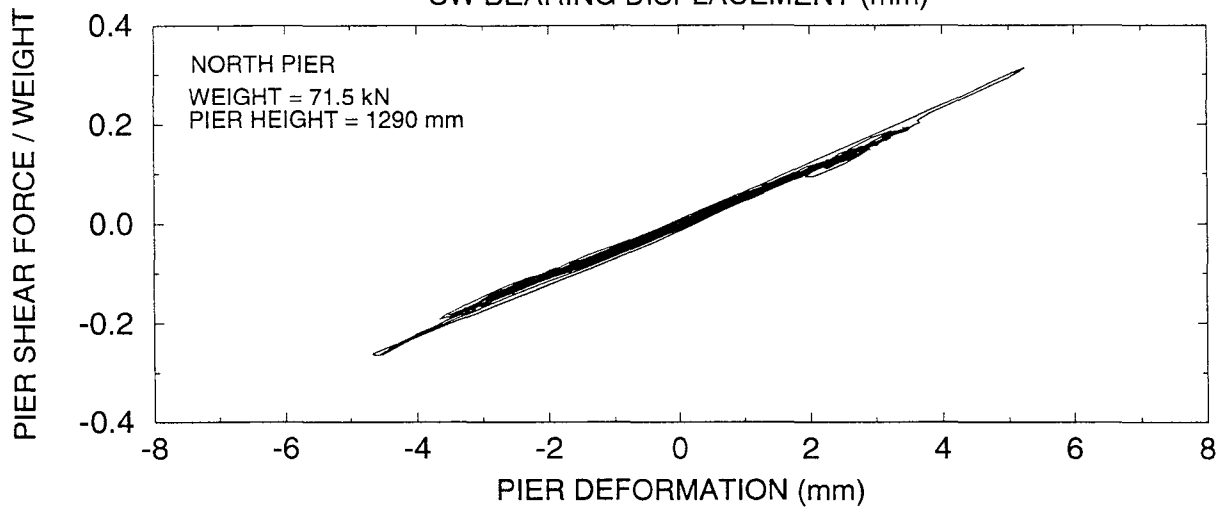
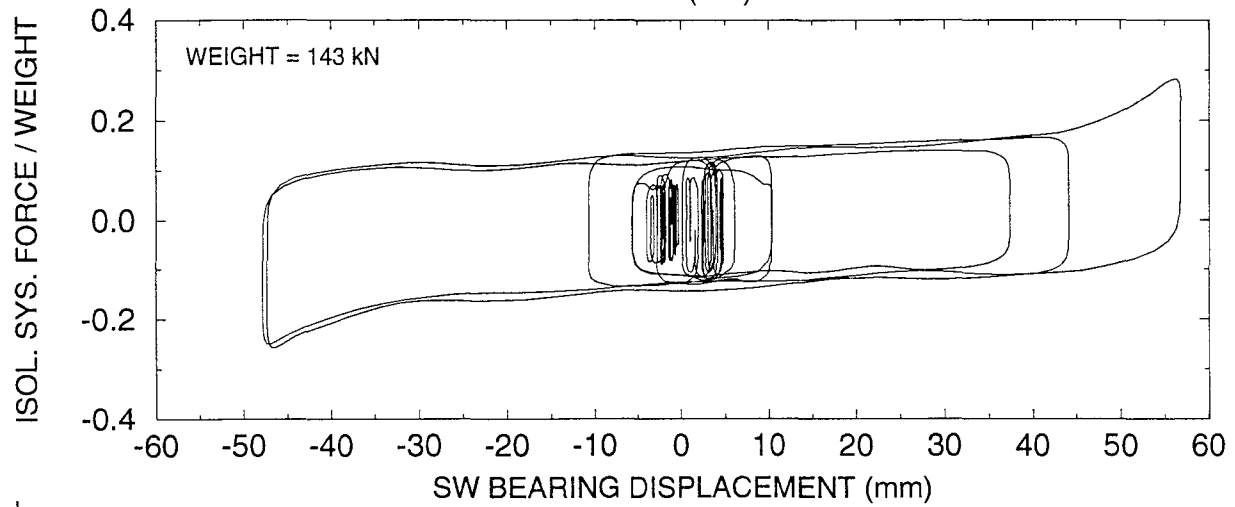
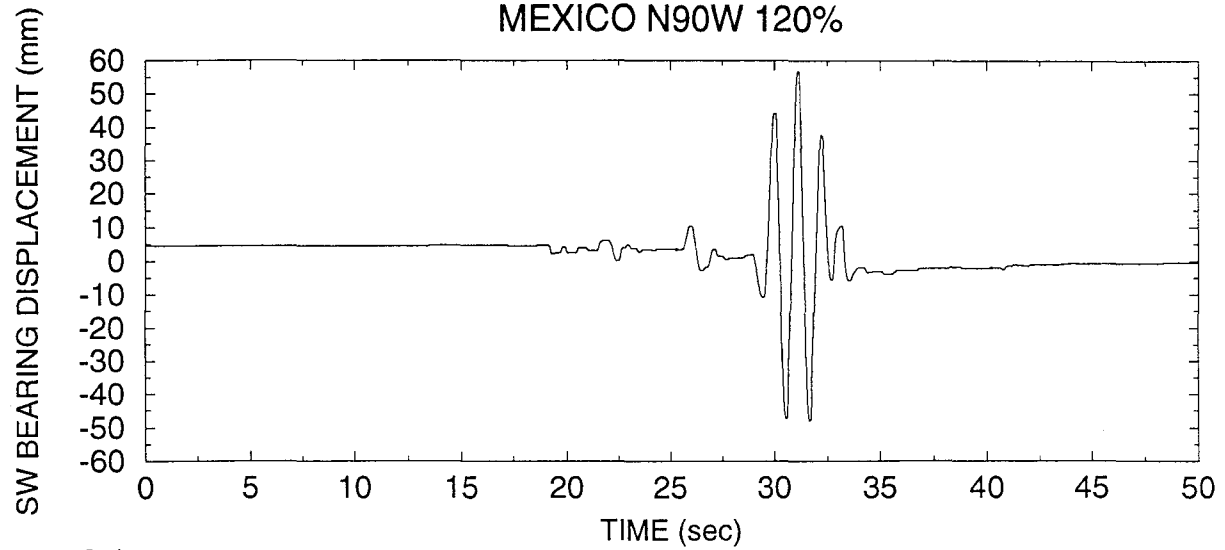




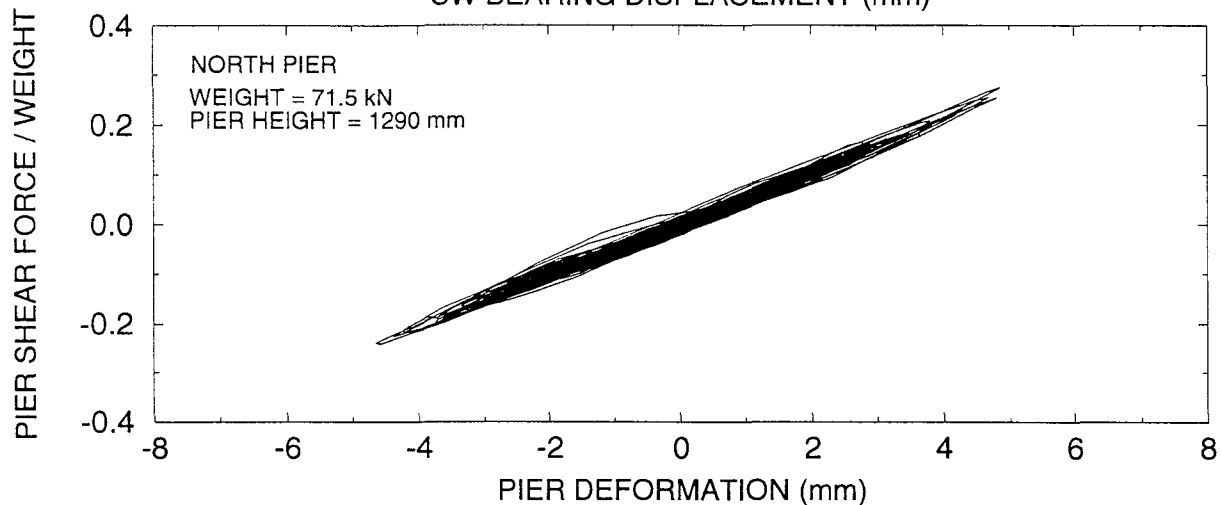
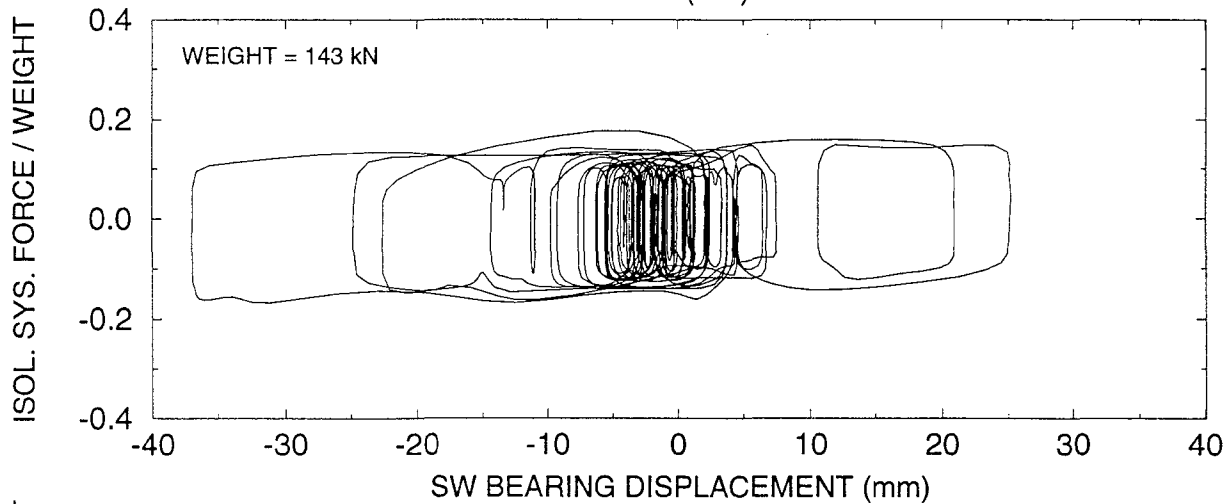
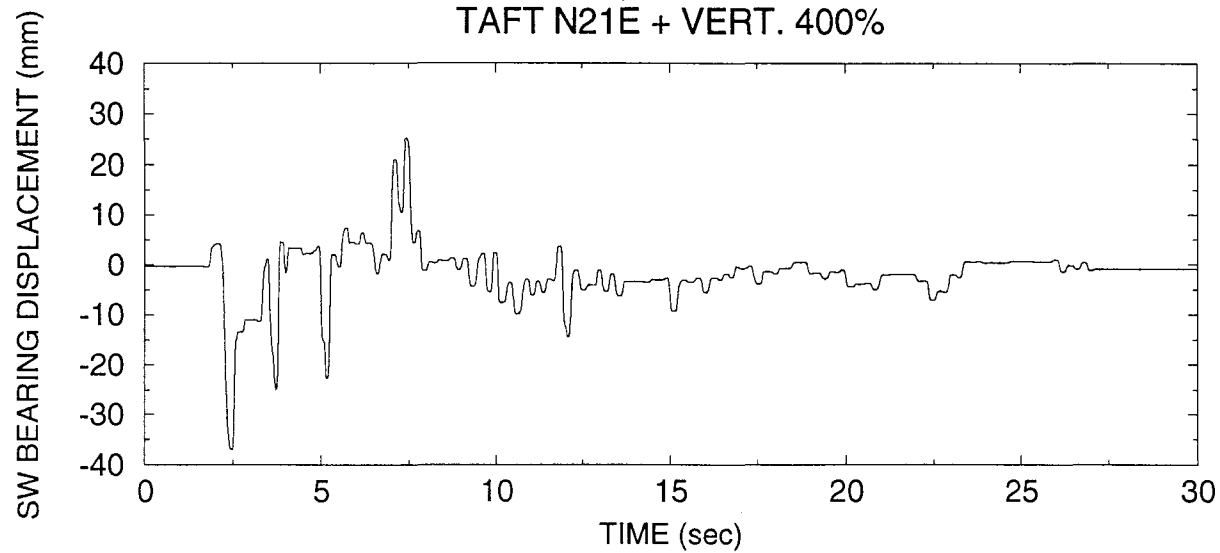
SYSTEM T2-No.1, TEST No. RSSRUN56  
MEXICO N90W 100%



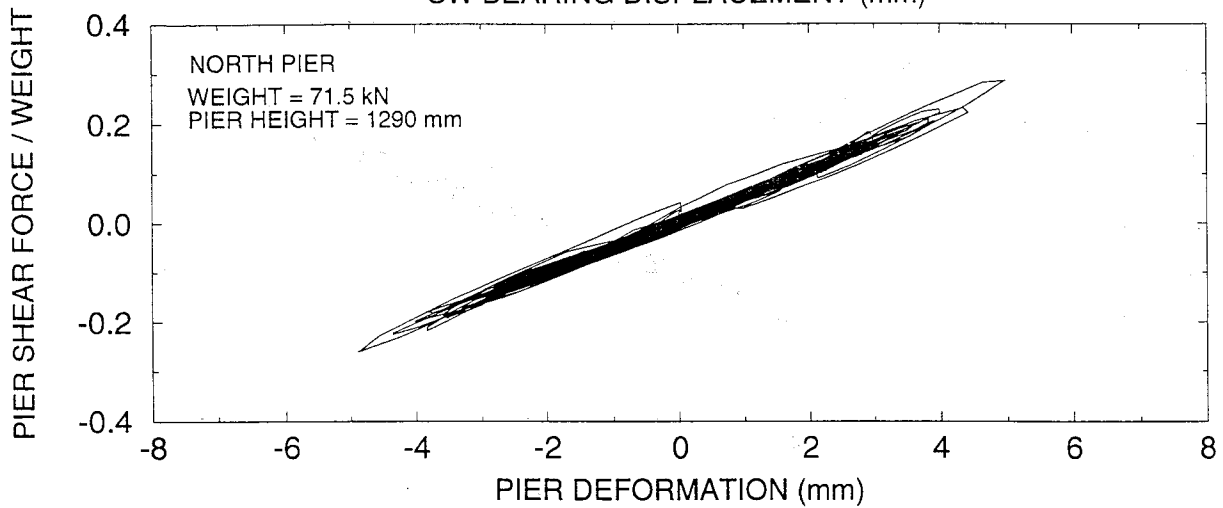
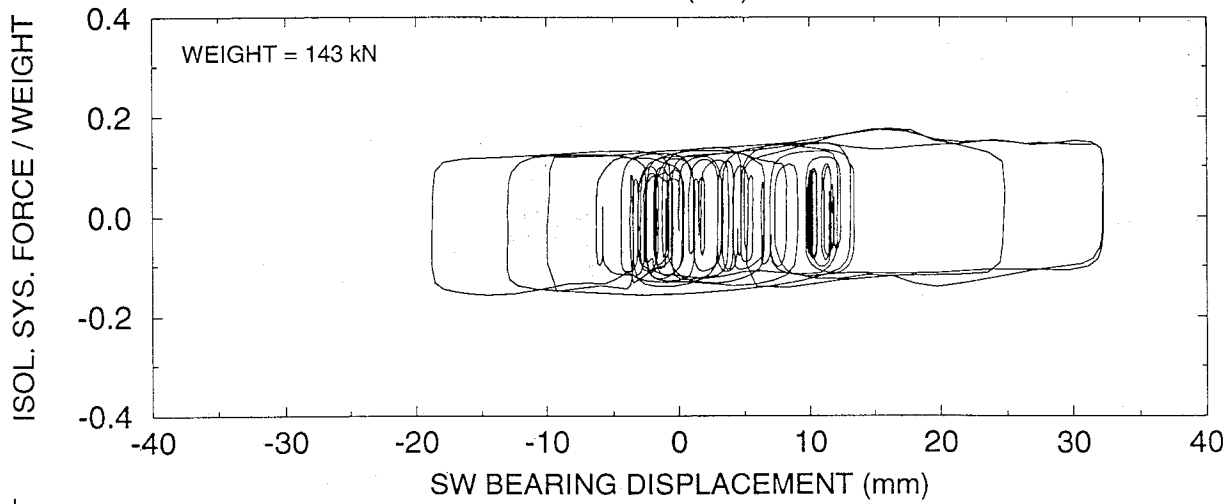
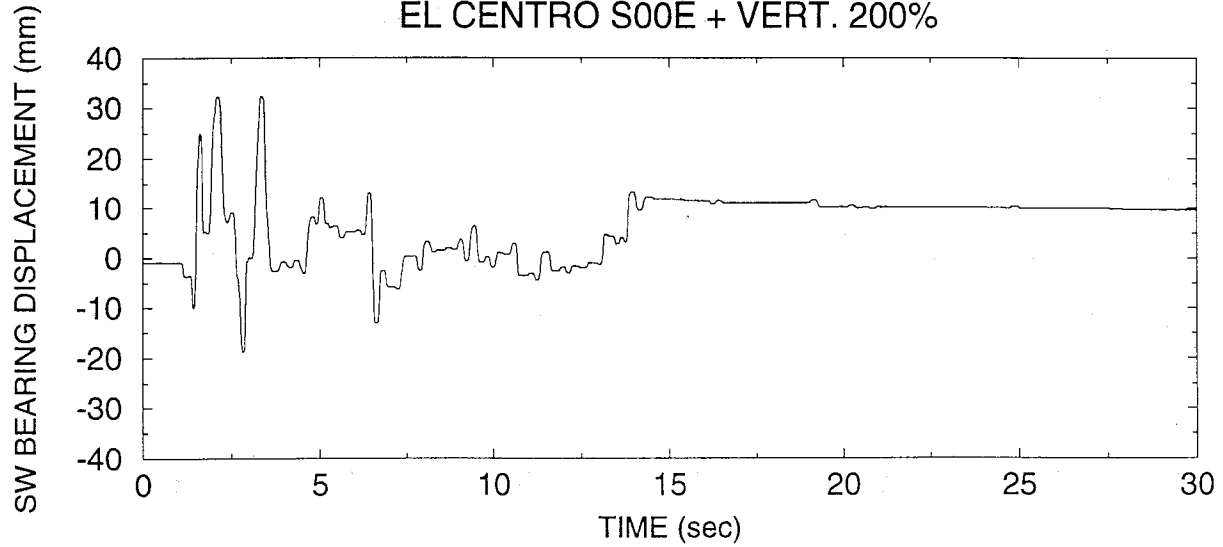
SYSTEM T2-No.1, TEST No. RSSRUN57  
MEXICO N90W 120%



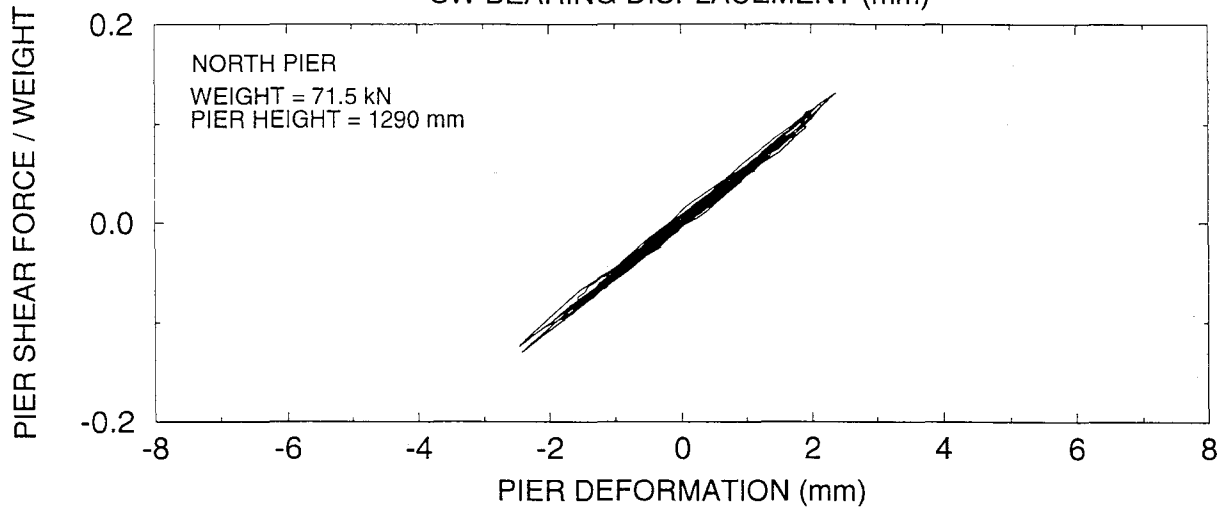
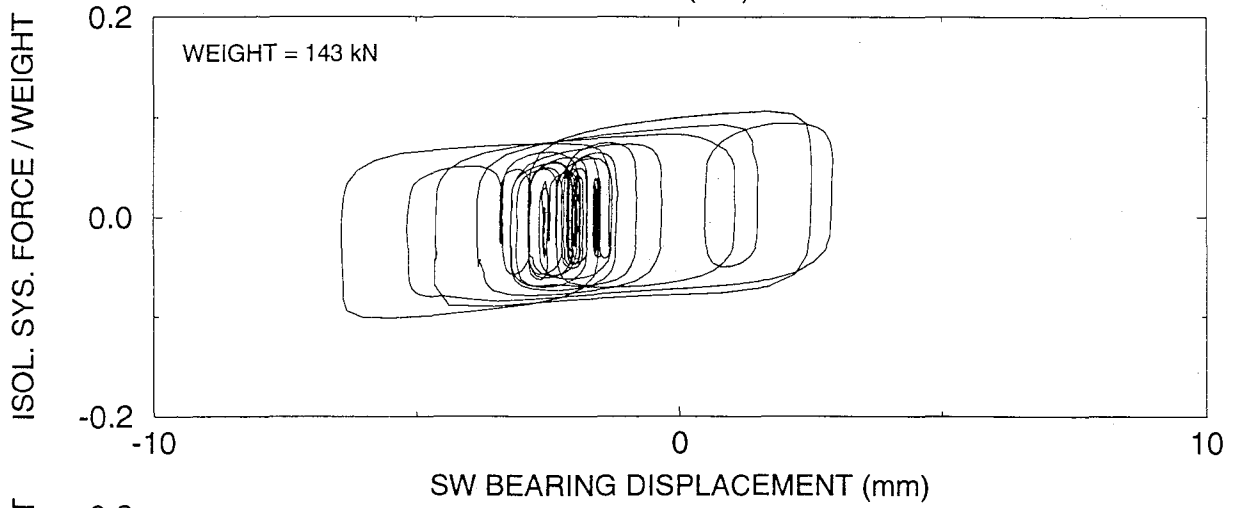
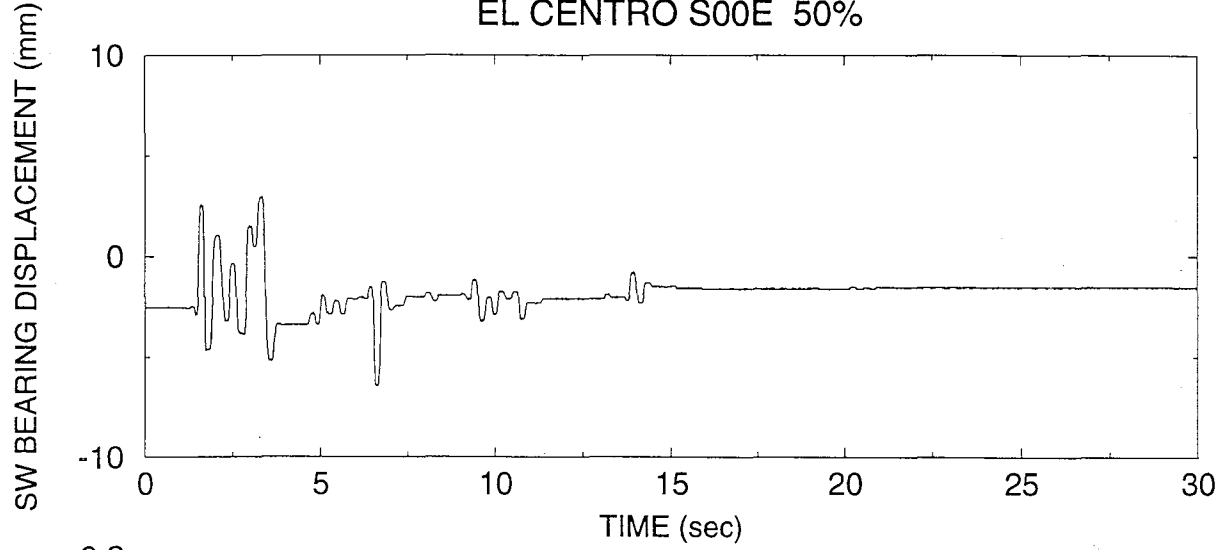
SYSTEM T2-No.1, TEST No. RSSRUN58  
TAFT N21E + VERT. 400%



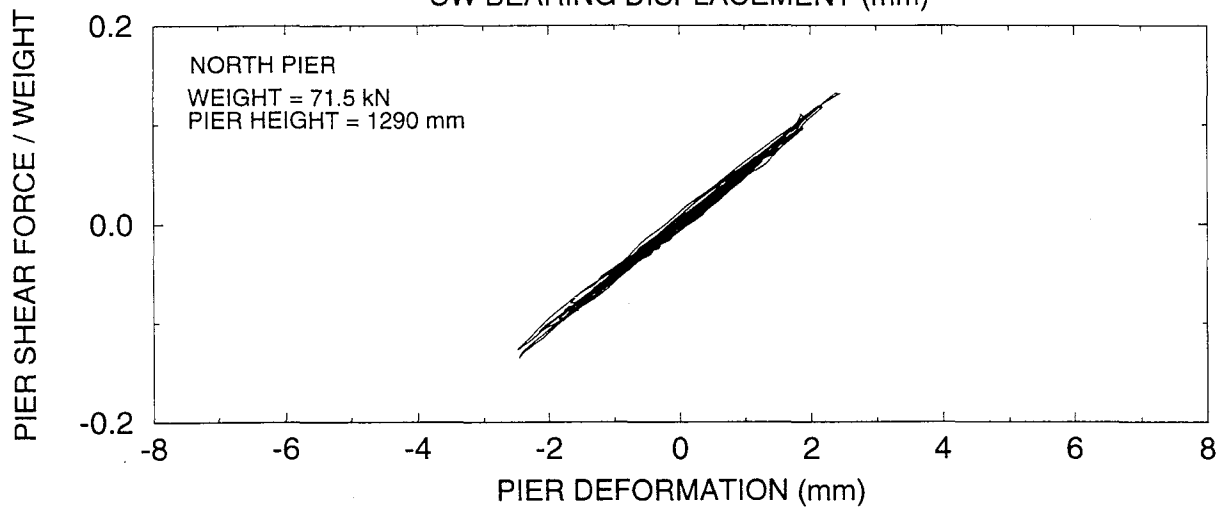
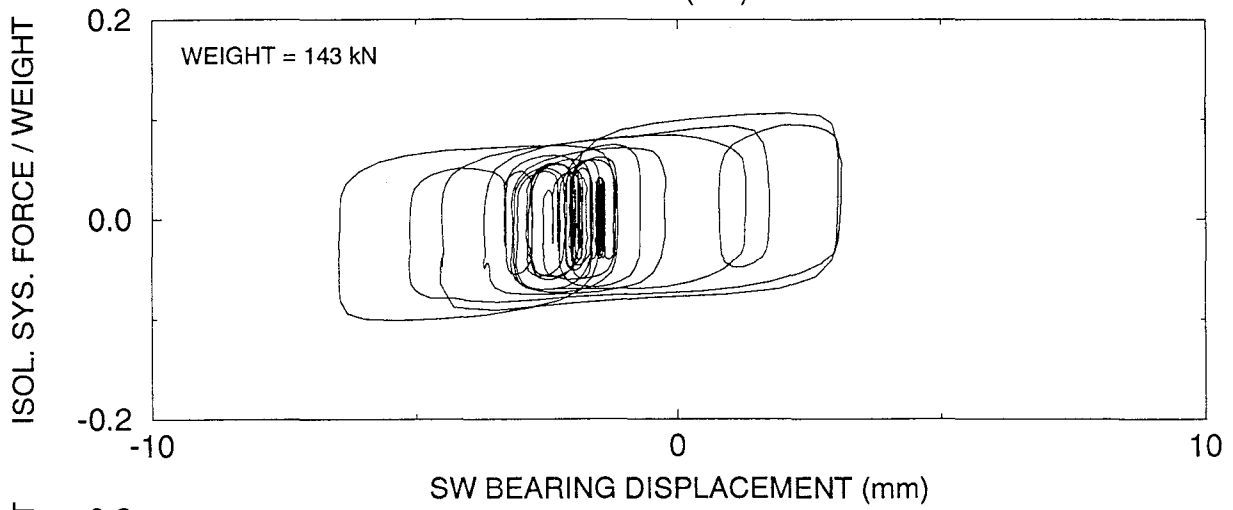
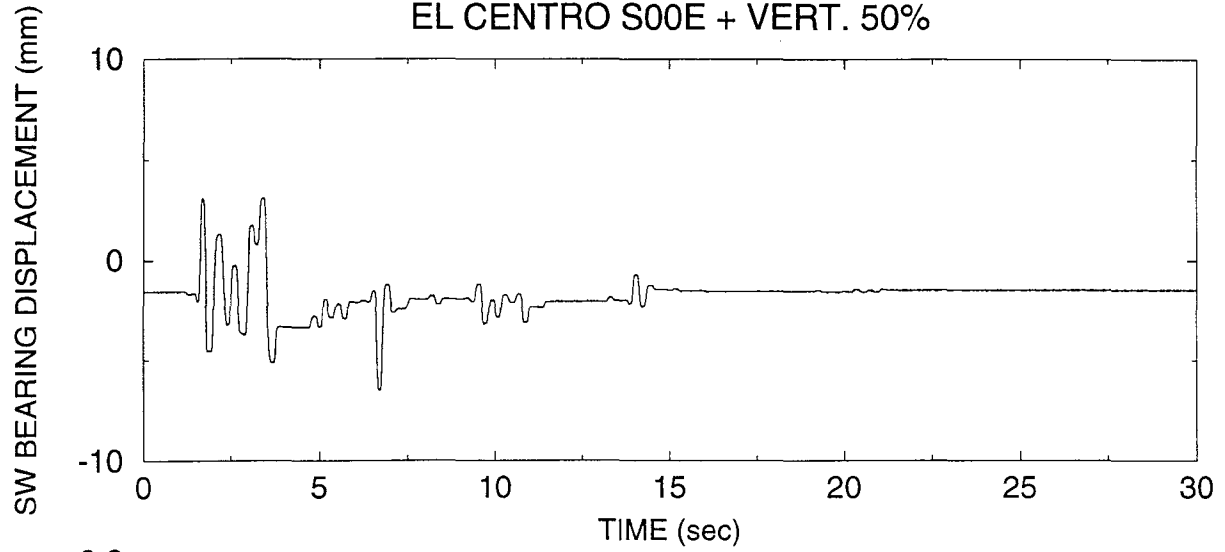
SYSTEM T2-No.1, TEST No. RSSRUN59  
EL CENTRO S00E + VERT. 200%



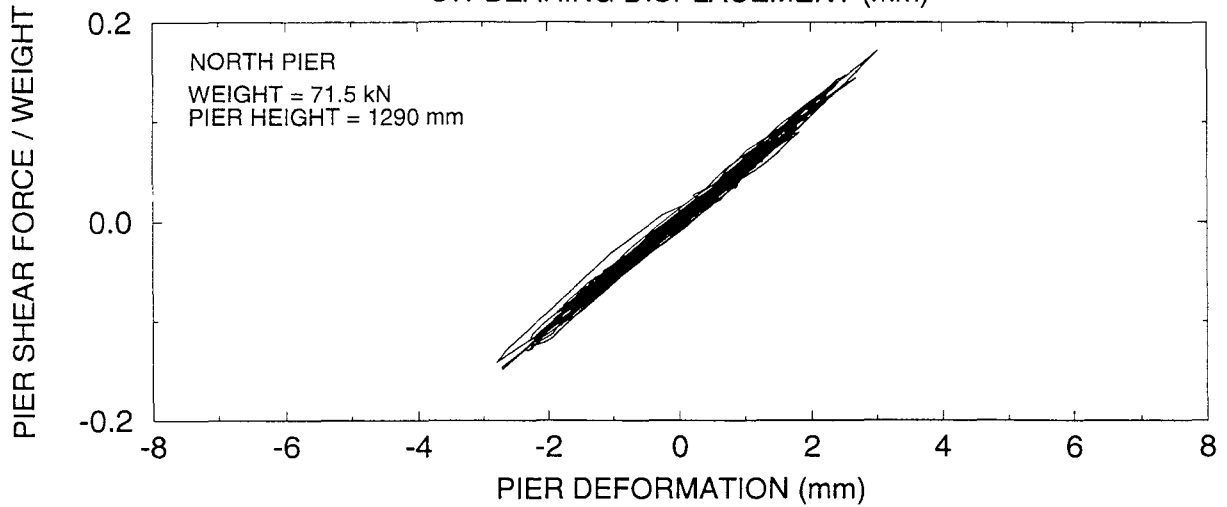
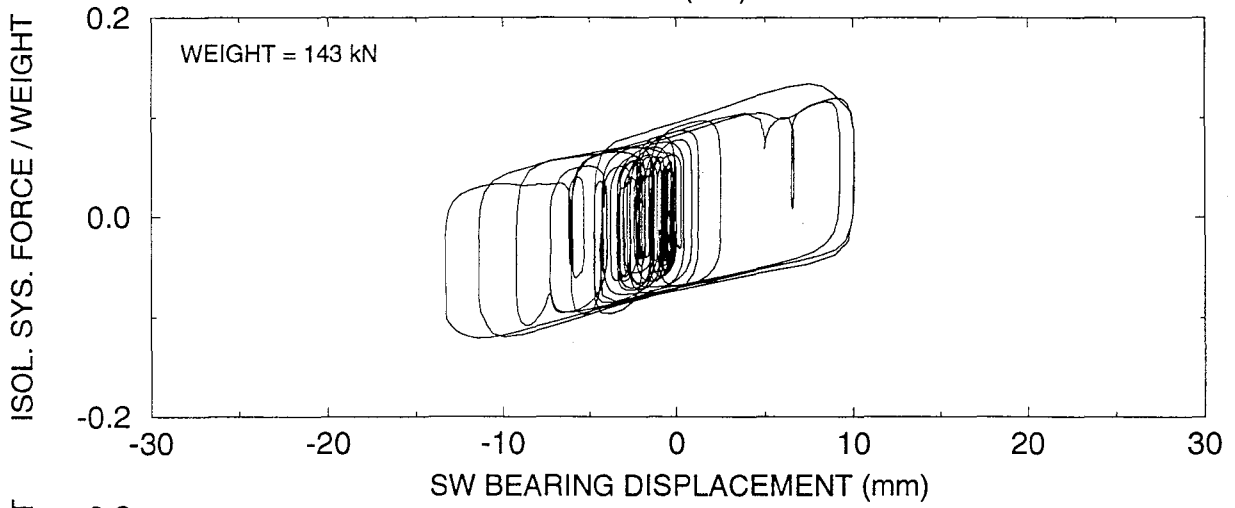
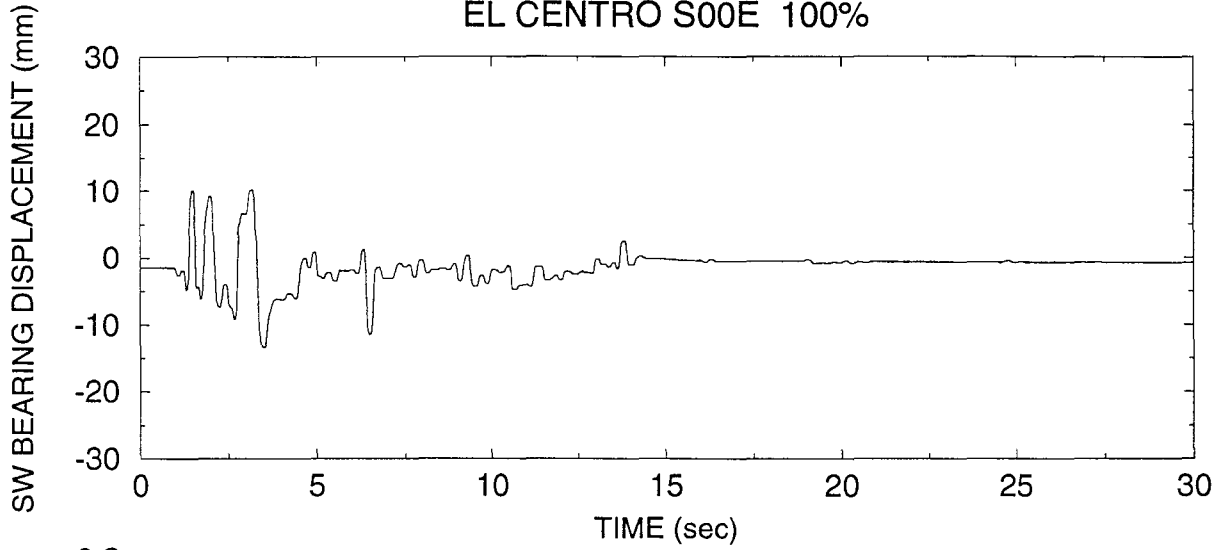
SYSTEM C1-No.3, TEST No. RLLRUN24  
EL CENTRO S00E 50%



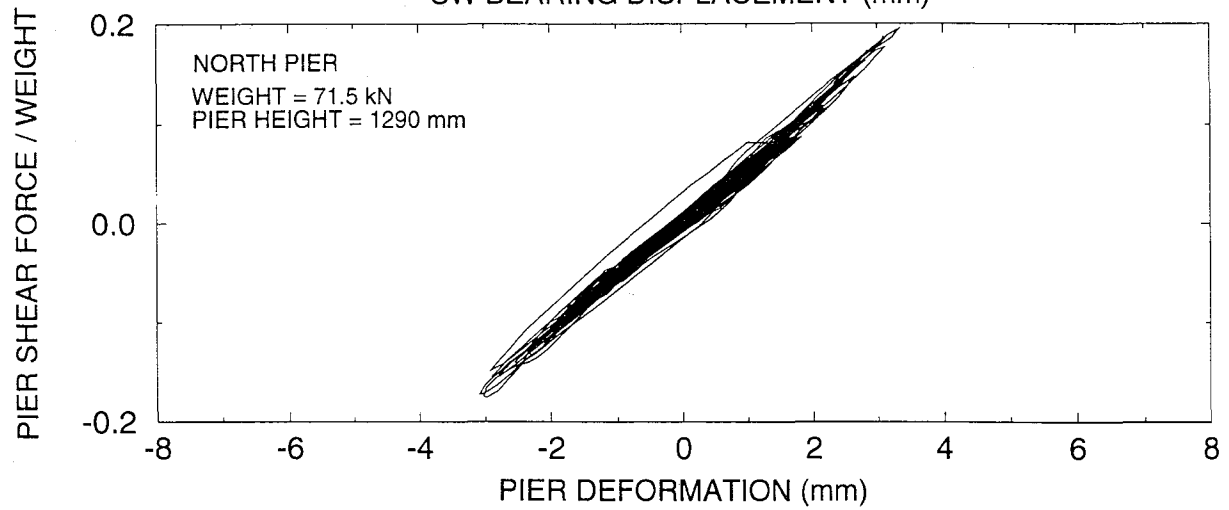
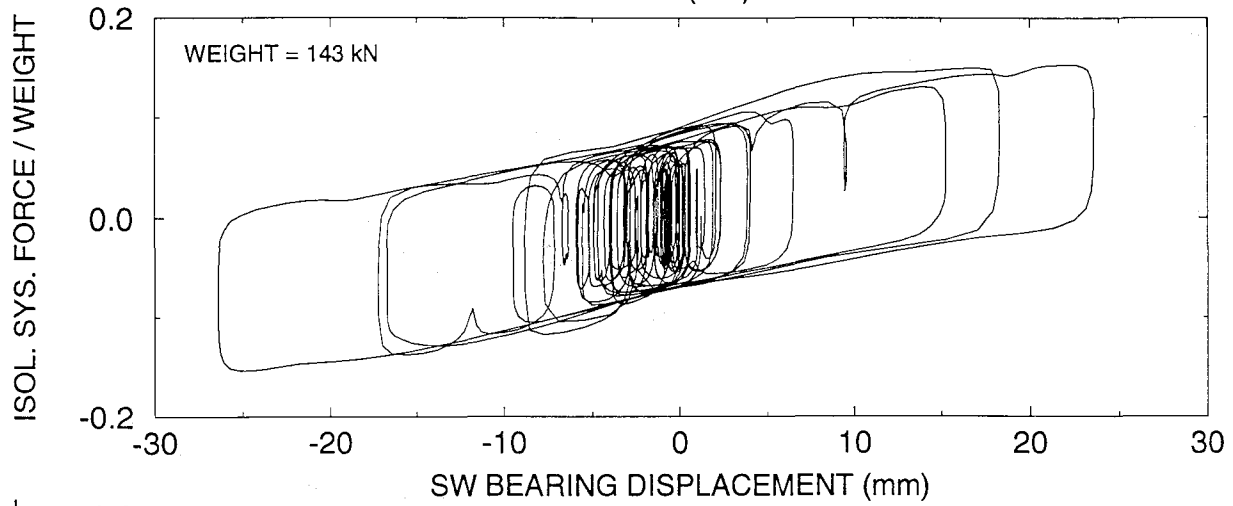
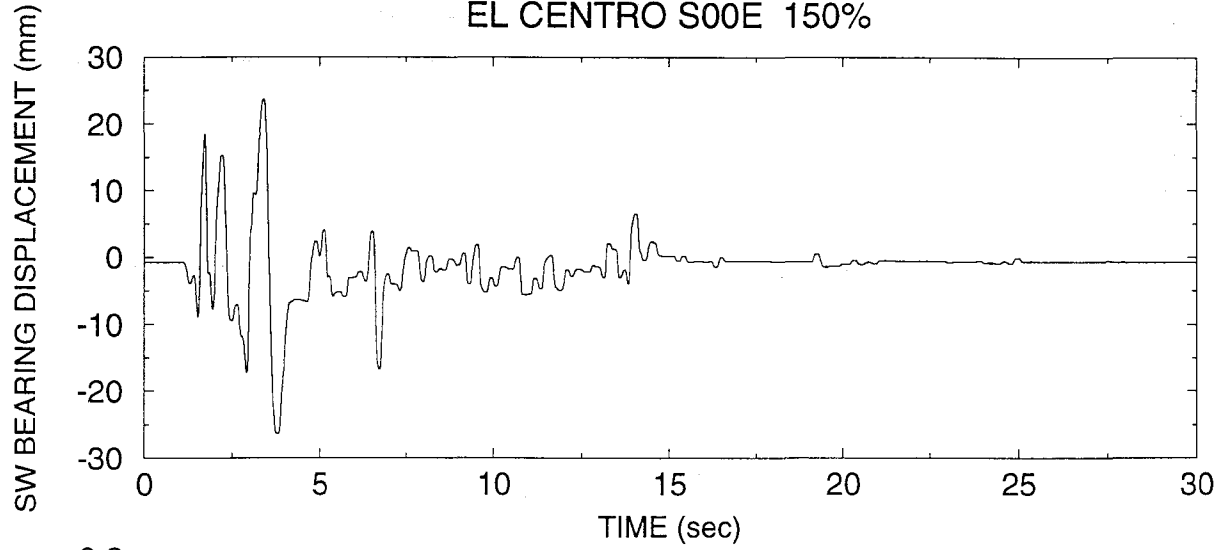
SYSTEM C1-No.3, TEST No. RLLRUN25  
EL CENTRO S00E + VERT. 50%



SYSTEM C1-No.3, TEST No. RLLRUN26  
EL CENTRO S00E 100%

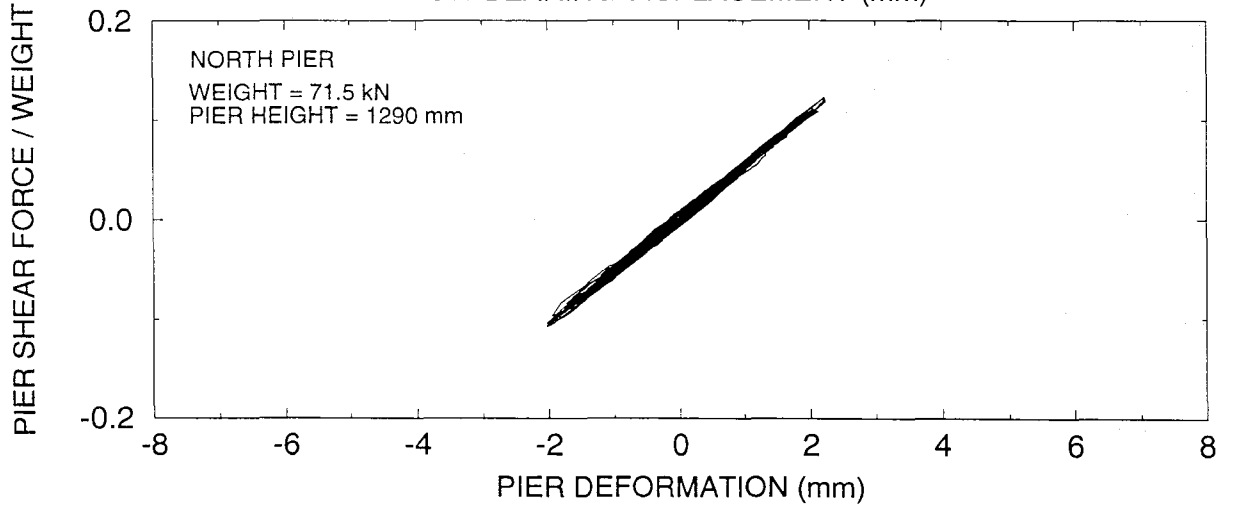
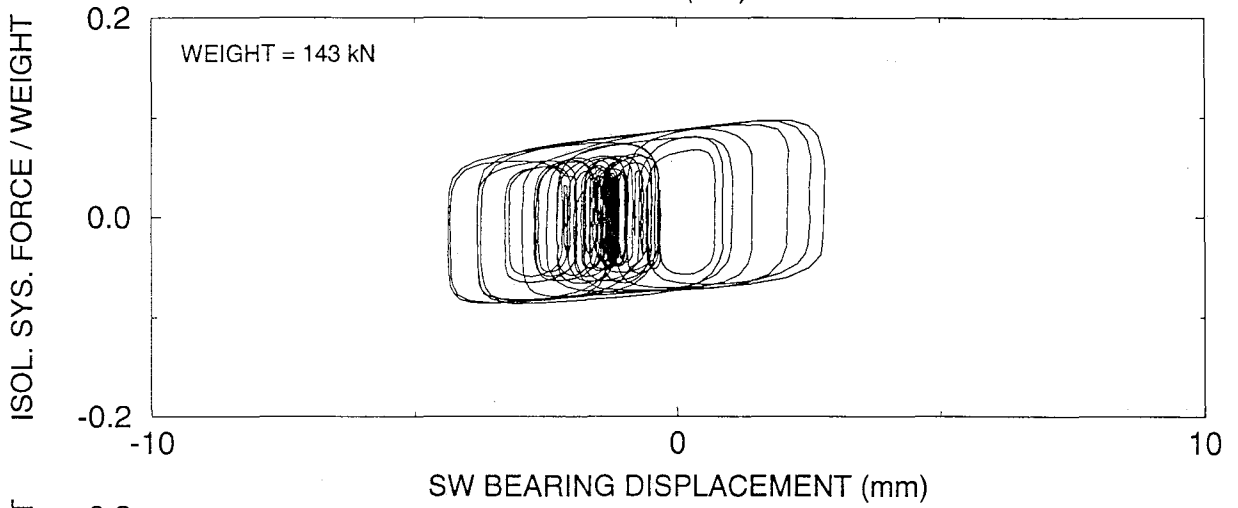
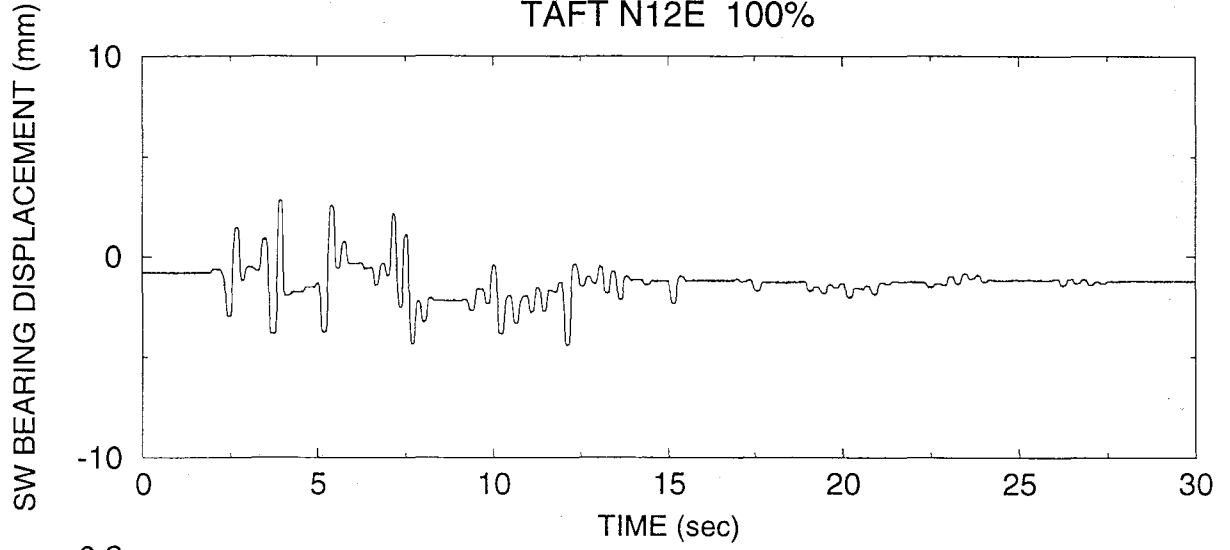


SYSTEM C1-No.3, TEST No. RLLRUN27  
EL CENTRO S00E 150%

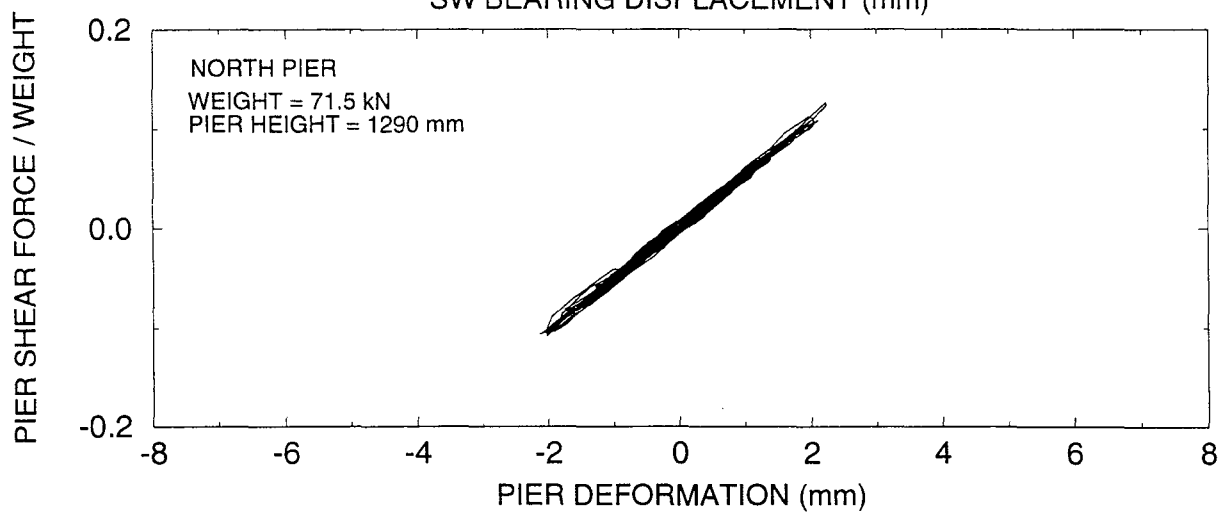
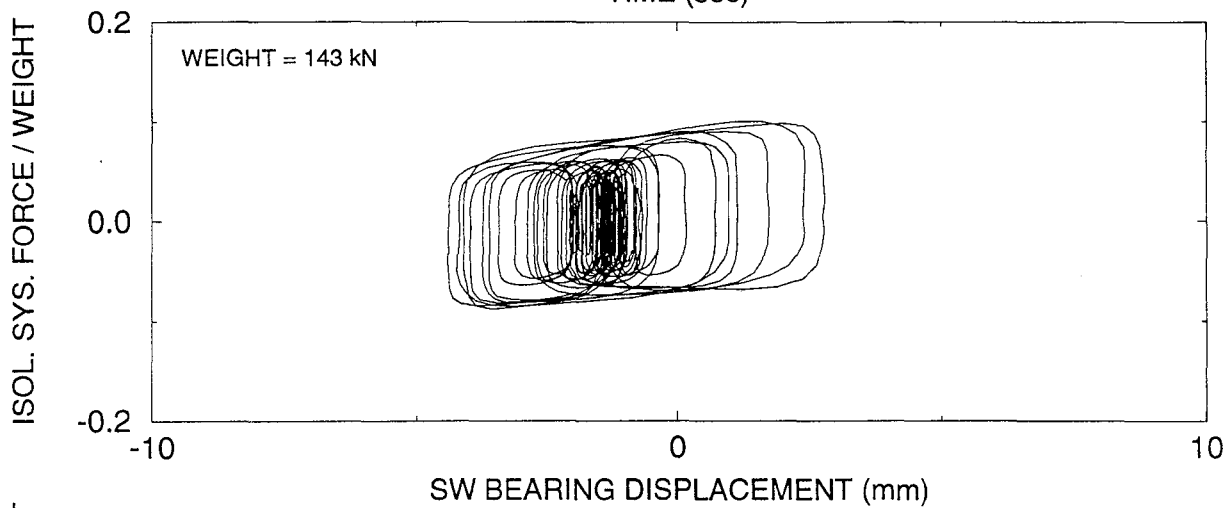
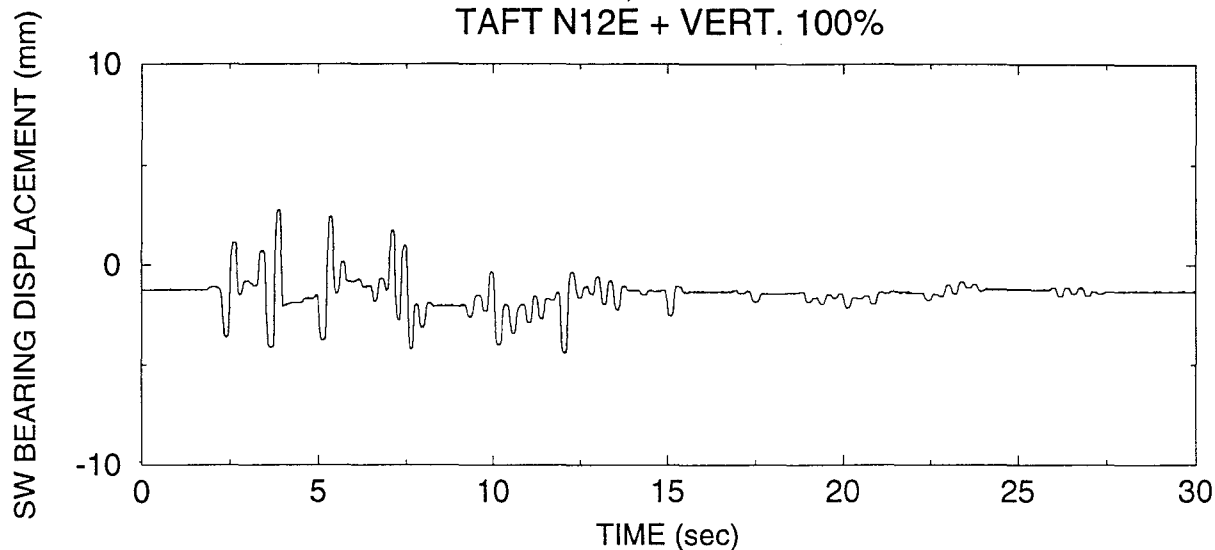




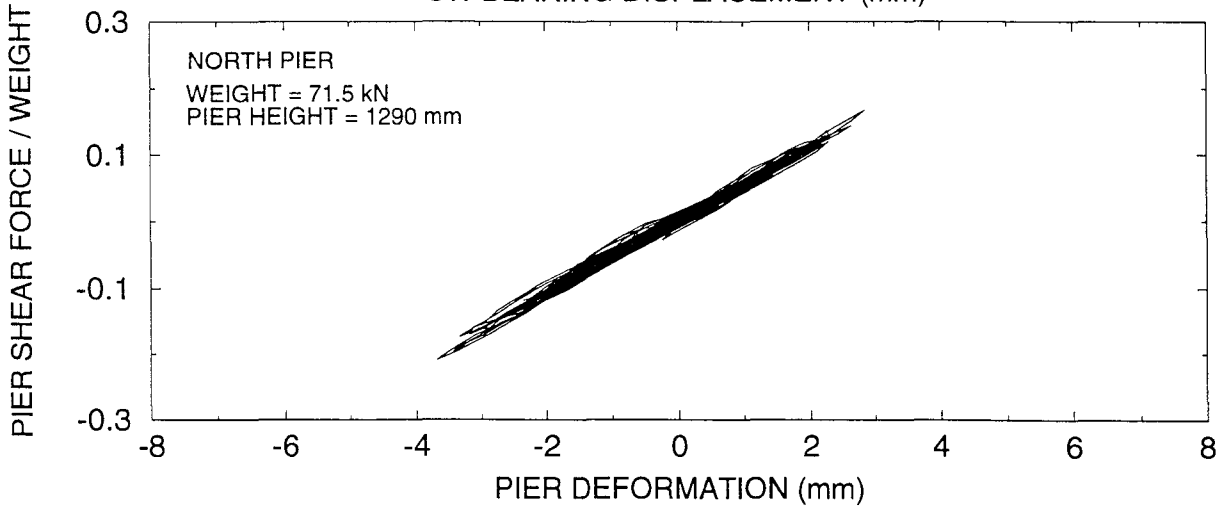
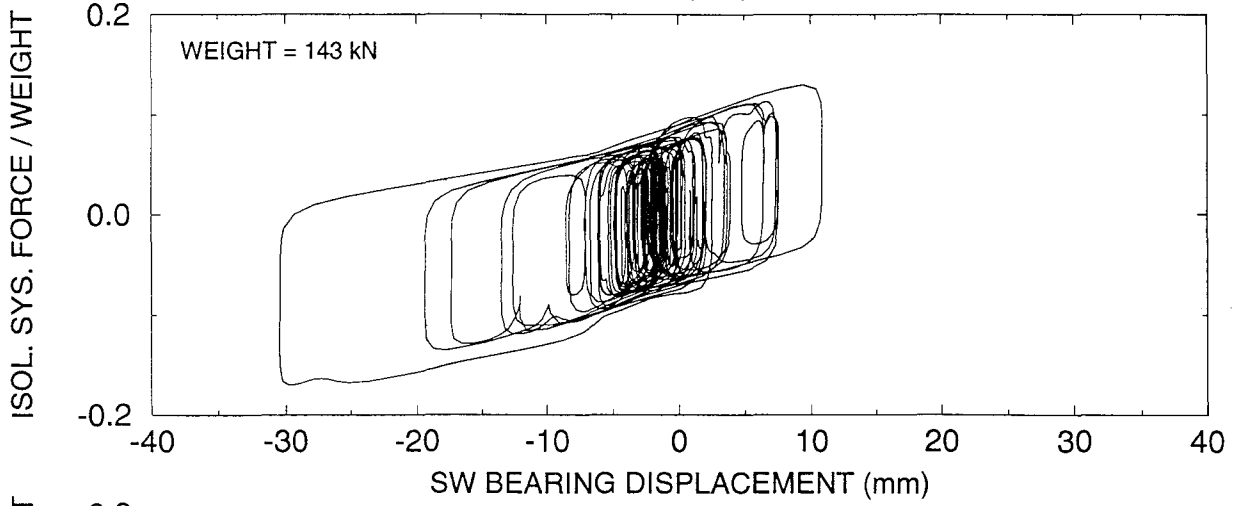
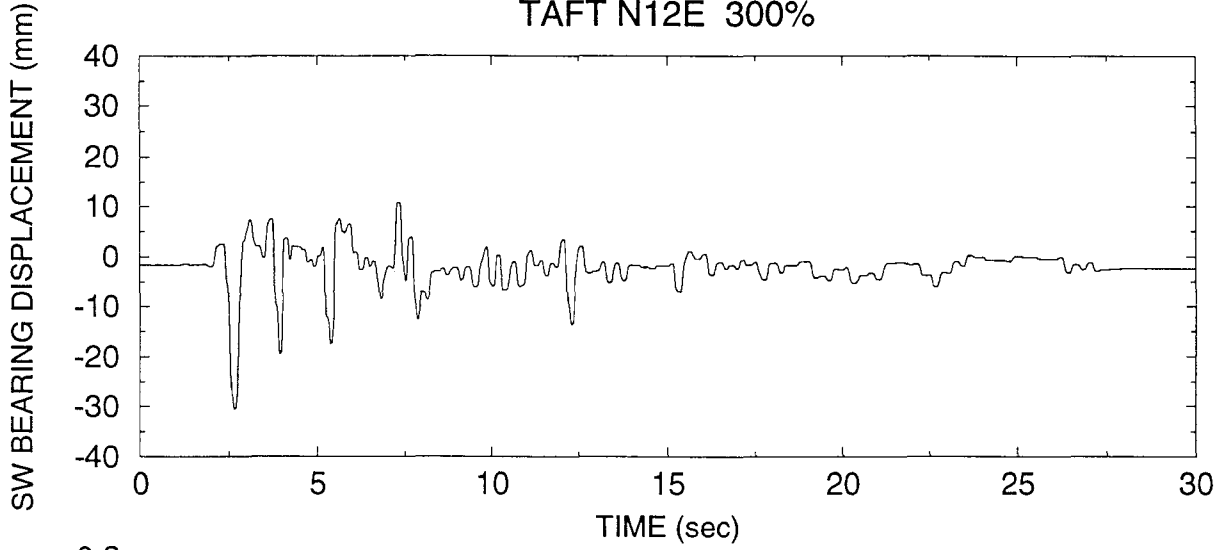
SYSTEM C1-No.3, TEST No. RLLRUN28  
TAFT N12E 100%



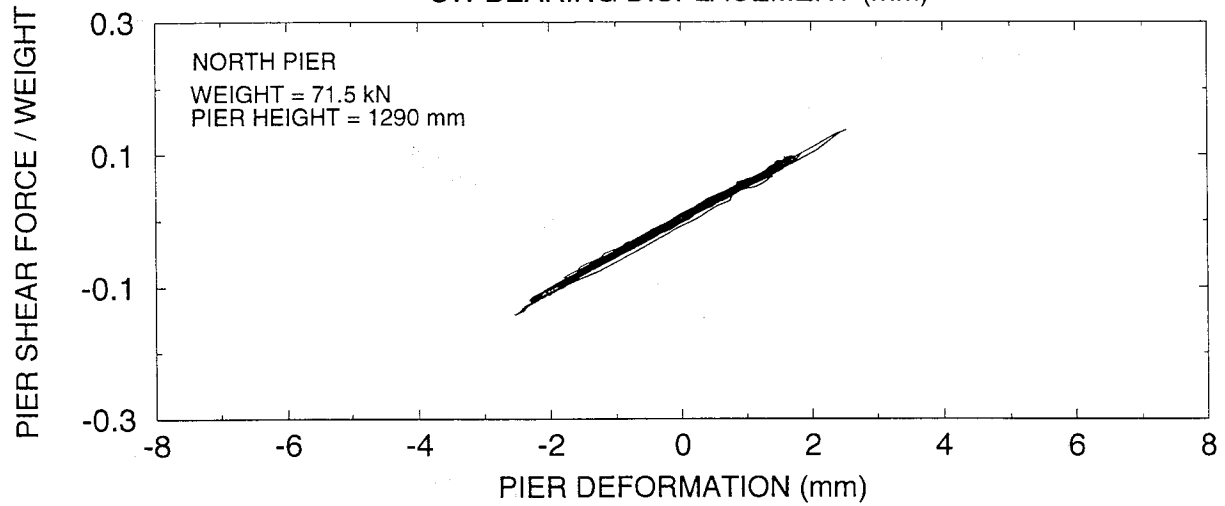
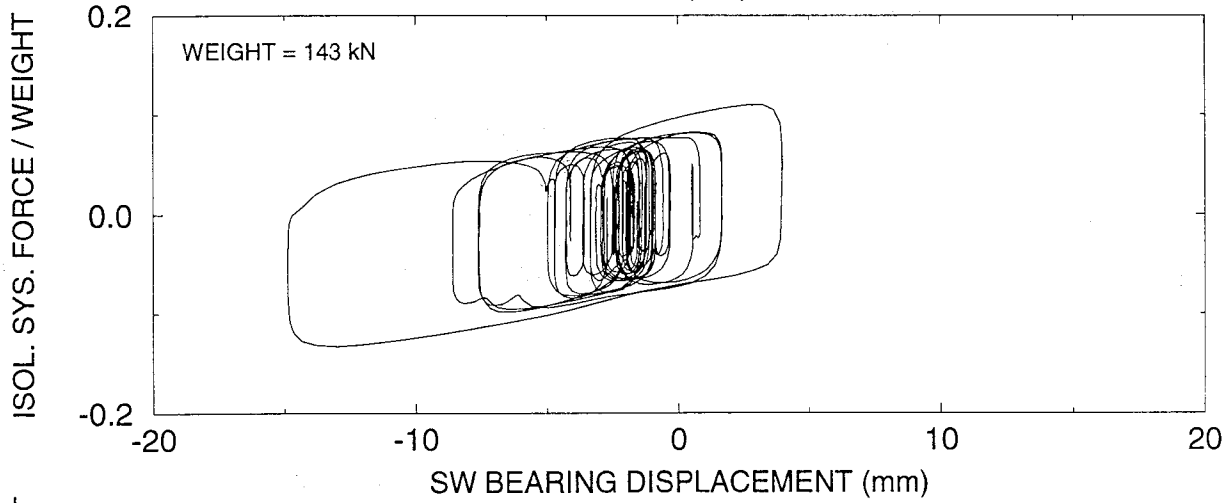
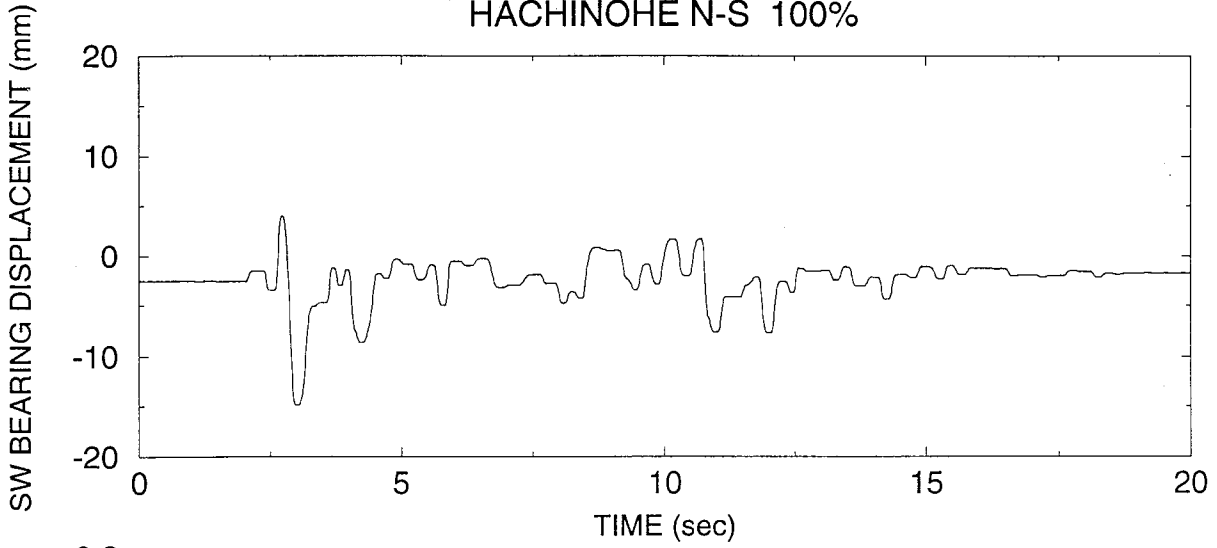
SYSTEM C1-No.3, TEST No. RLLRUN29  
TAFT N12E + VERT. 100%



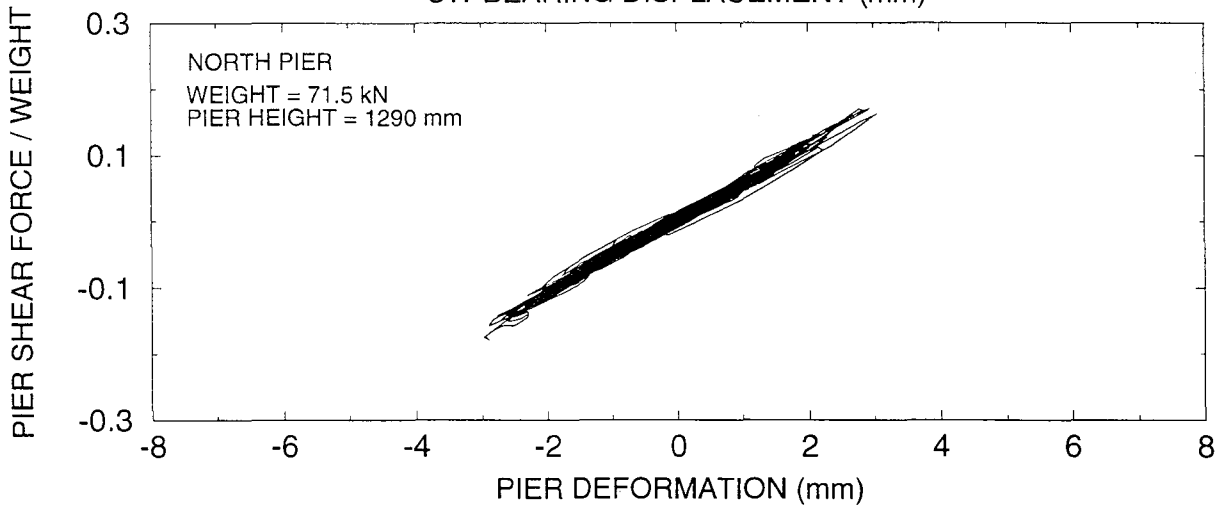
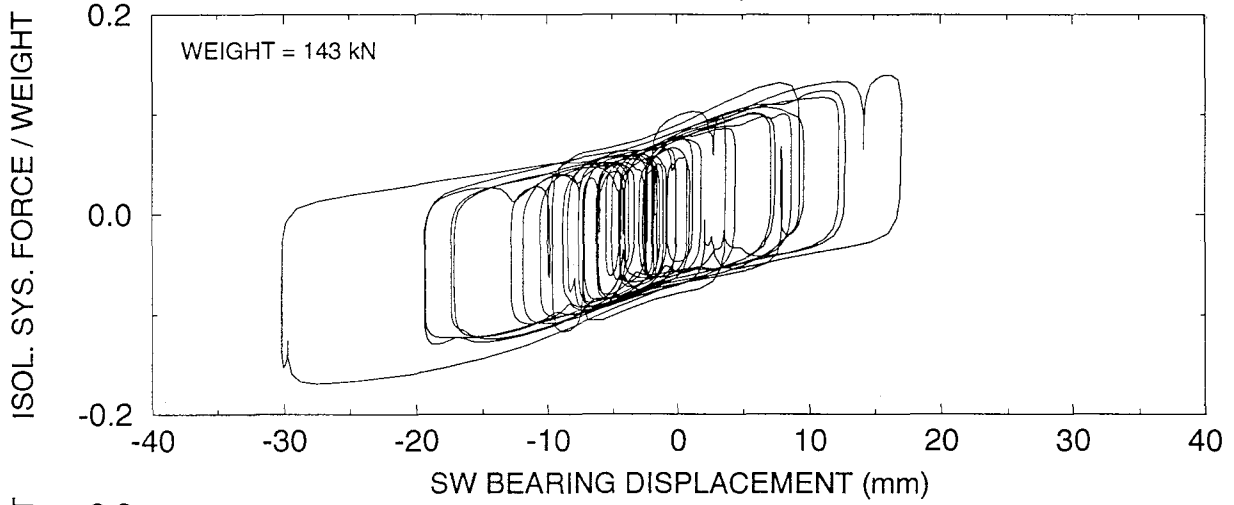
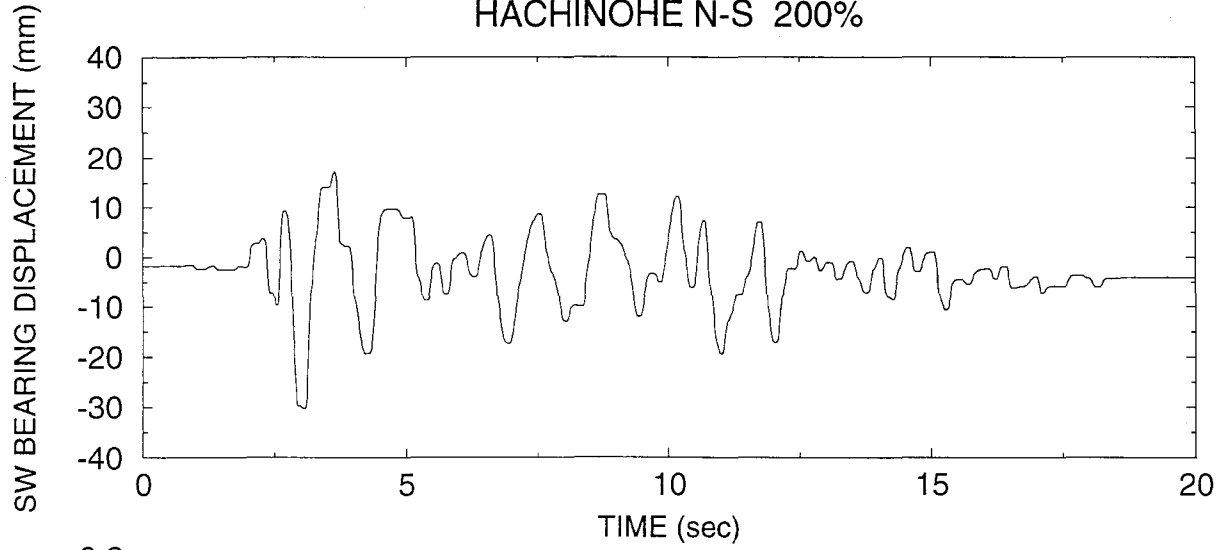
SYSTEM C1-No.3, TEST No. RLLRUN31  
TAFT N12E 300%



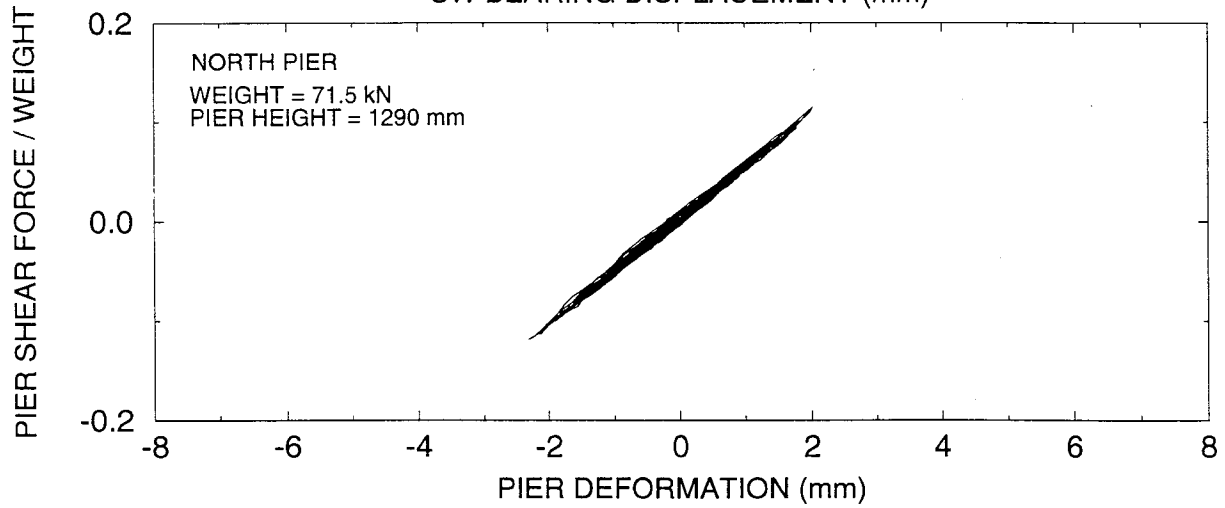
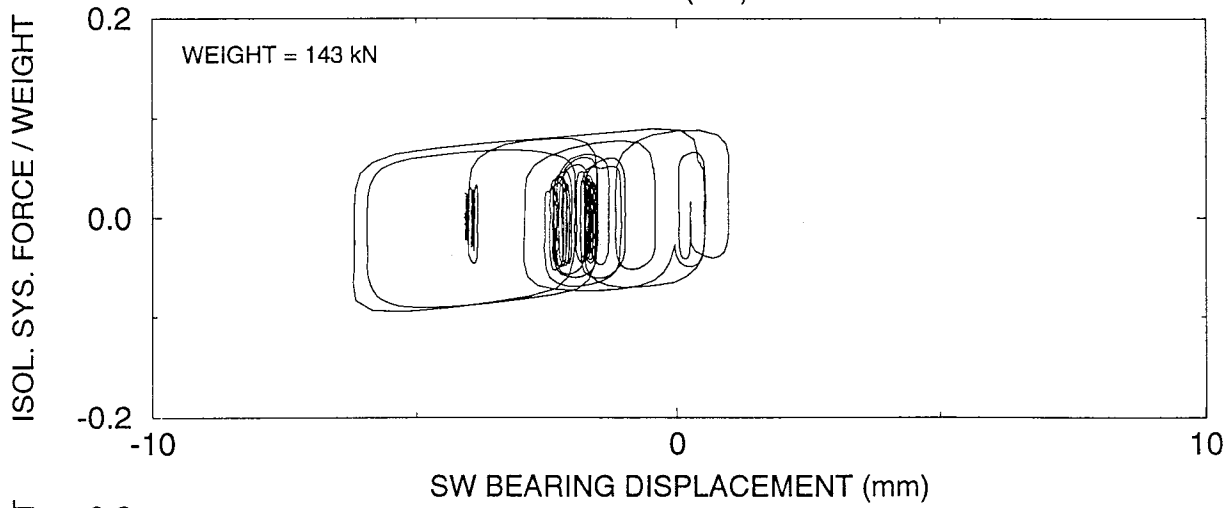
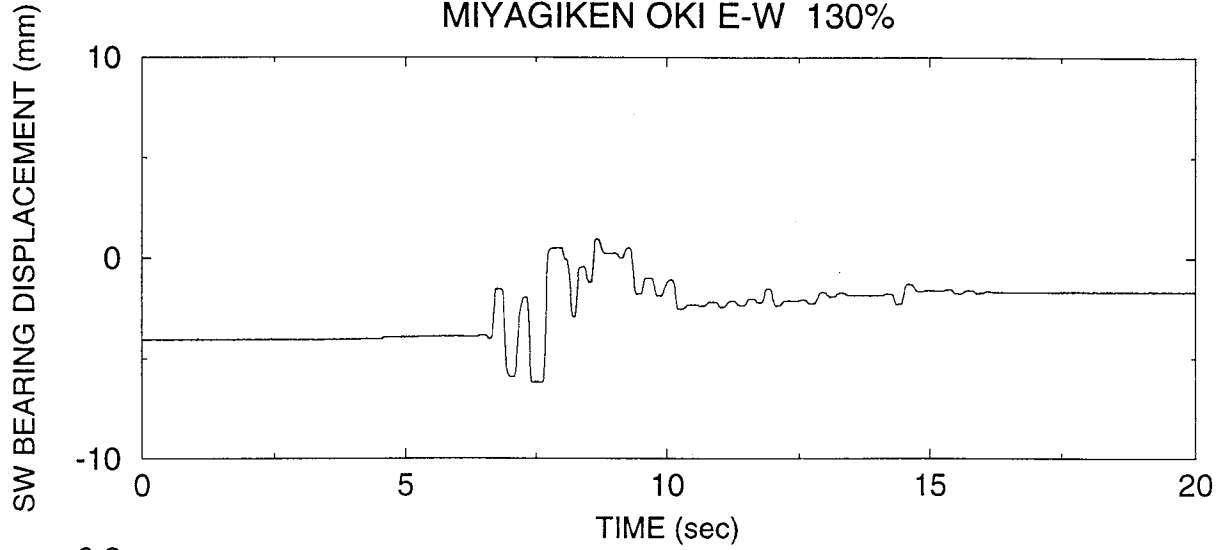
SYSTEM C1-No.3, TEST No. RLLRUN32  
HACHINOHE N-S 100%



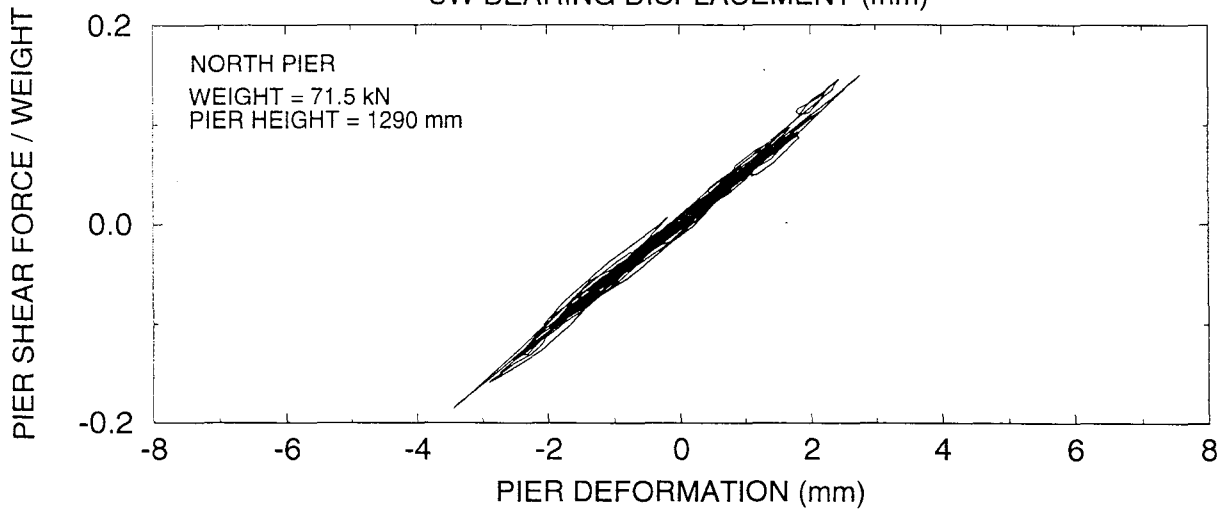
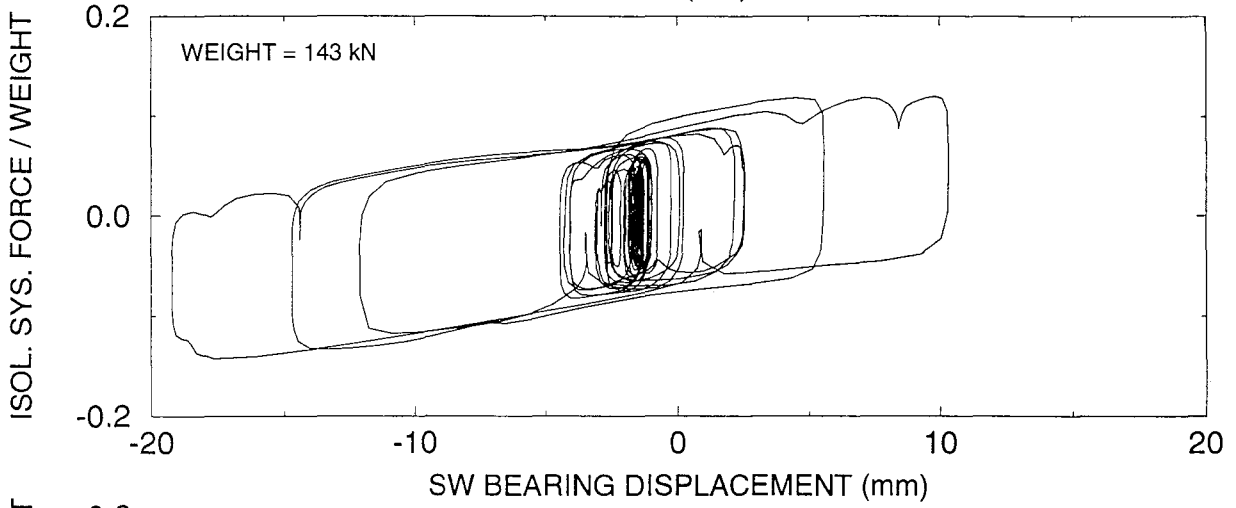
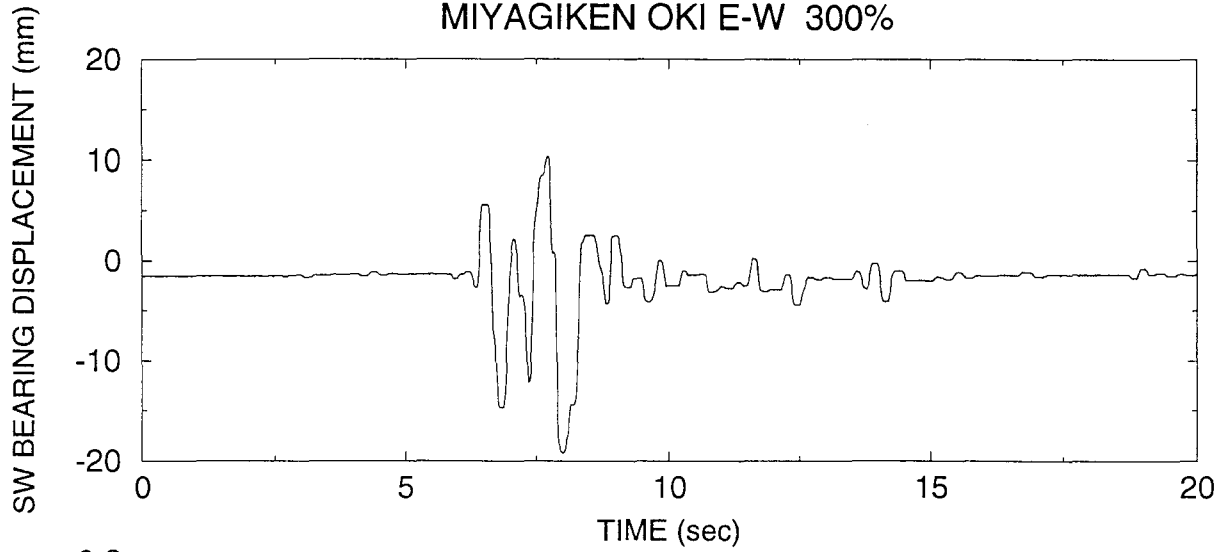
SYSTEM C1-No.3, TEST No. RLLRUN33  
HACHINOHE N-S 200%



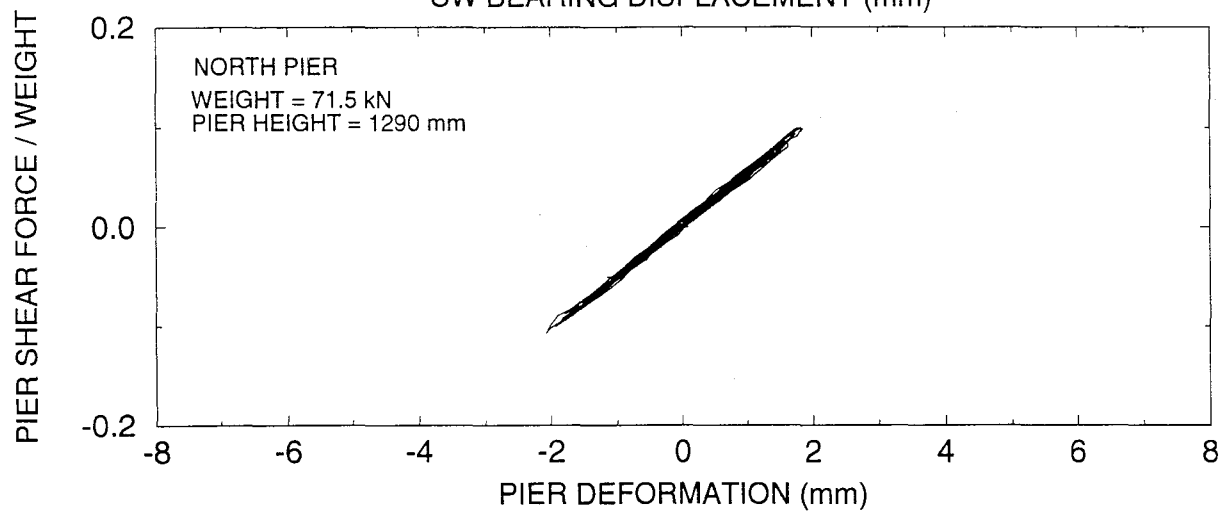
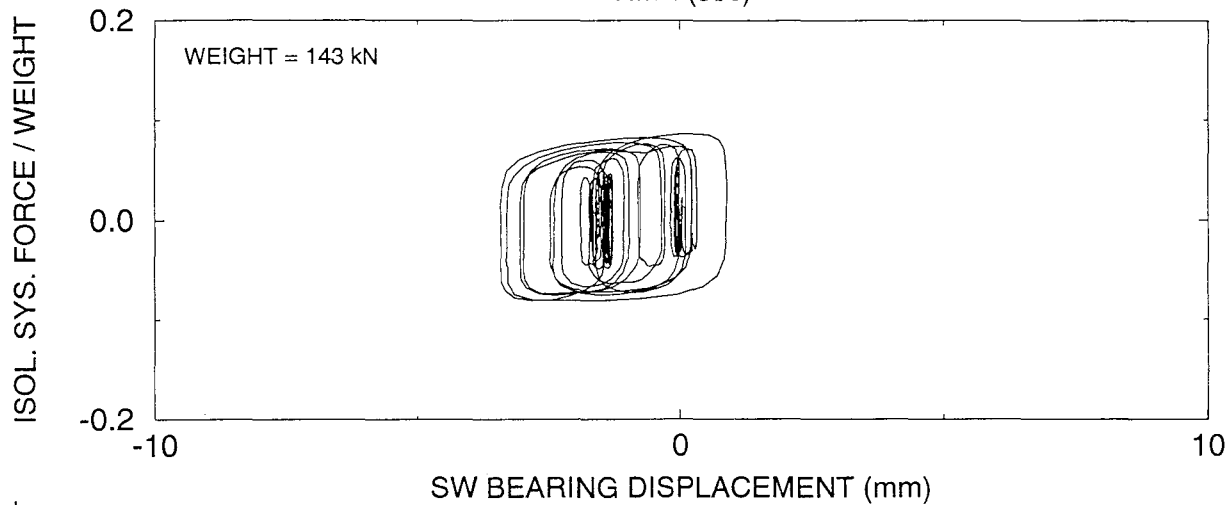
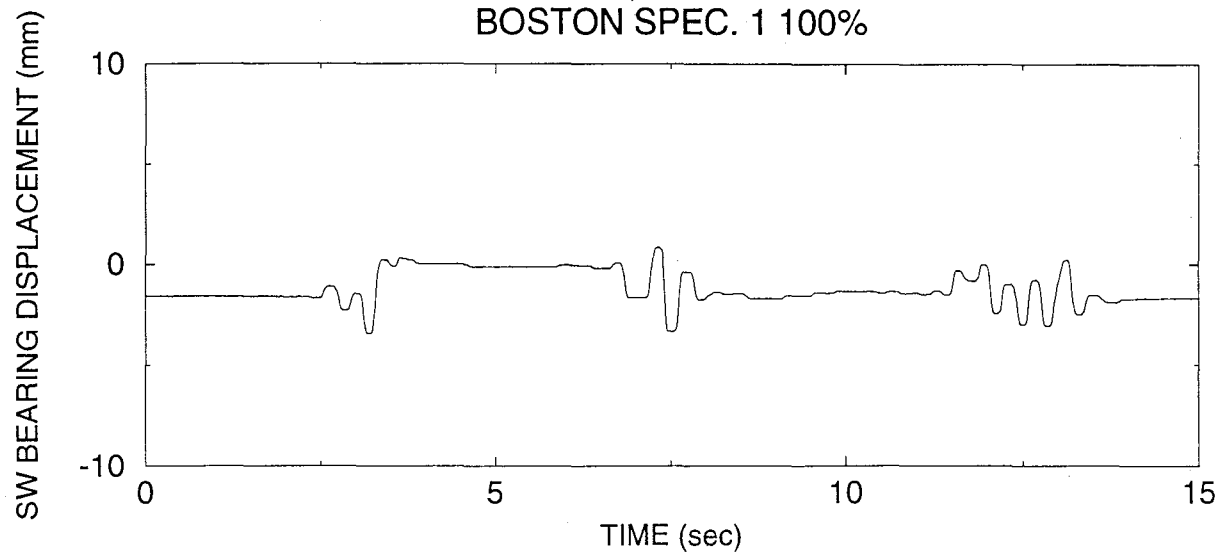
SYSTEM C1-No.3, TEST No. RLLRUN34  
MIYAGIKEN OKI E-W 130%



SYSTEM C1-No.3, TEST No. RLLRUN36  
MIYAGIKEN OKI E-W 300%

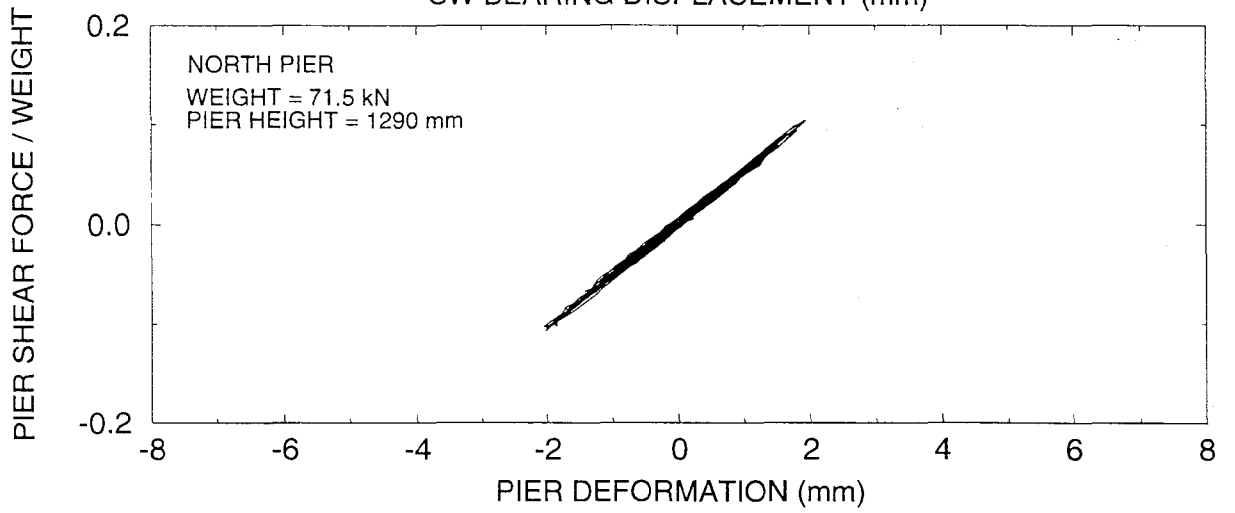
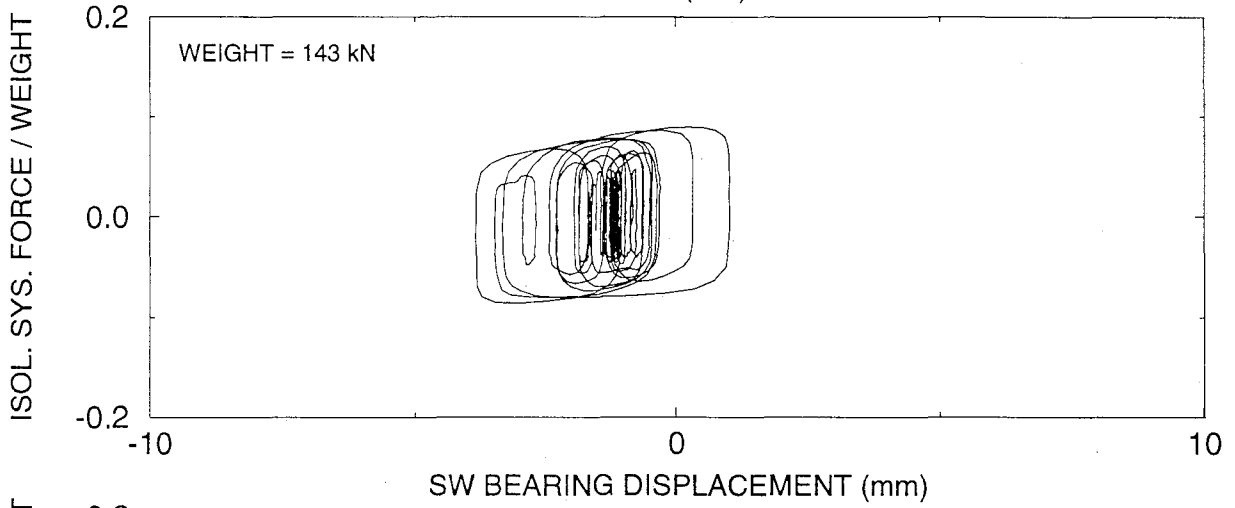
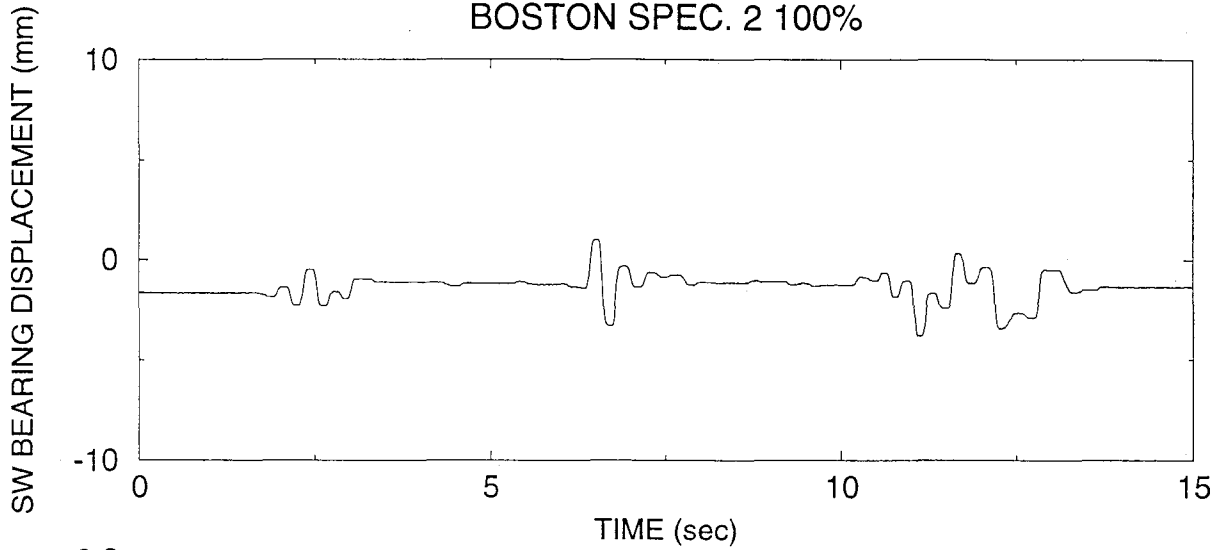


SYSTEM C1-No.3, TEST No. RLLRUN37  
BOSTON SPEC. 1 100%

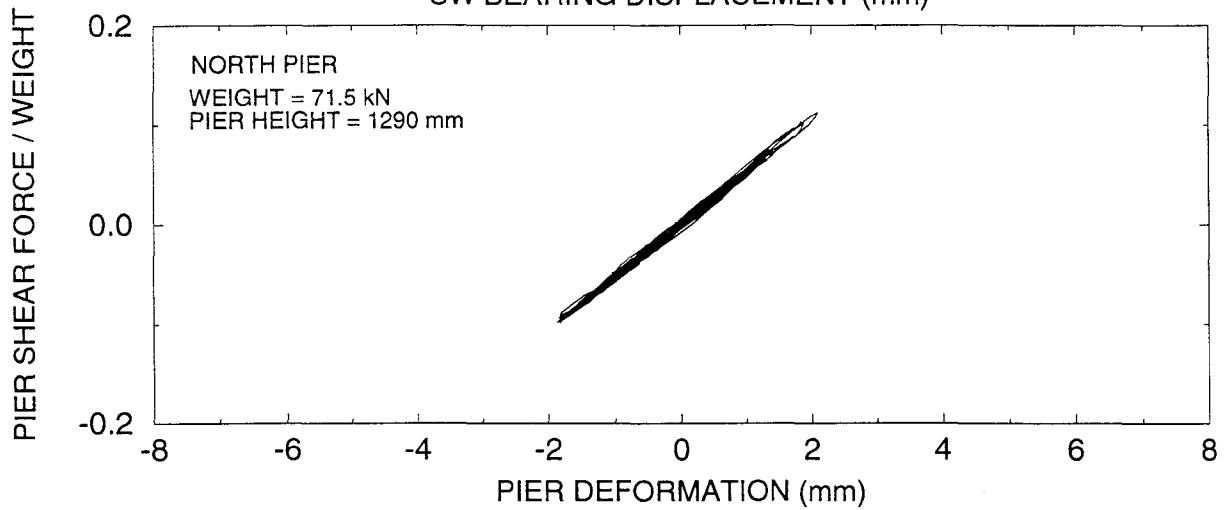
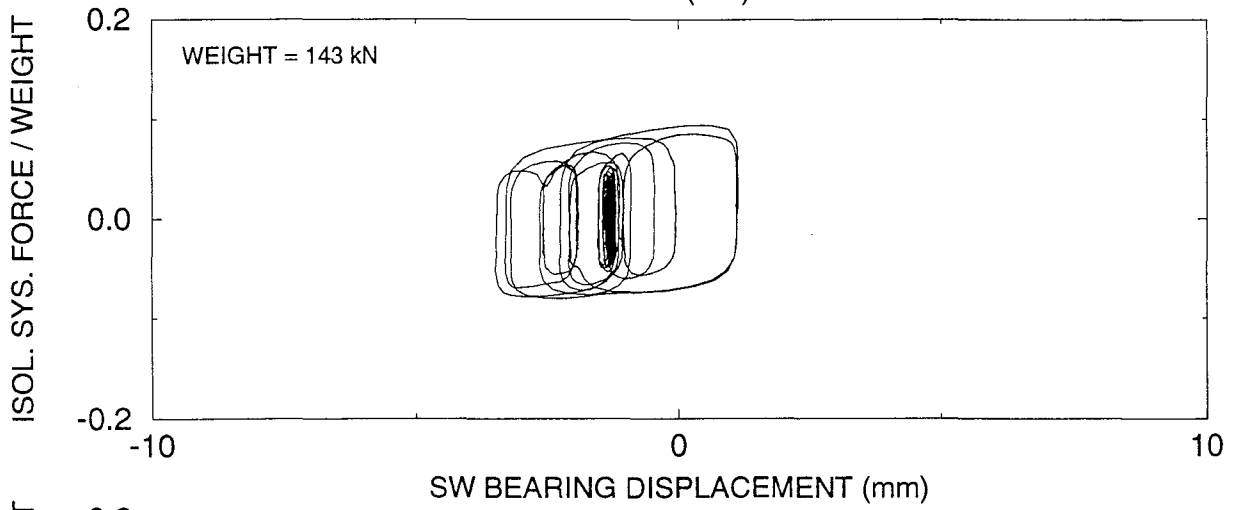
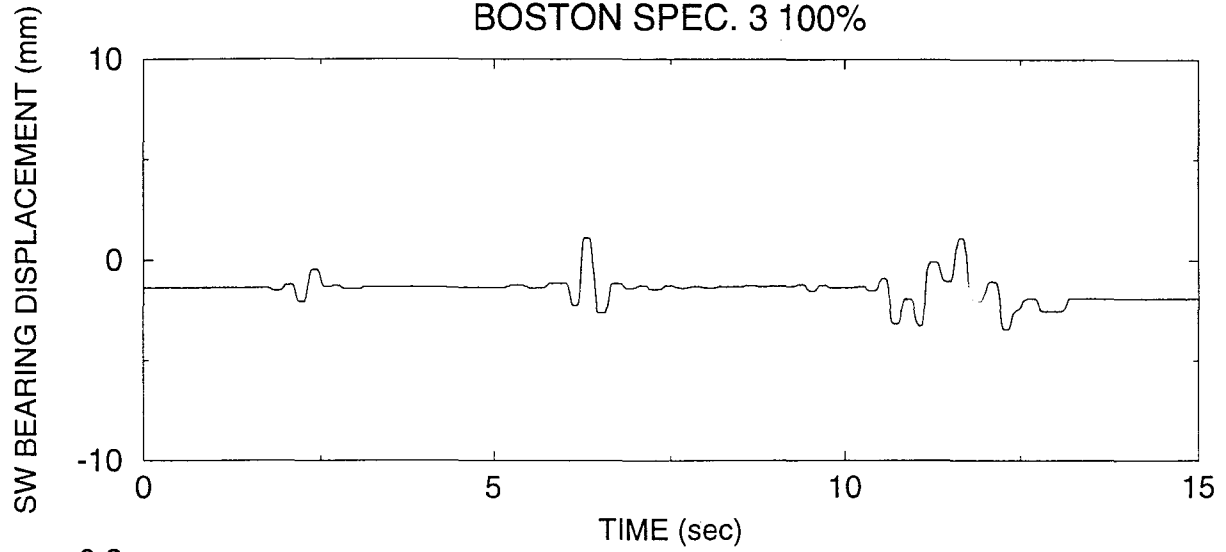




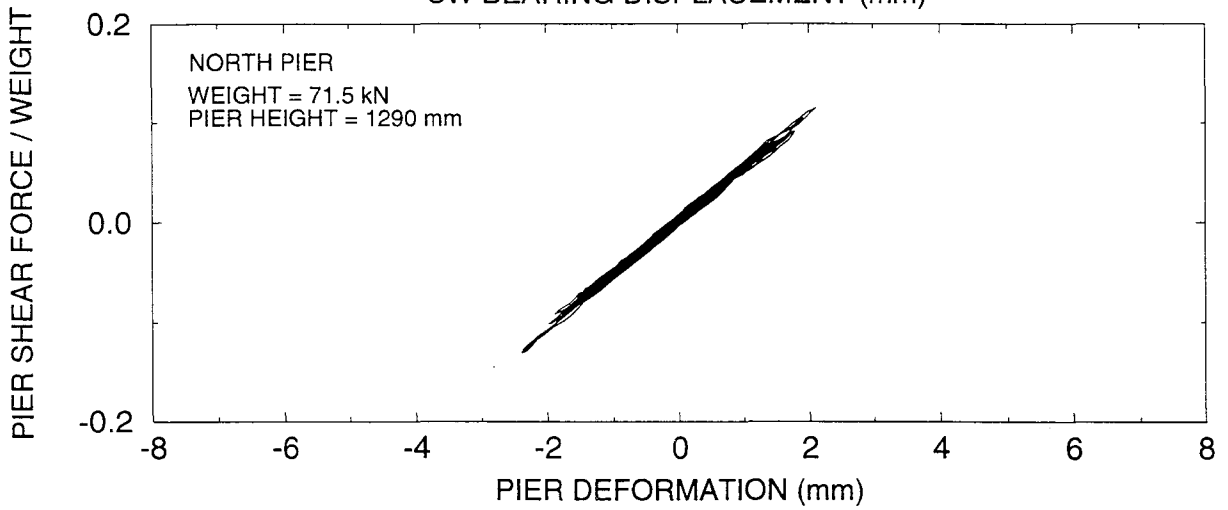
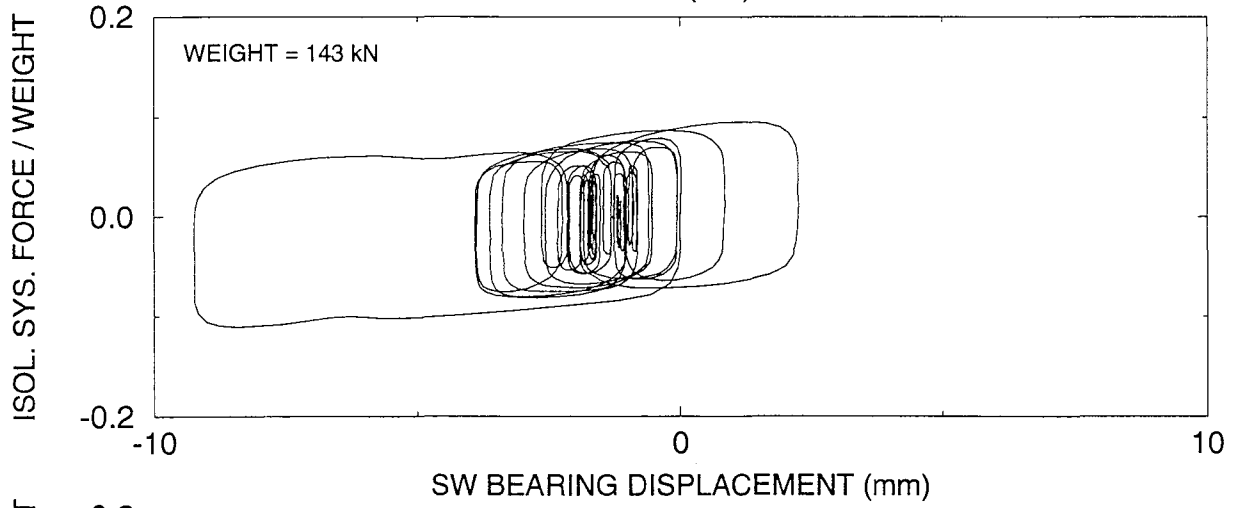
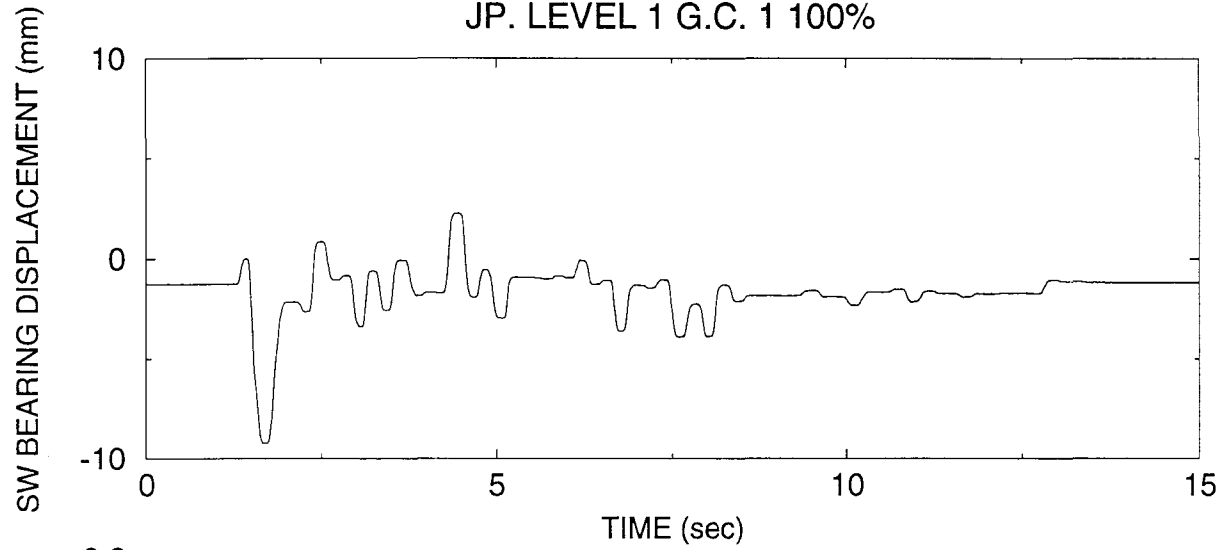
SYSTEM C1-No.3, TEST No. RLLRUN38  
BOSTON SPEC. 2 100%



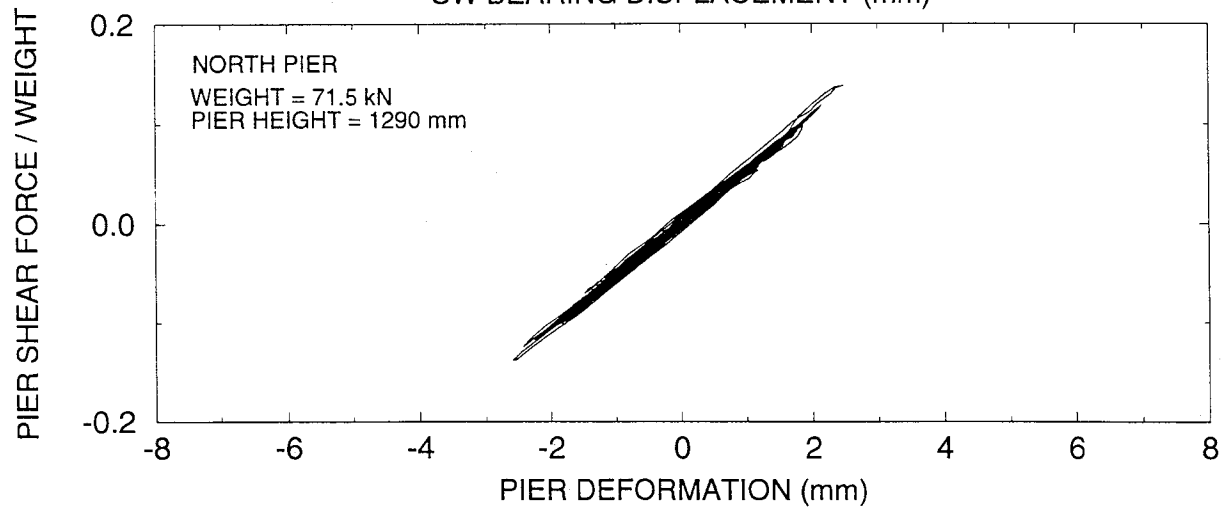
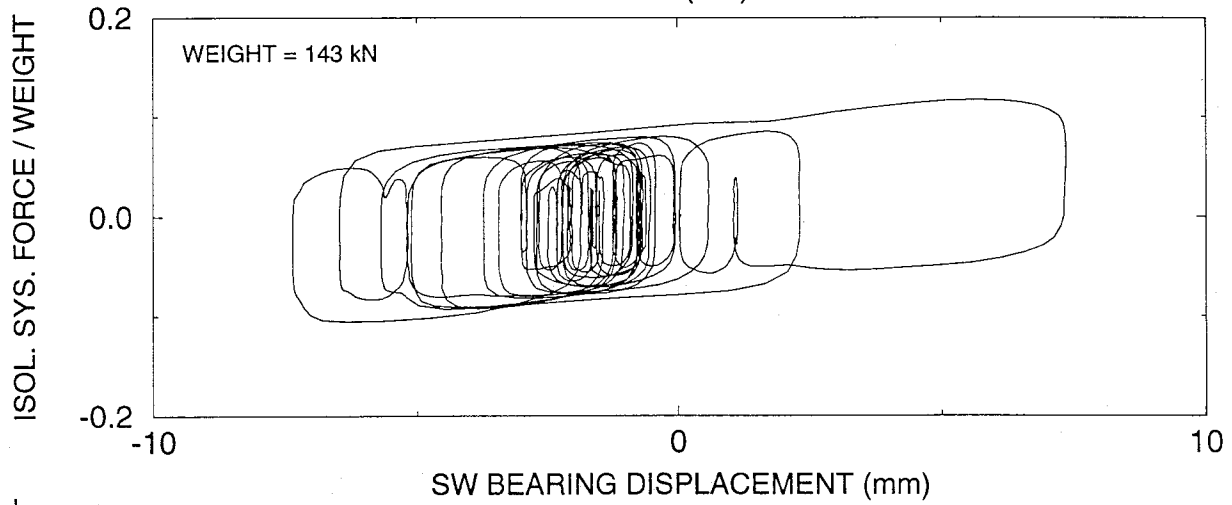
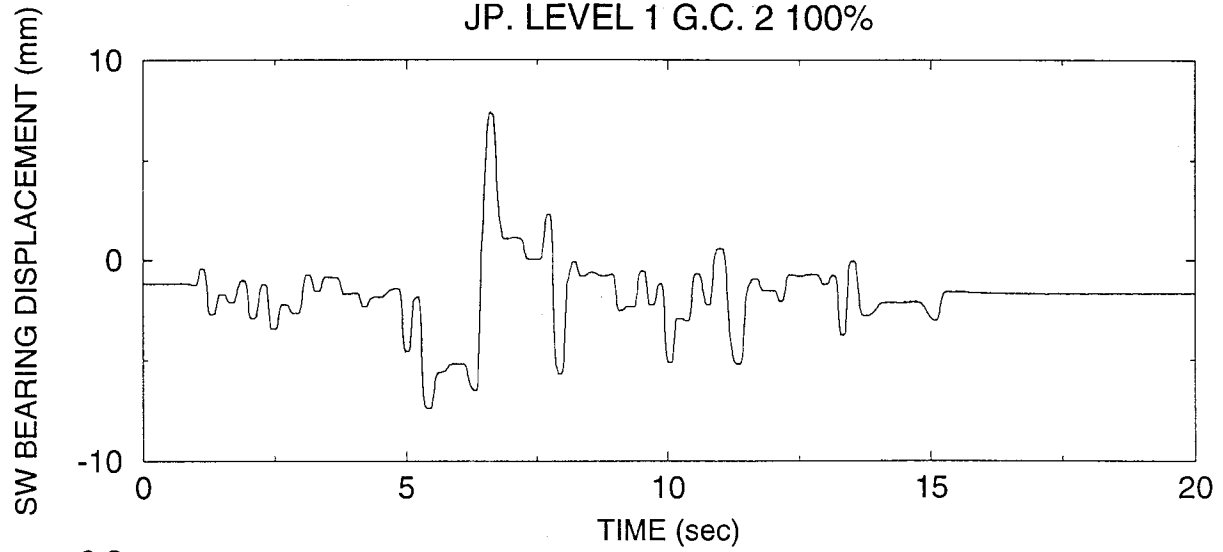
SYSTEM C1-No.3, TEST No. RLLRUN39  
BOSTON SPEC. 3 100%



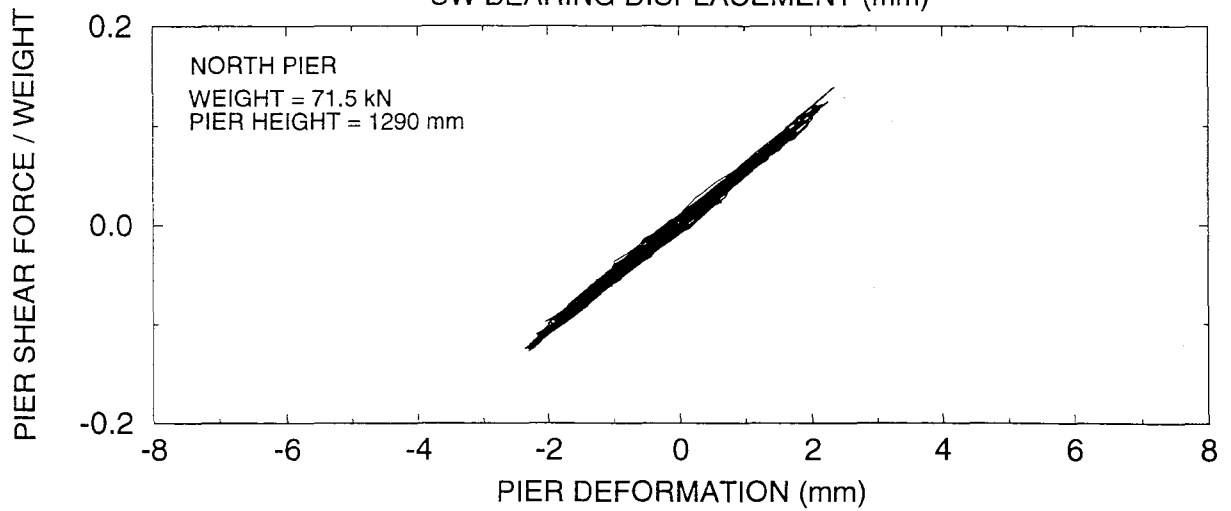
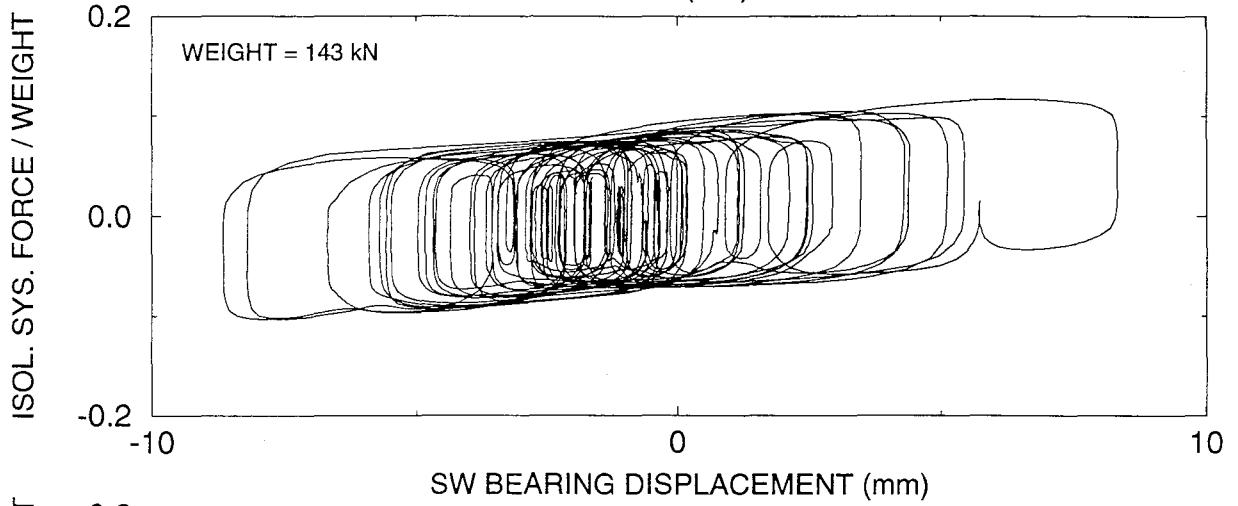
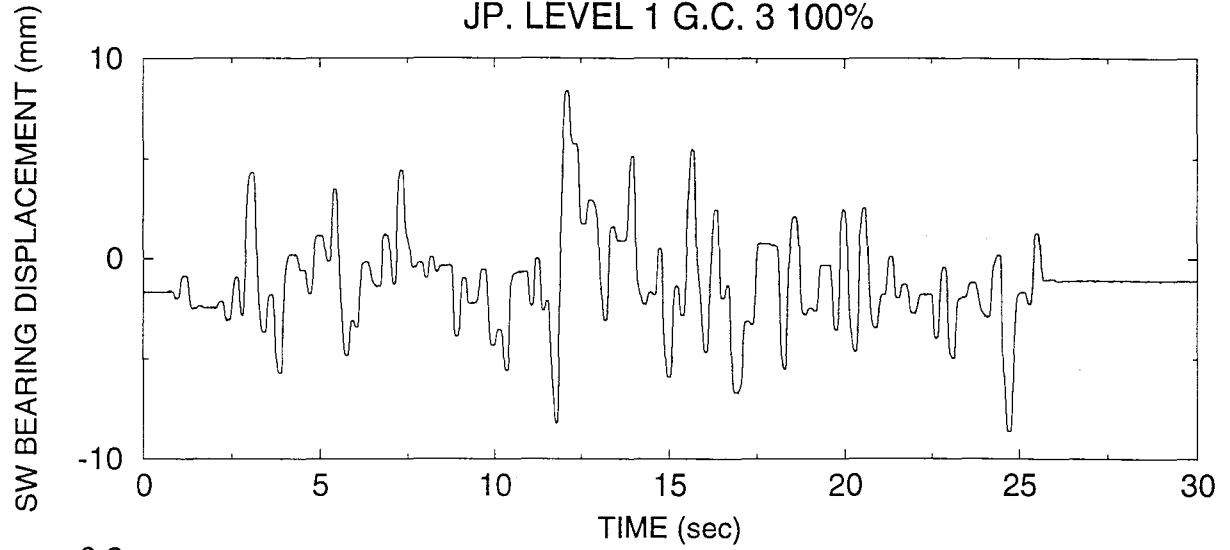
SYSTEM C1-No.3, TEST No. RLLRUN43  
JP. LEVEL 1 G.C. 1 100%



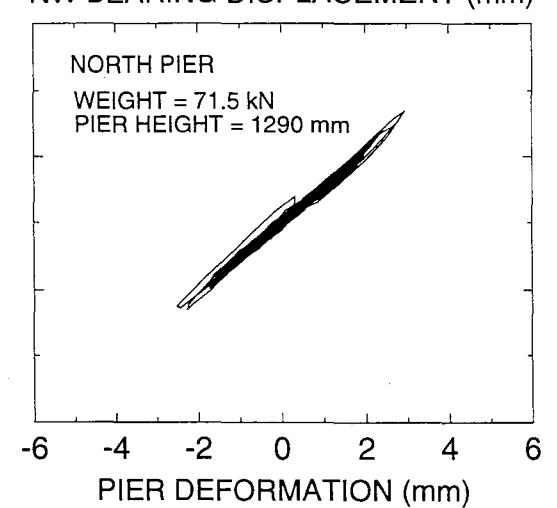
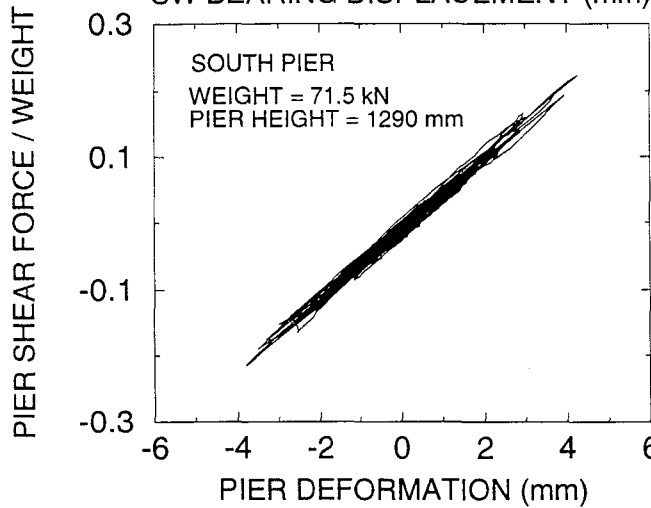
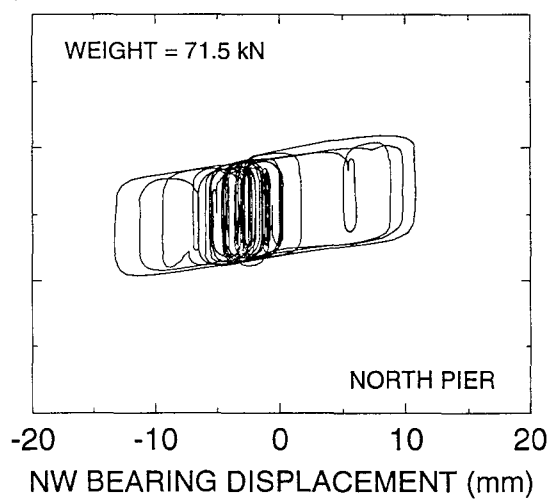
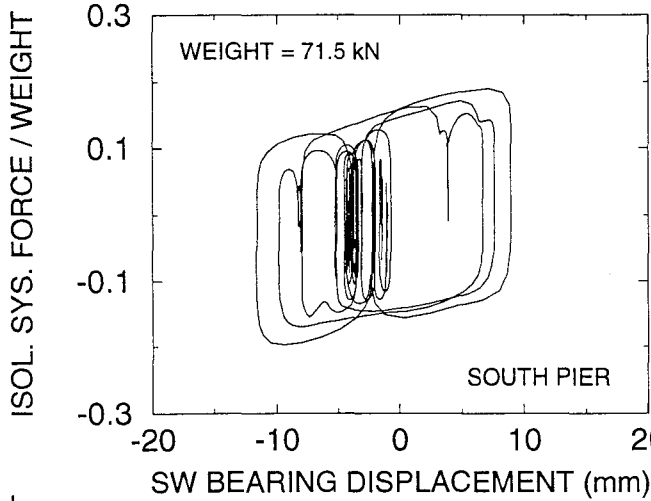
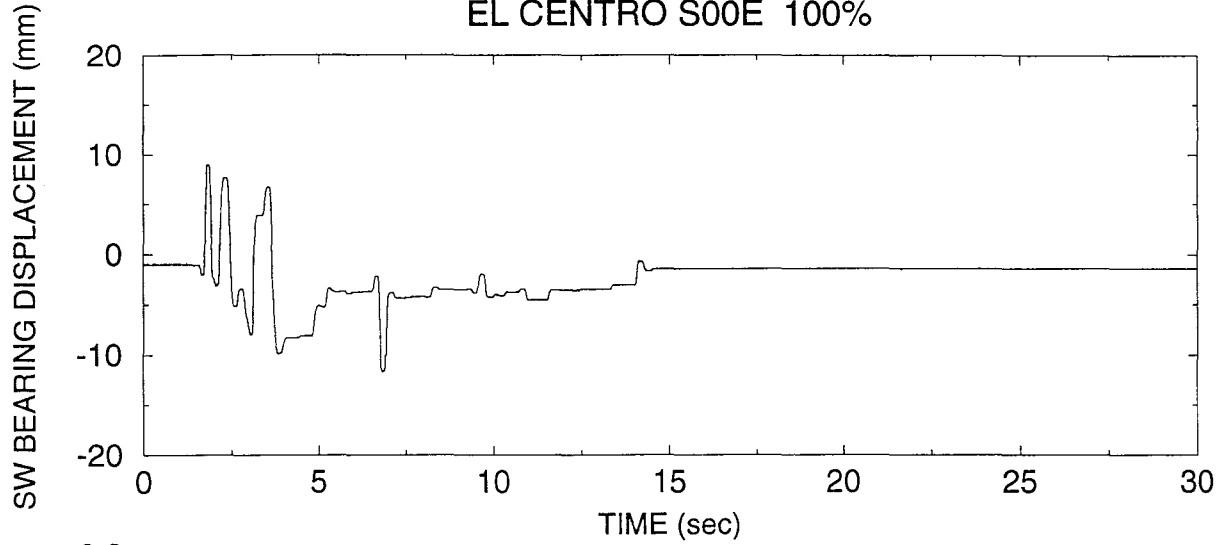
SYSTEM C1-No.3, TEST No. RLLRUN44  
JP. LEVEL 1 G.C. 2 100%



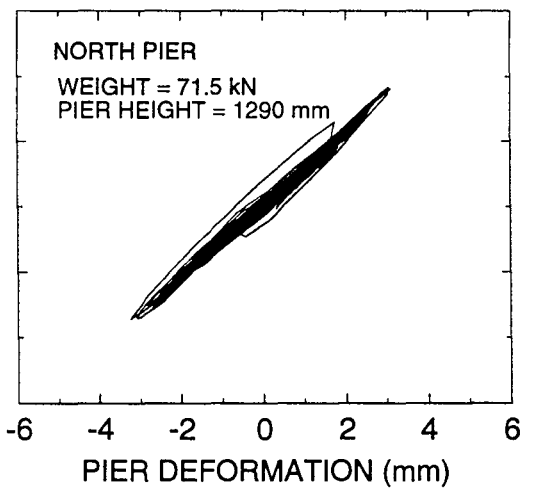
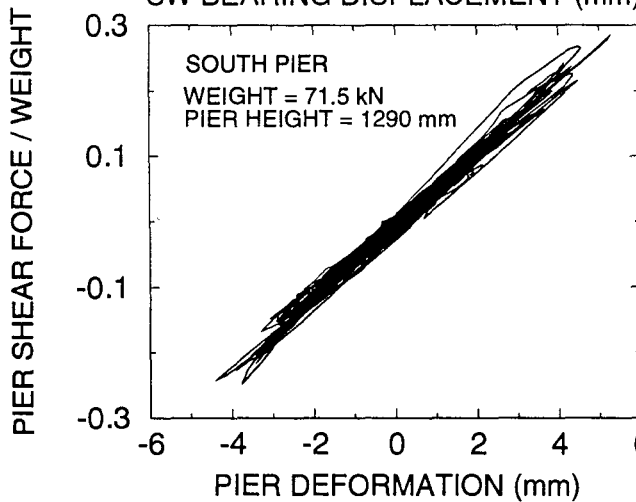
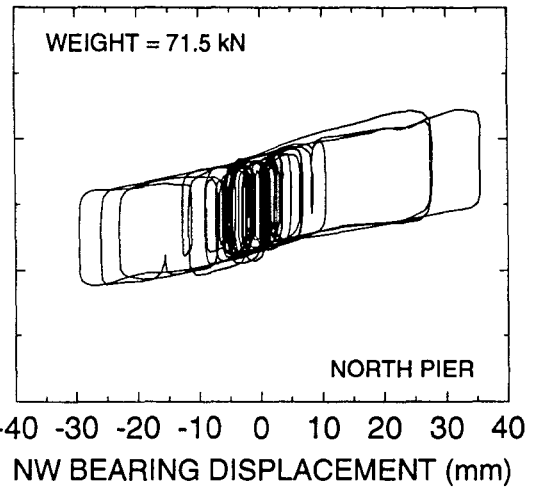
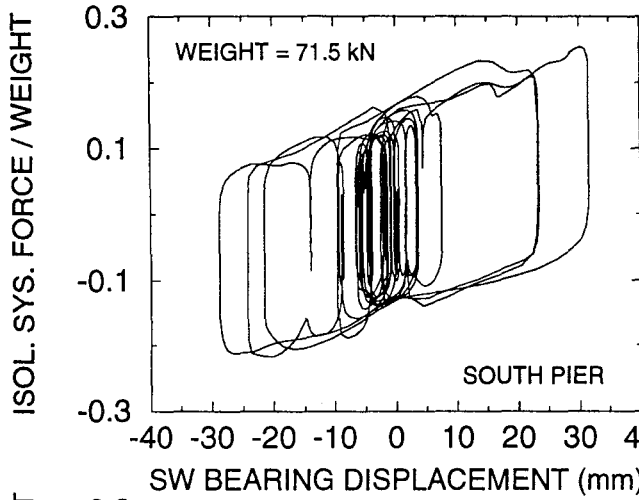
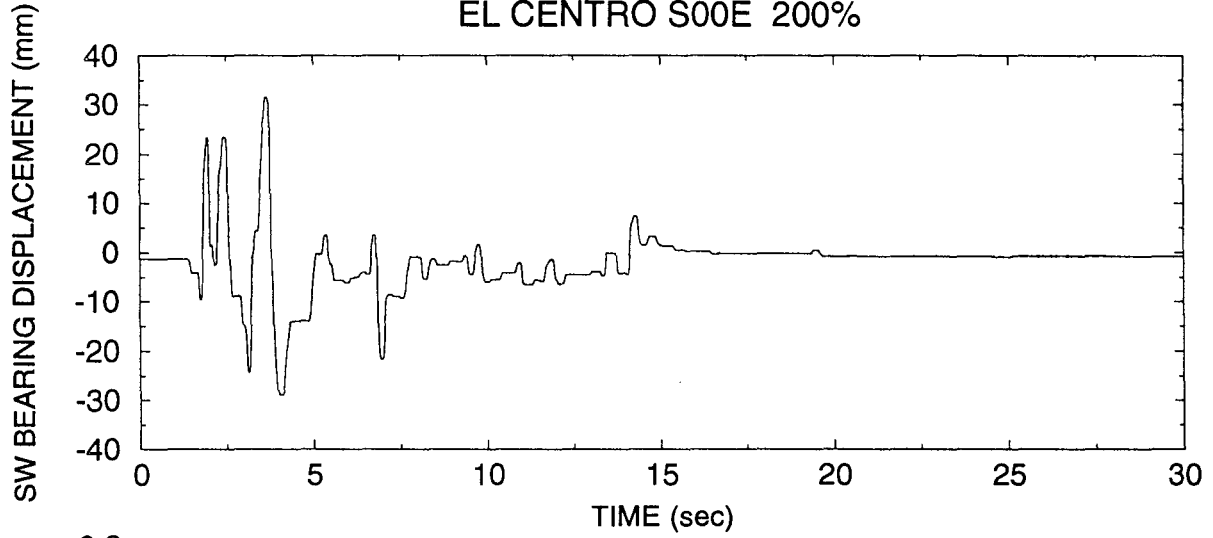
SYSTEM C1-No.3, TEST No. RLLRUN45  
JP. LEVEL 1 G.C. 3 100%



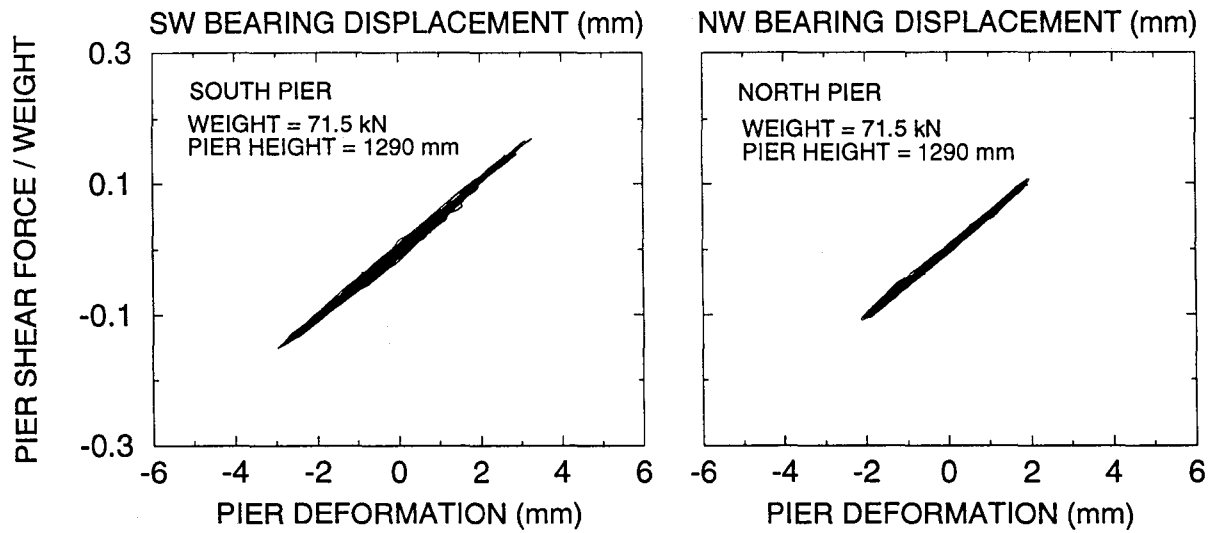
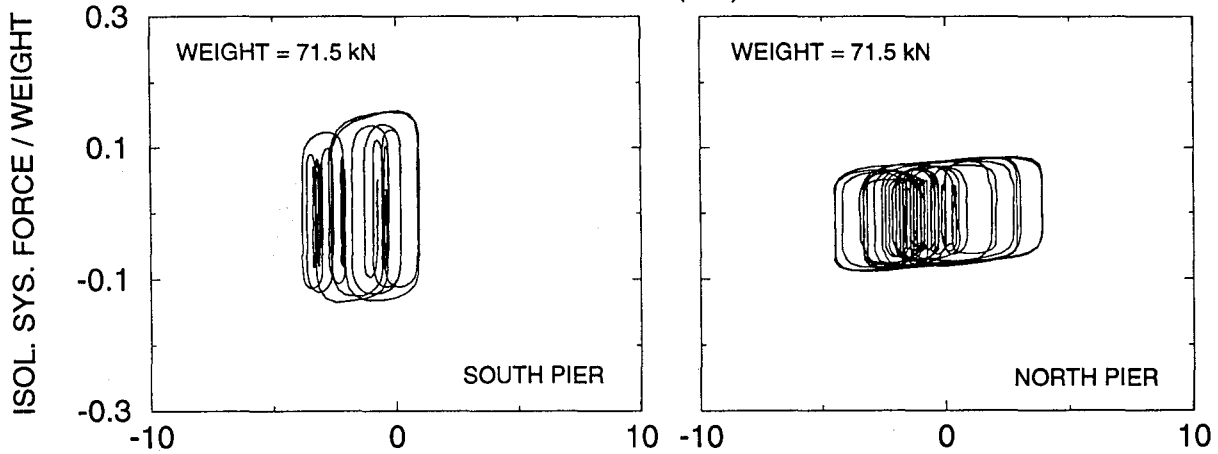
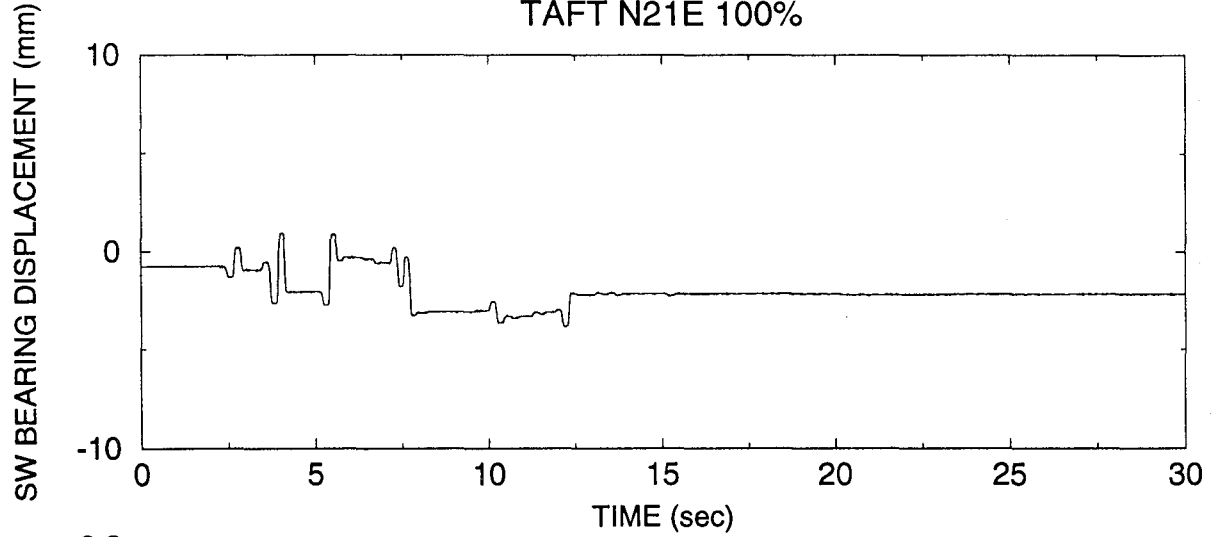
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN19  
EL CENTRO S00E 100%



SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN20  
EL CENTRO S00E 200%

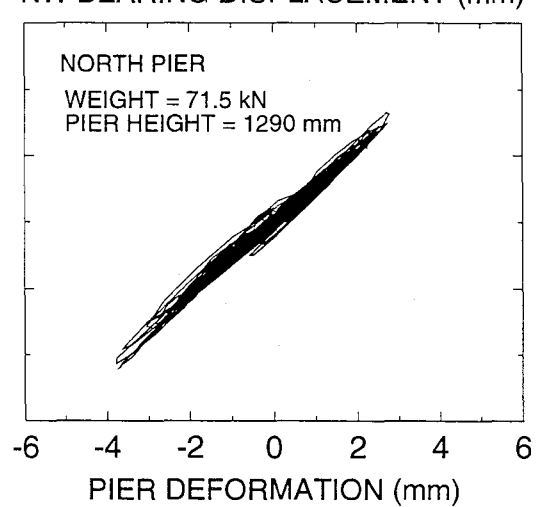
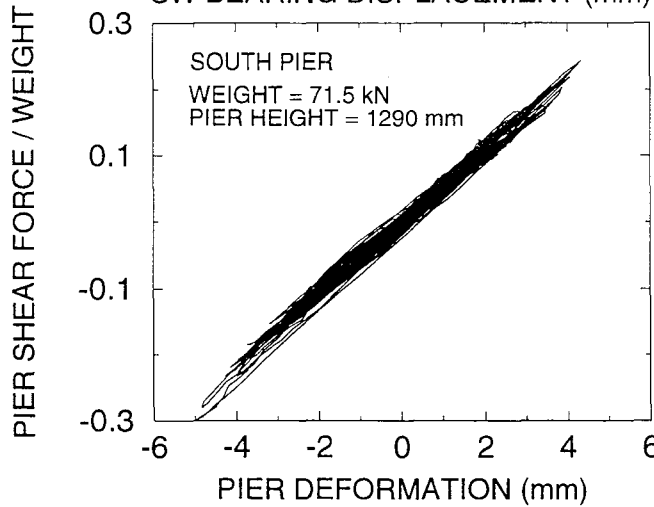
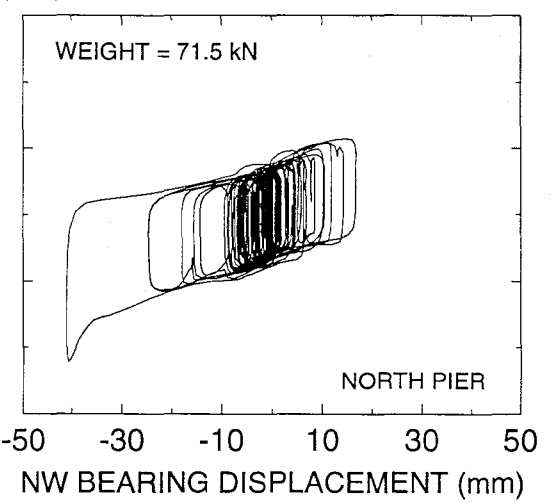
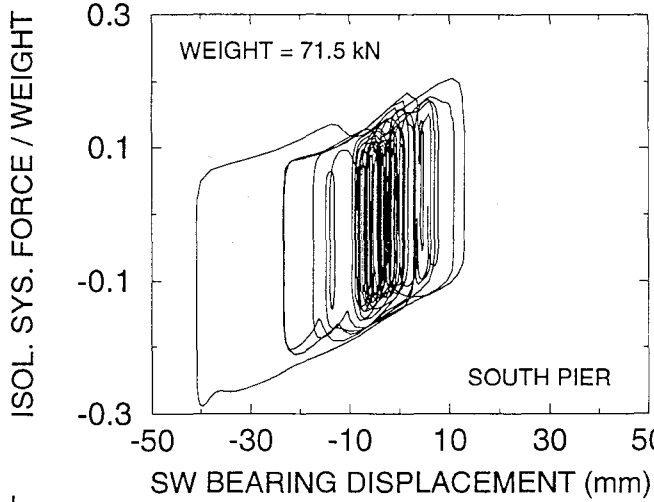
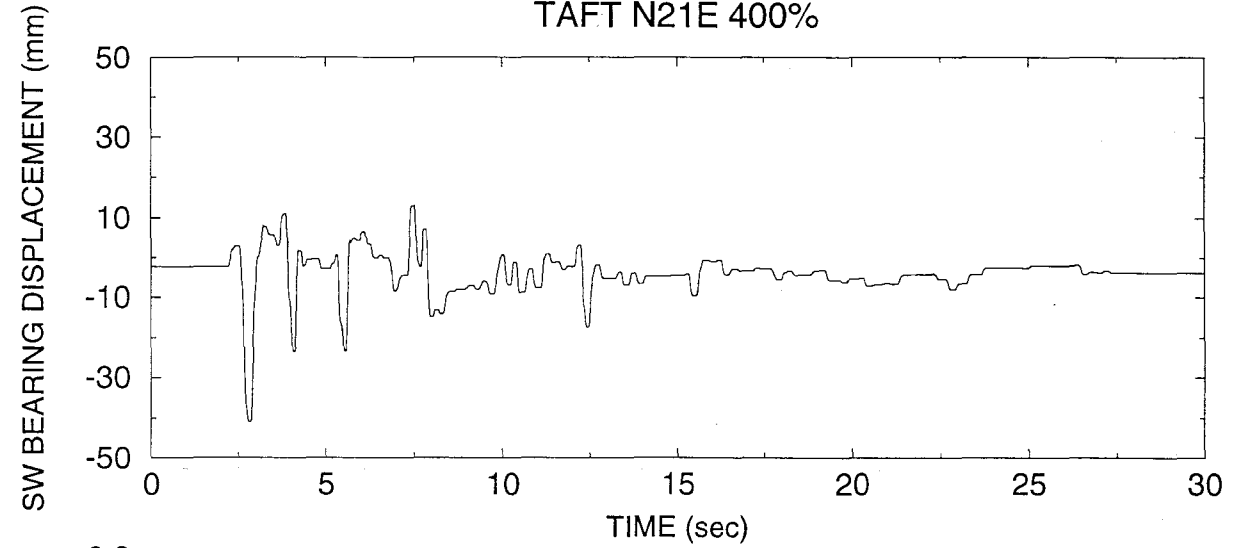


SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN21  
TAFT N21E 100%

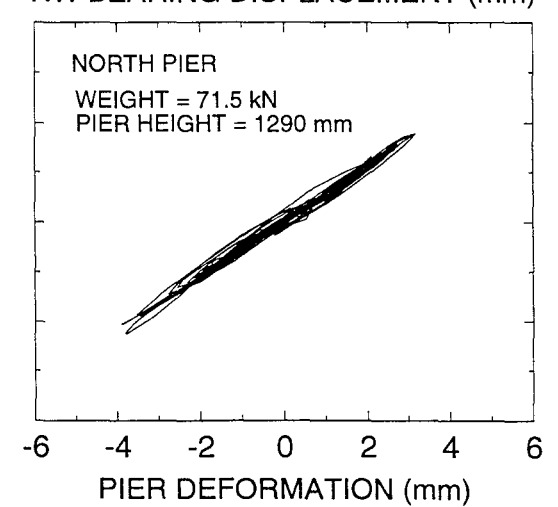
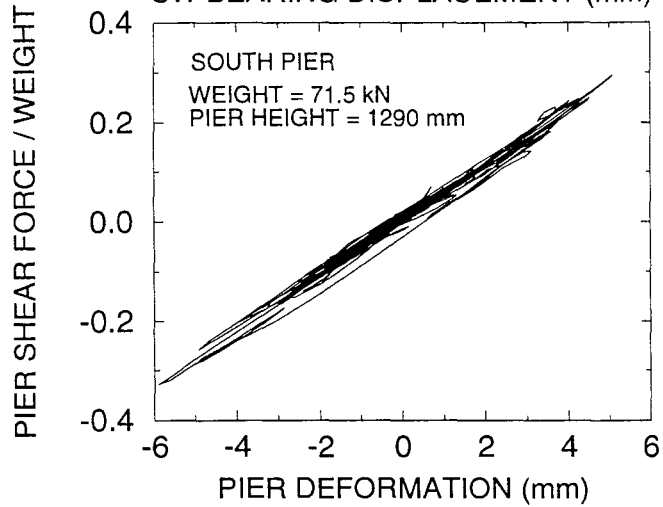
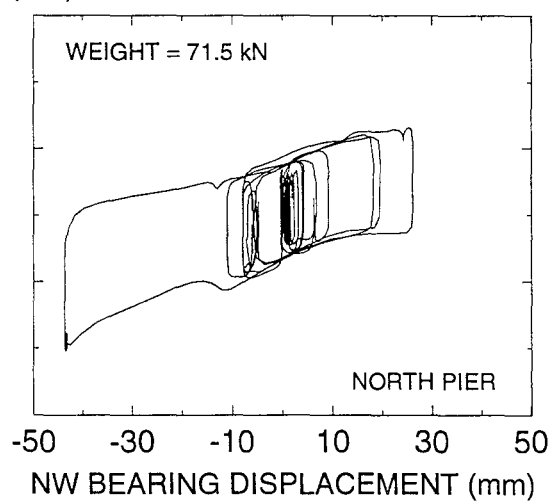
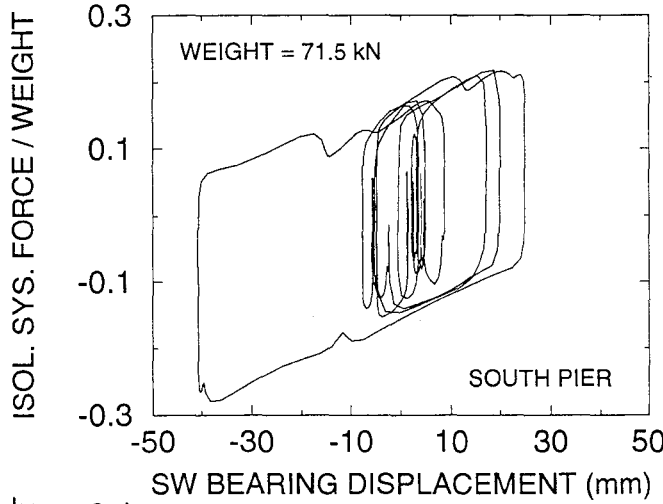
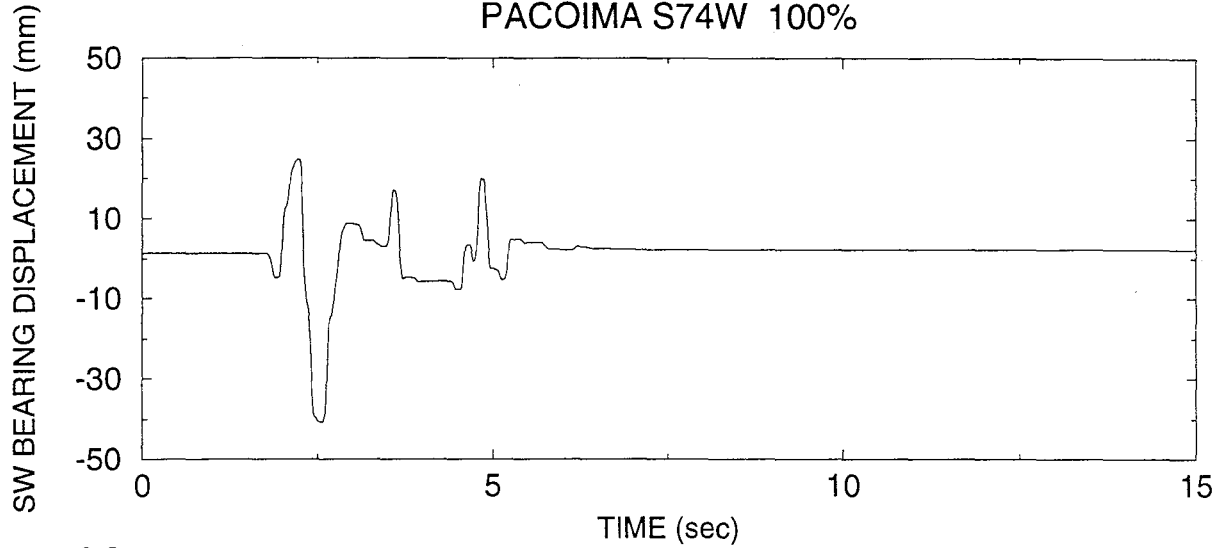




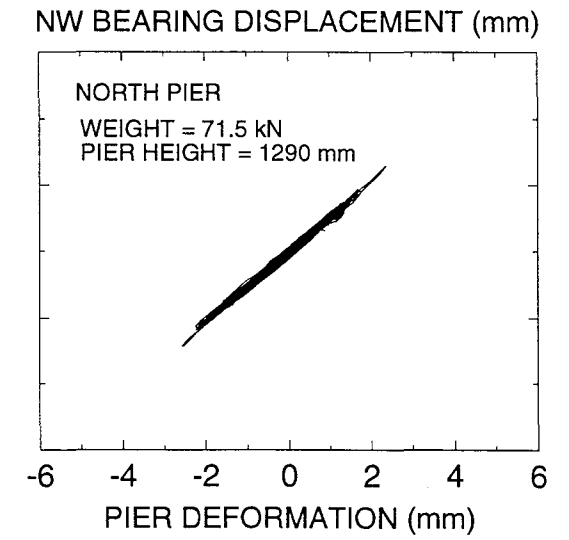
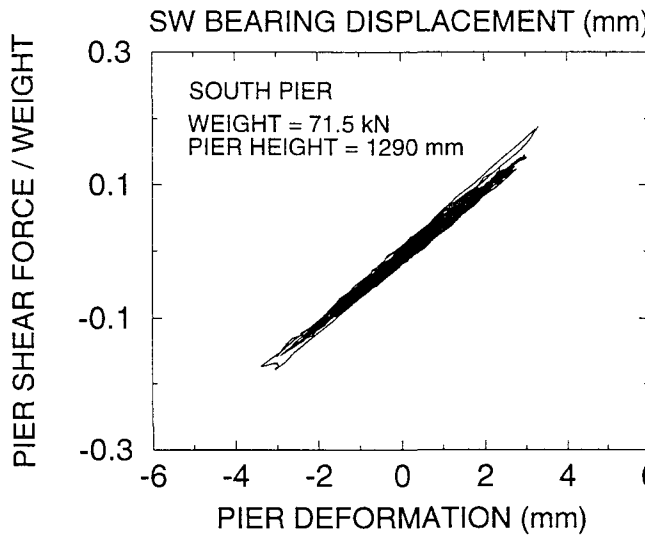
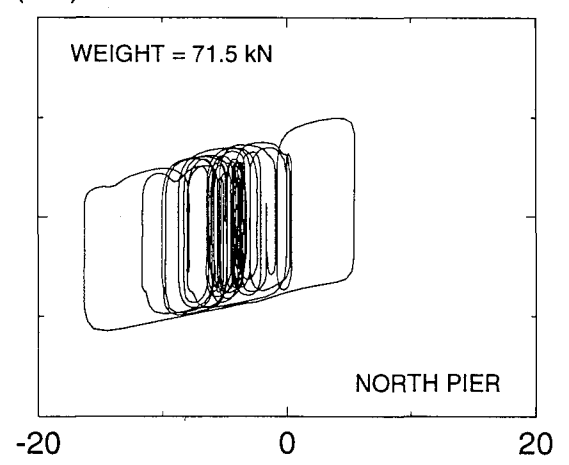
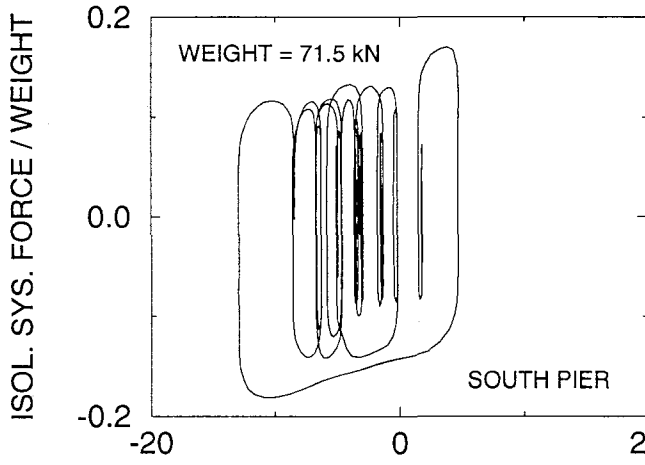
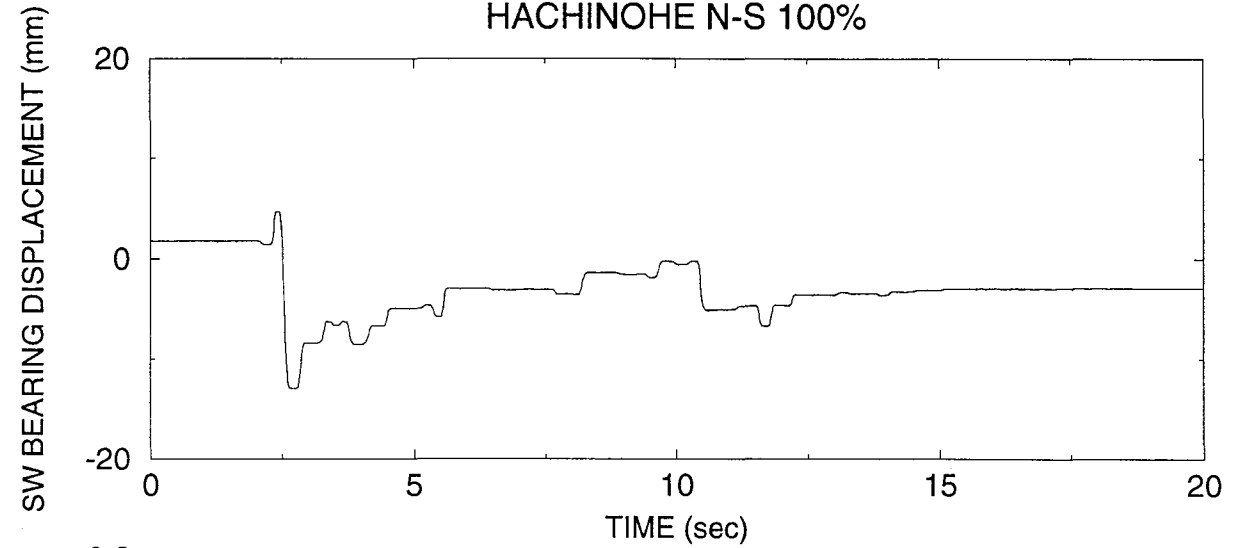
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN22  
TAFT N21E 400%



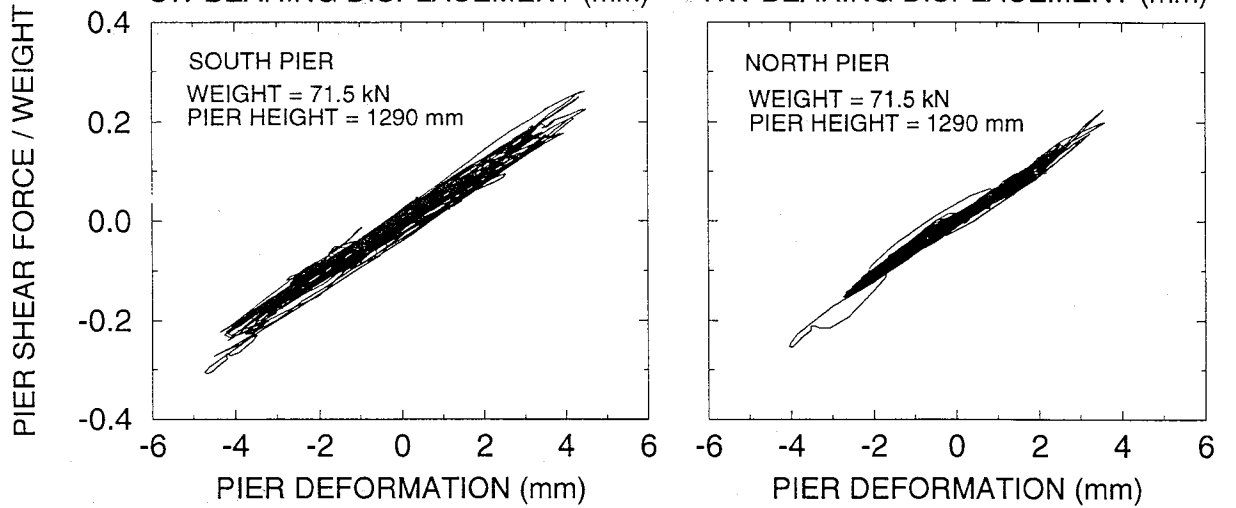
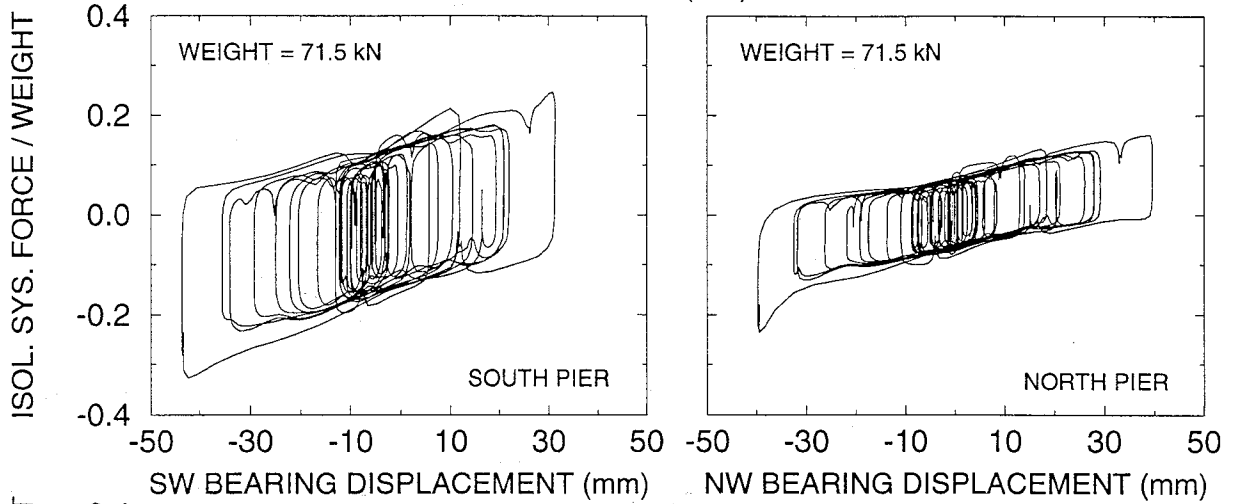
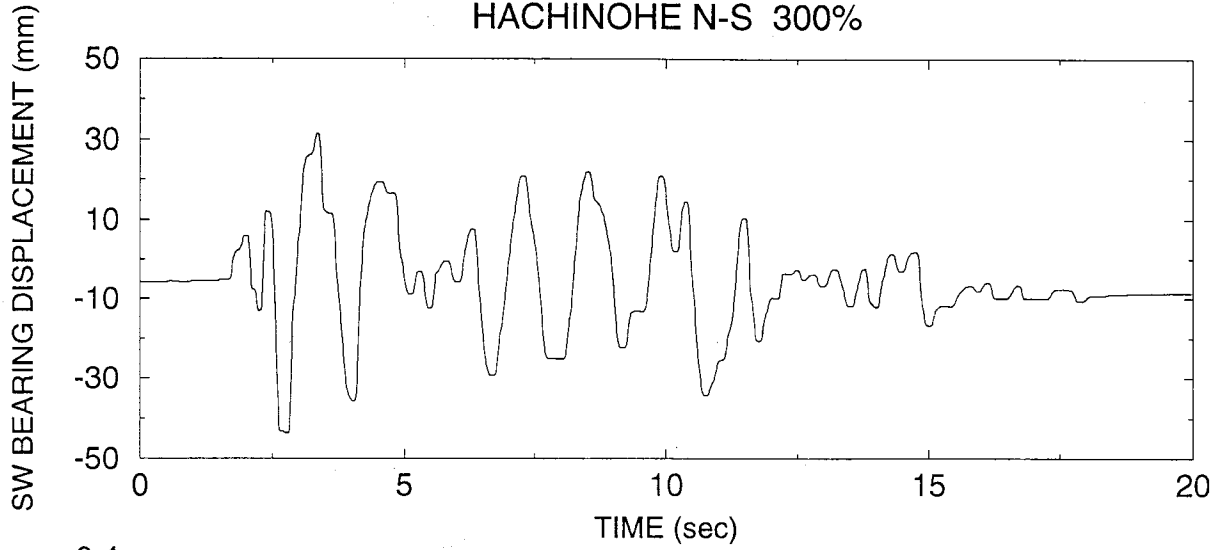
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN23  
PACOIMA S74W 100%



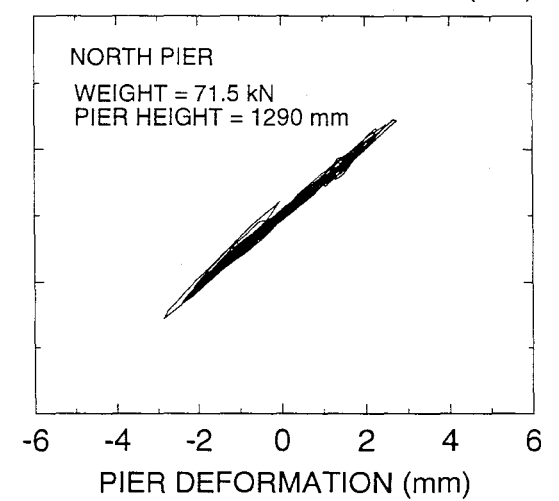
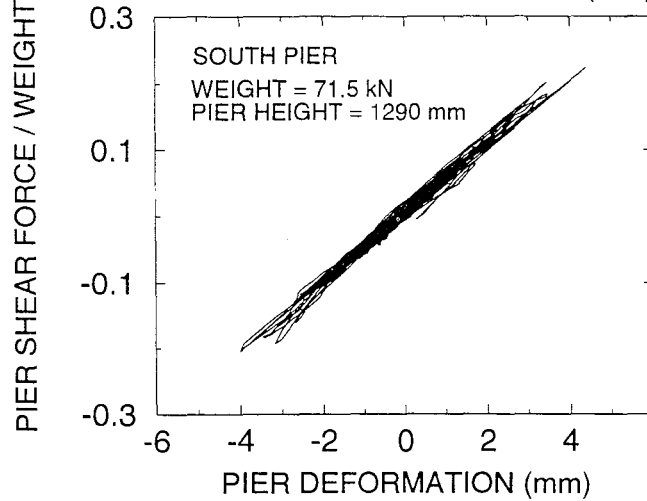
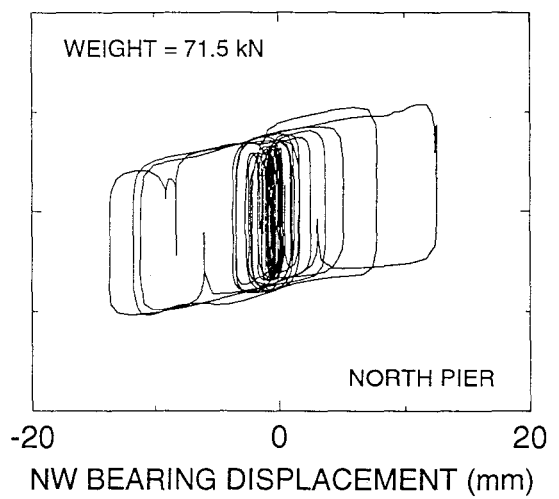
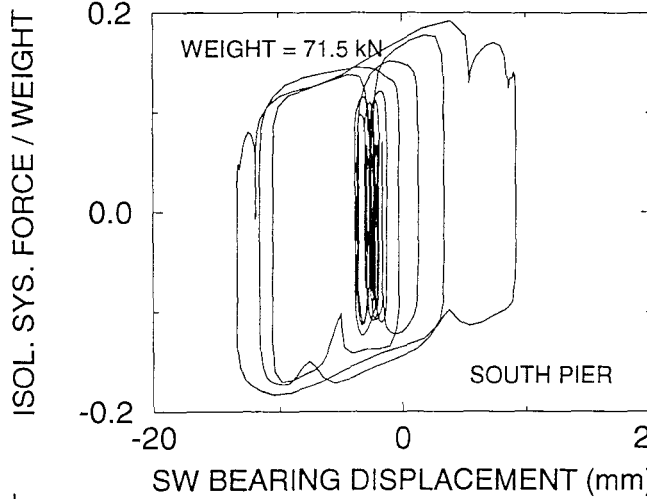
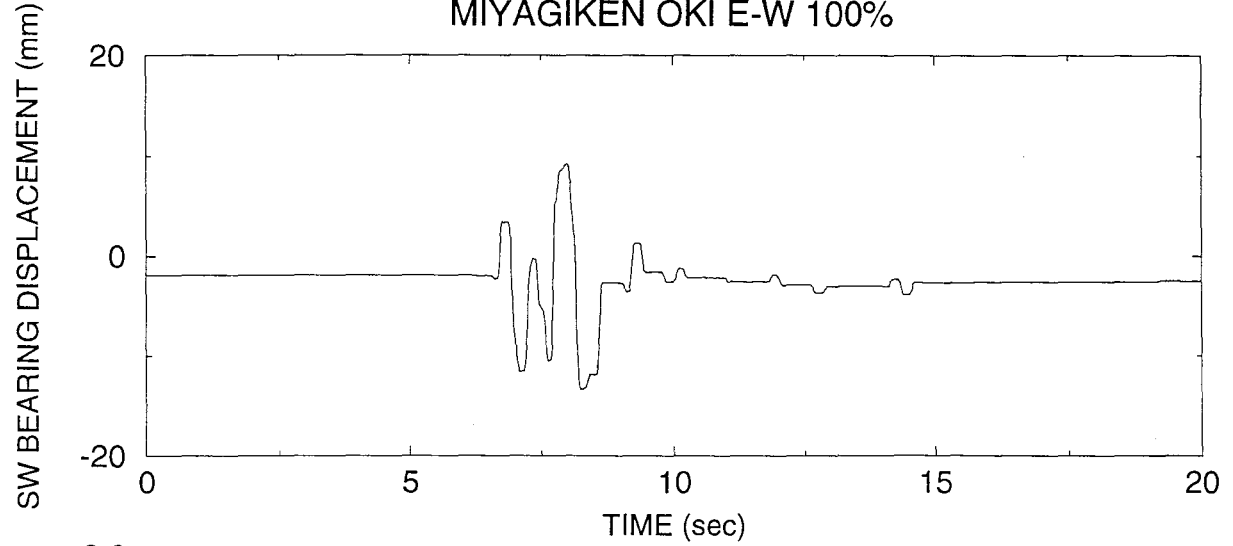
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN24  
HACHINOHE N-S 100%



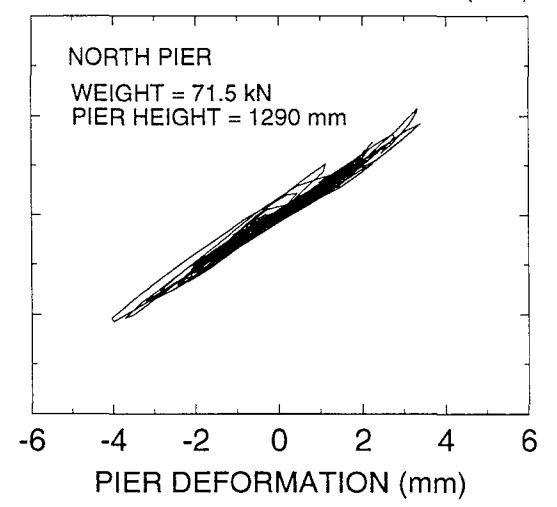
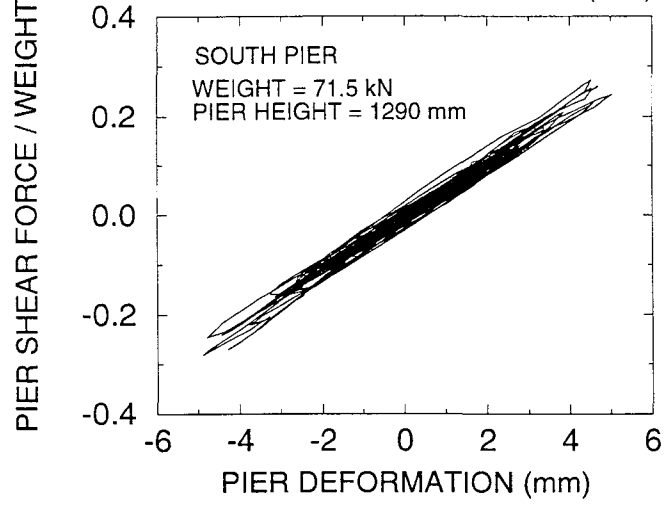
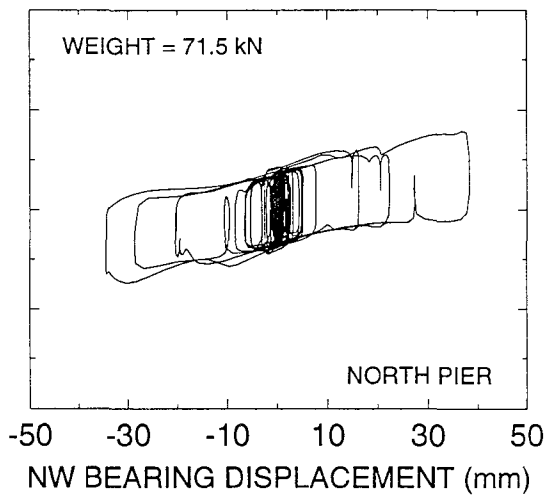
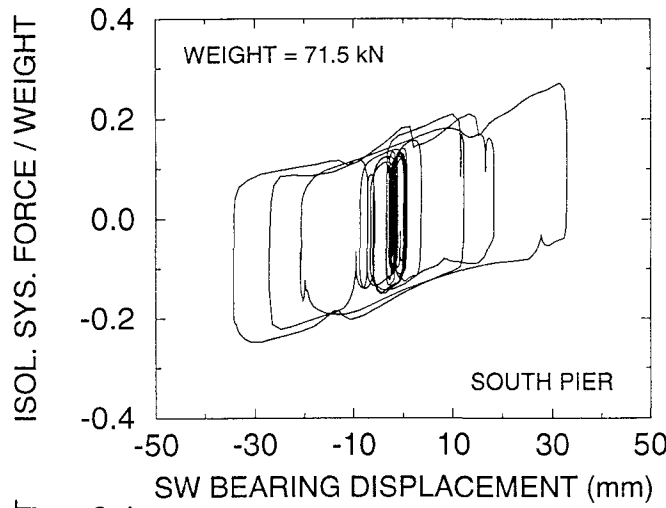
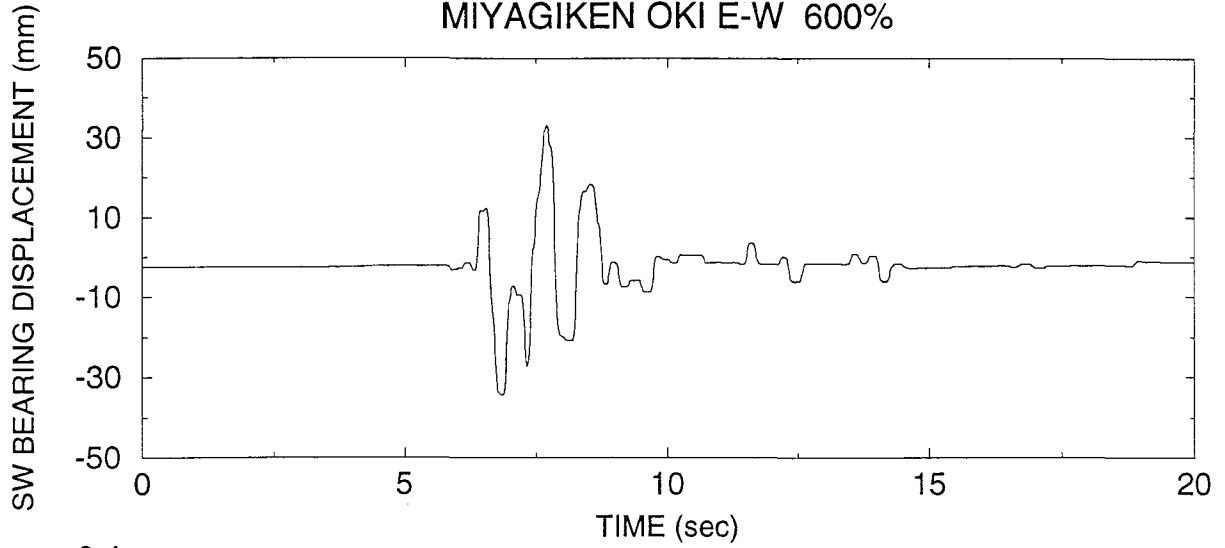
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN26  
HACHINOHE N-S 300%



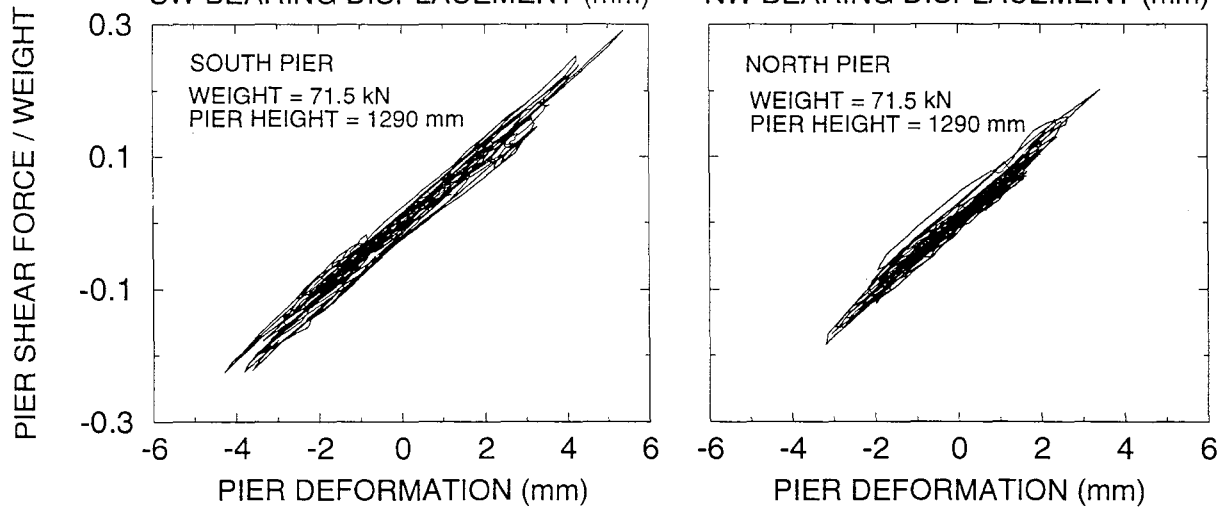
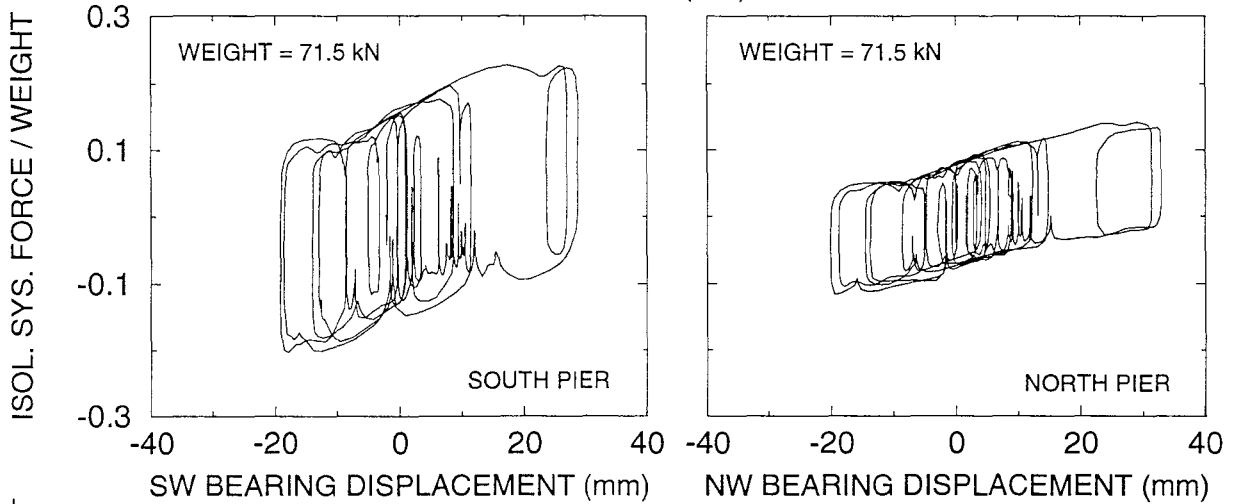
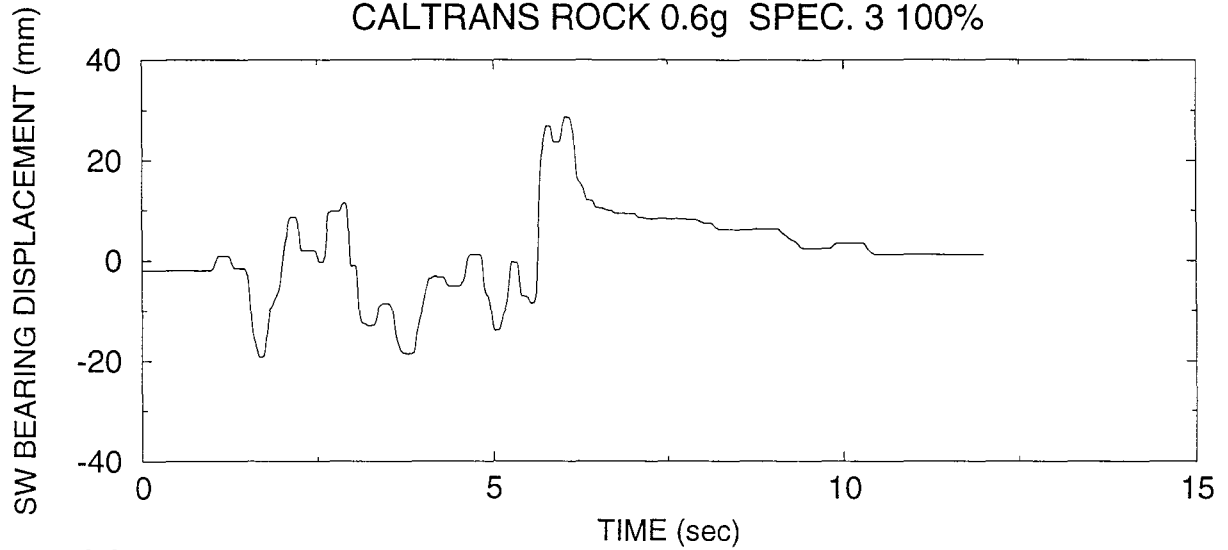
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN27  
MIYAGIKEN OKI E-W 100%



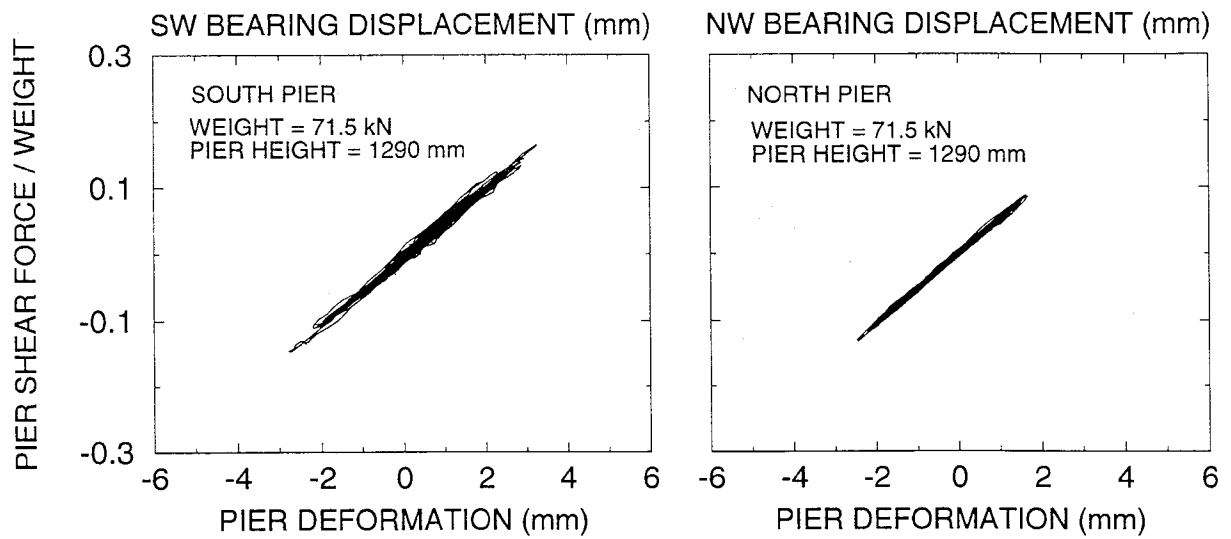
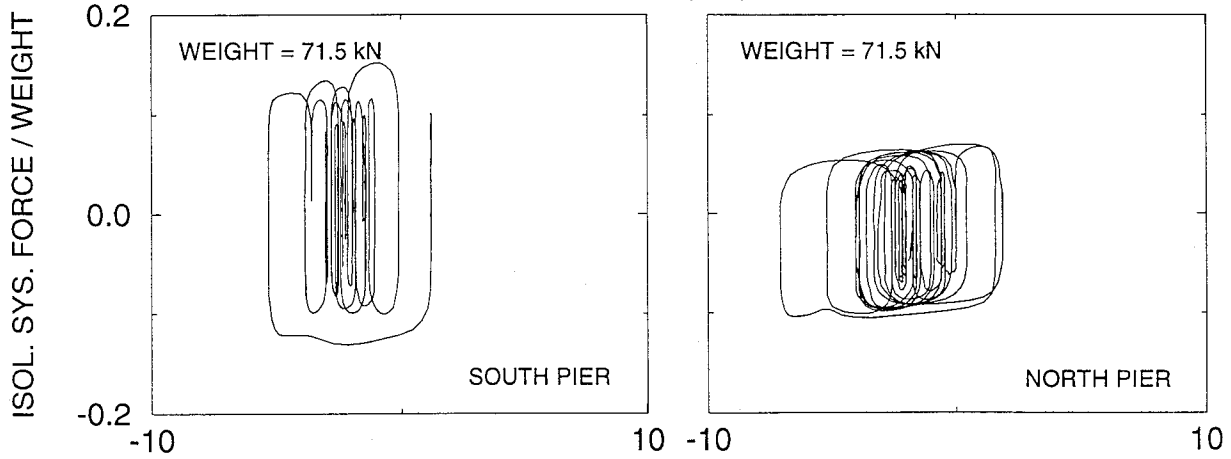
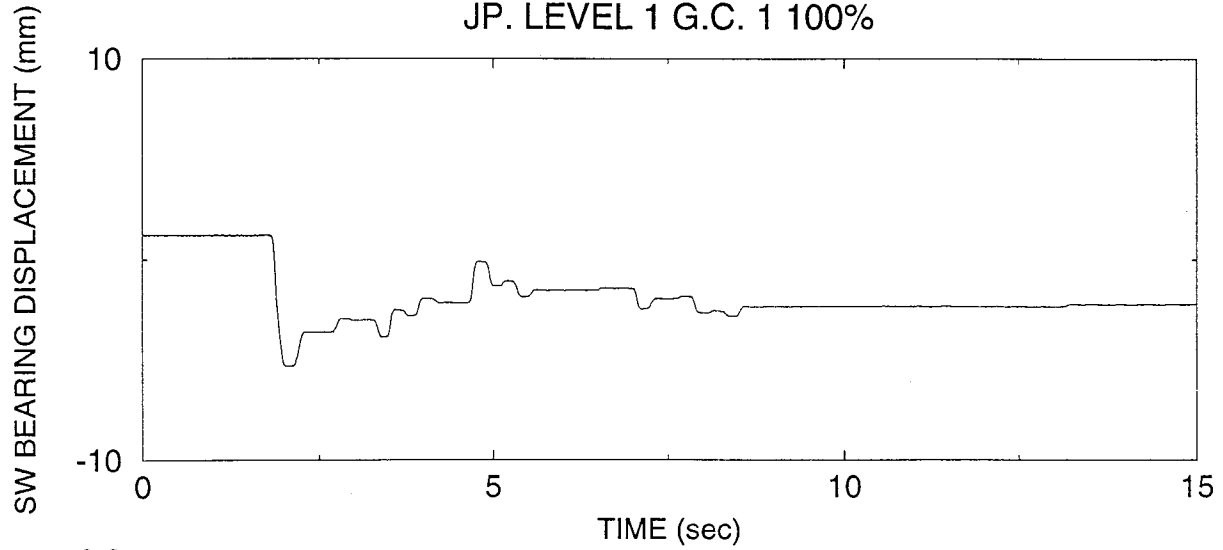
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN28  
 MIYAGIKEN OKI E-W 600%



SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN29  
CALTRANS ROCK 0.6g SPEC. 3 100%

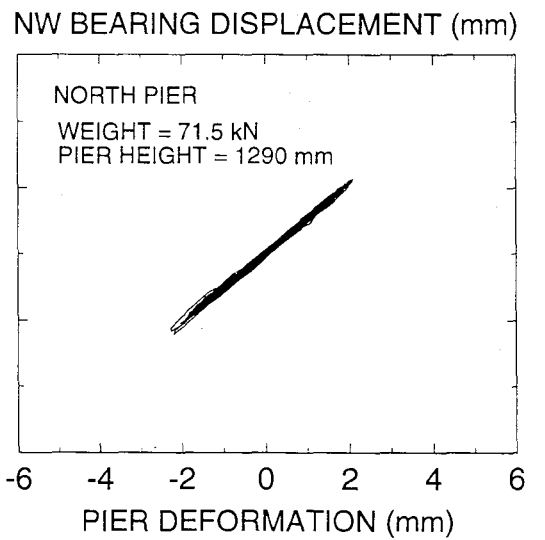
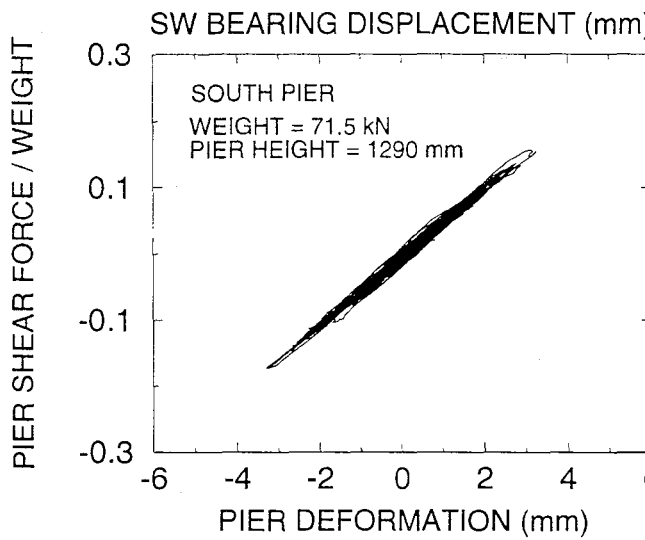
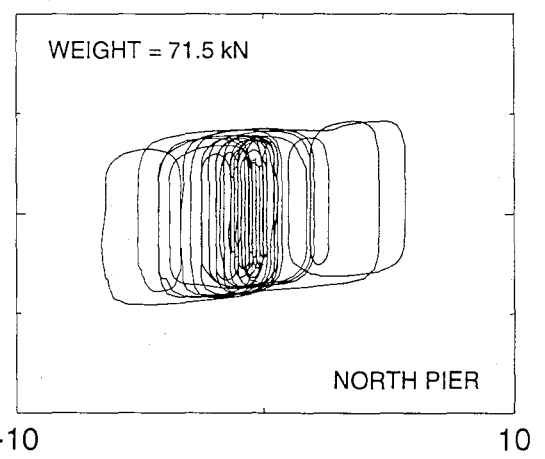
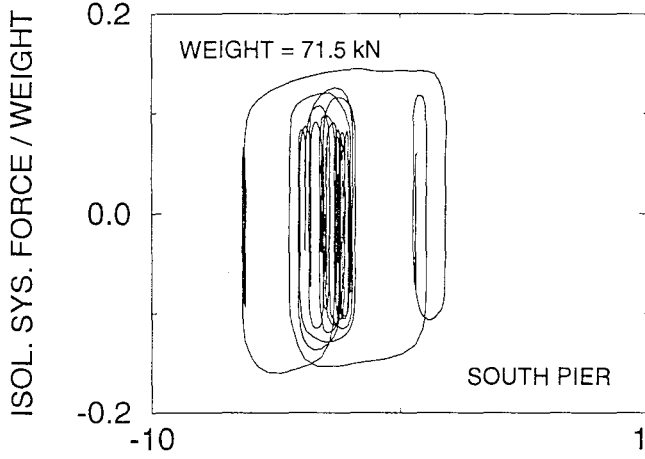
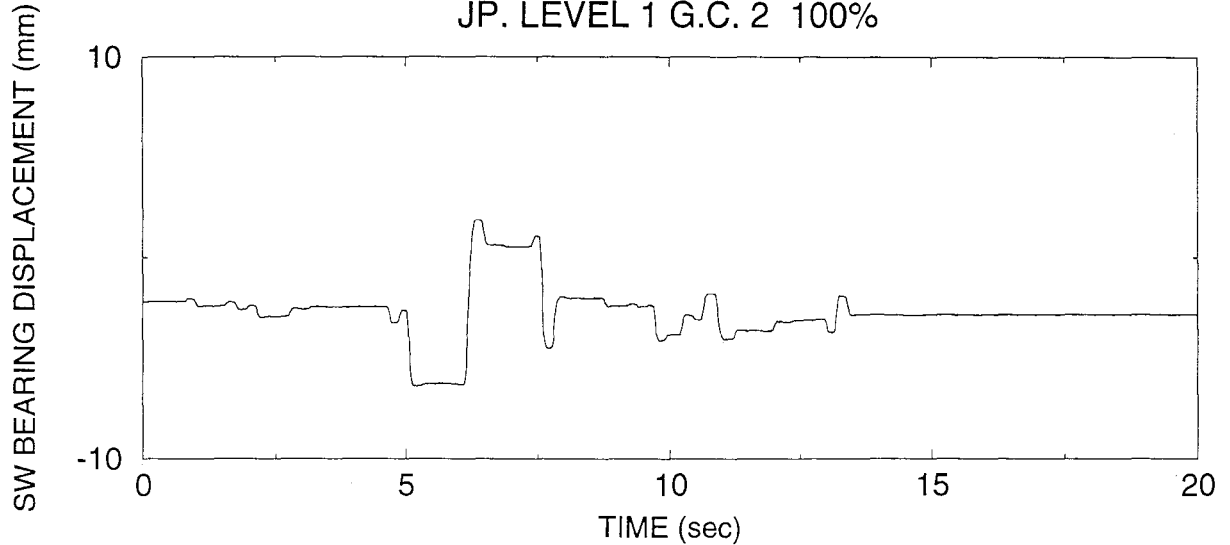


SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN30  
 JP. LEVEL 1 G.C. 1 100%

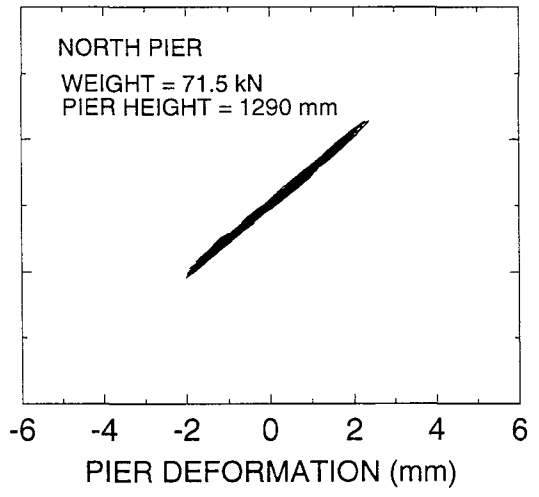
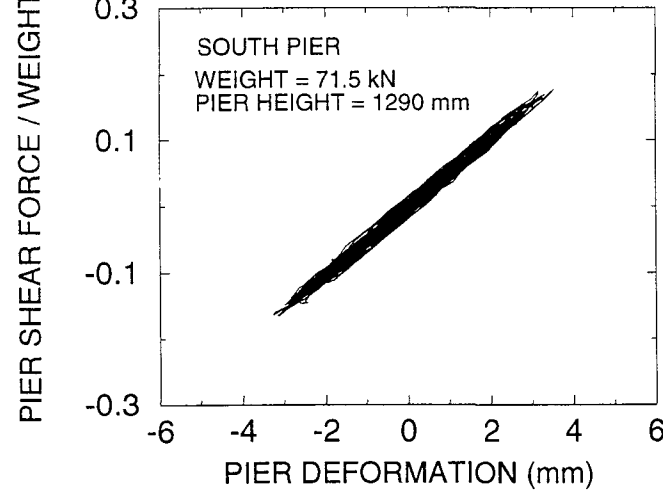
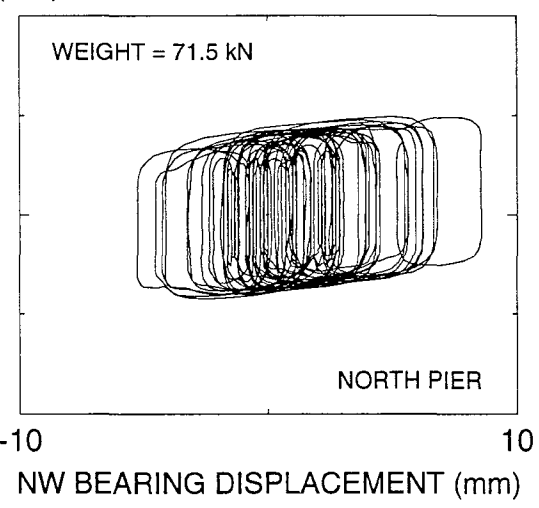
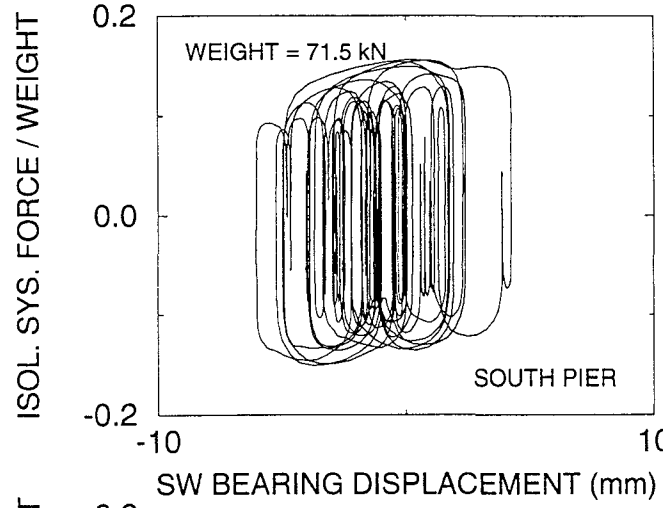
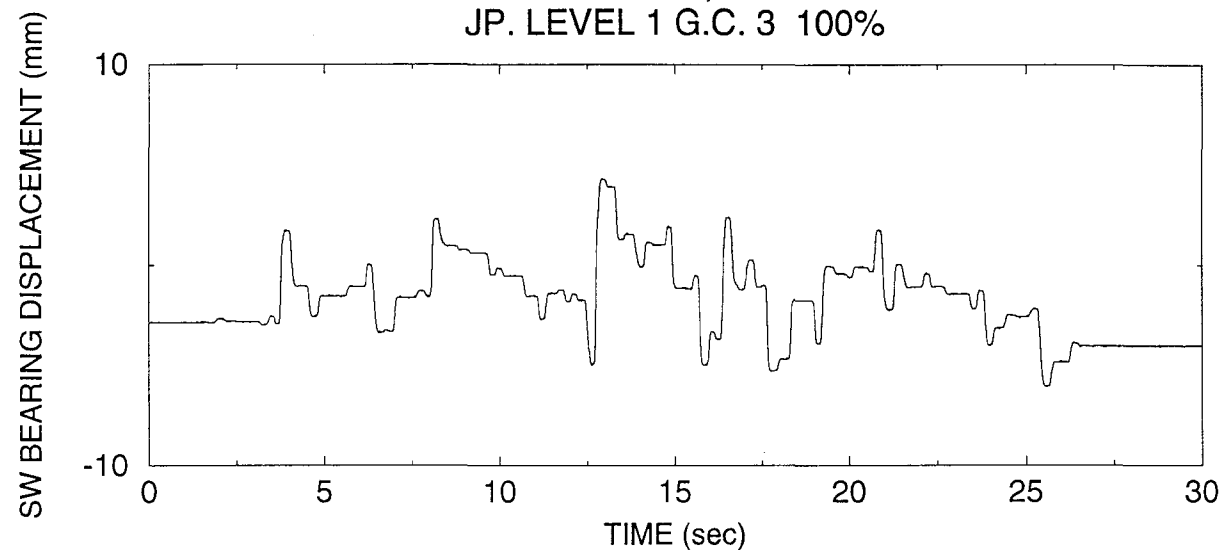




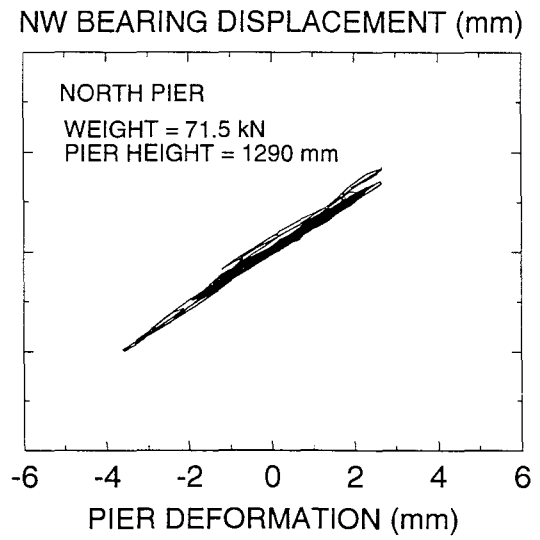
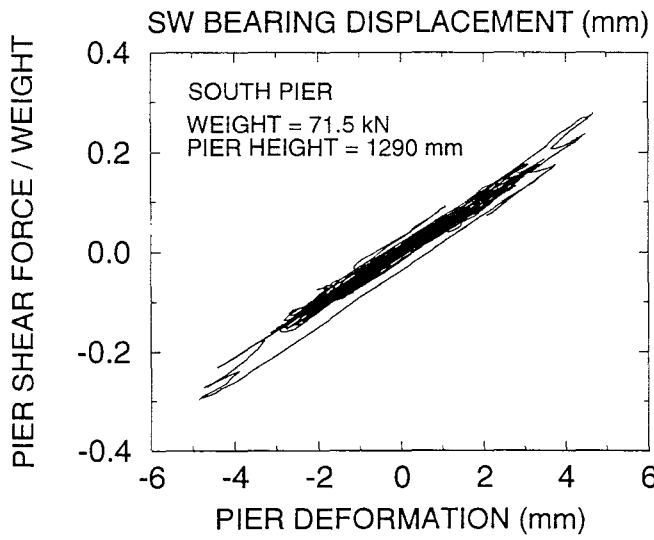
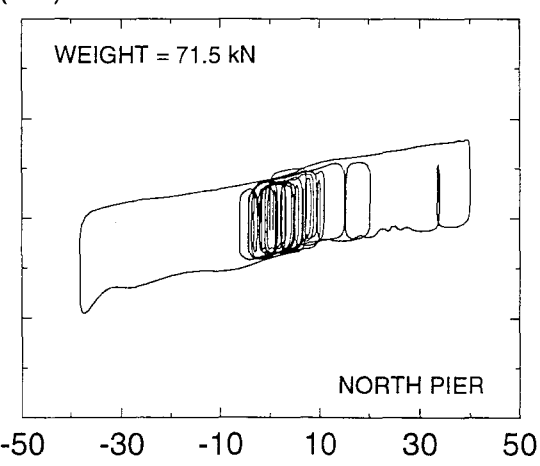
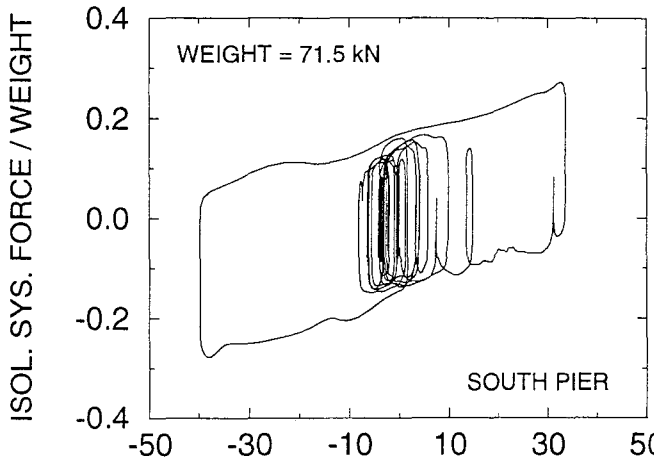
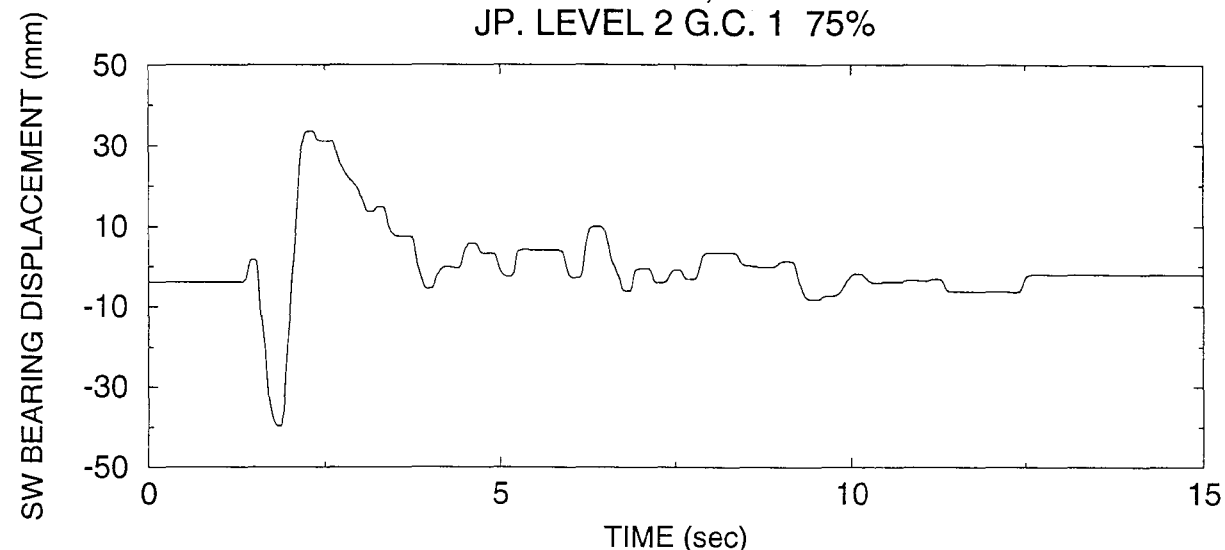
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN31  
JP. LEVEL 1 G.C. 2 100%



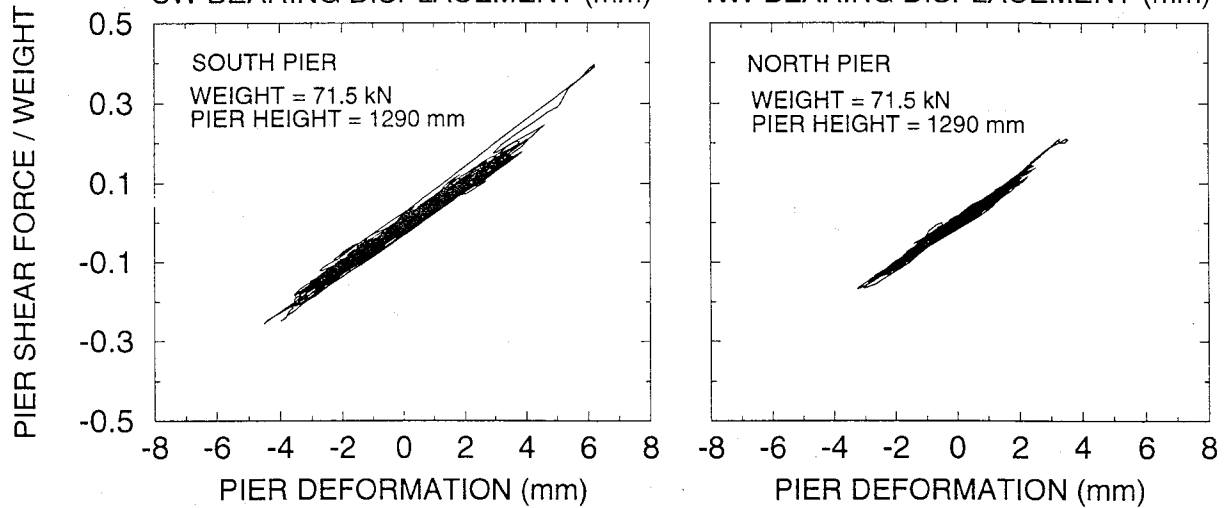
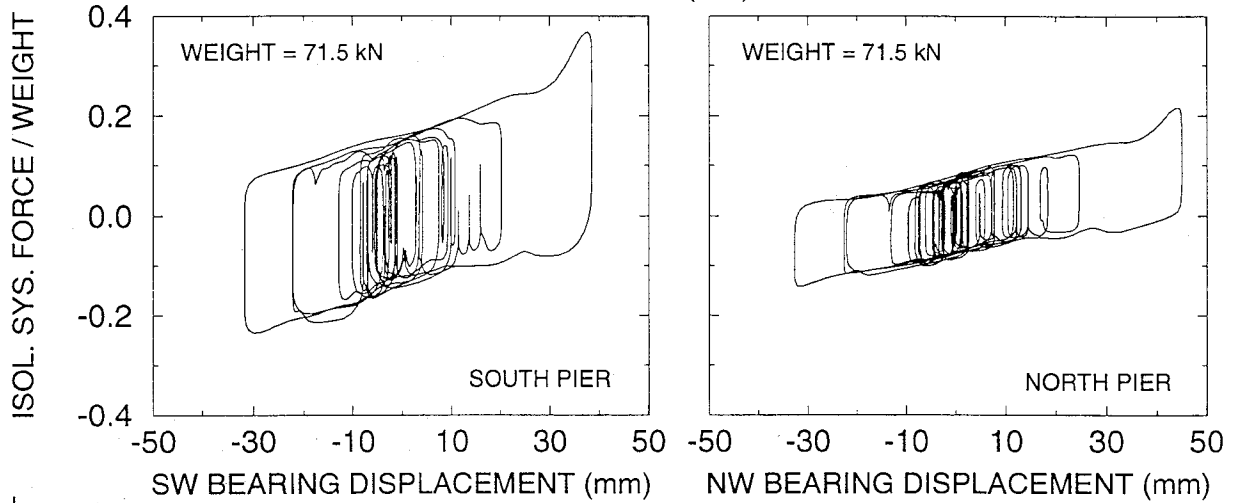
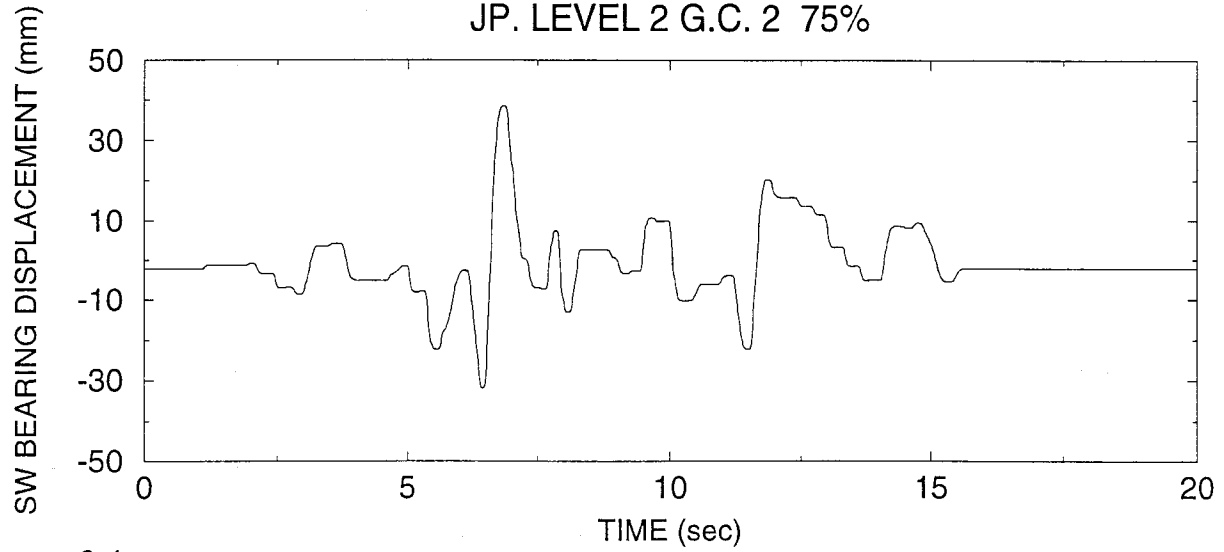
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN32  
JP. LEVEL 1 G.C. 3 100%



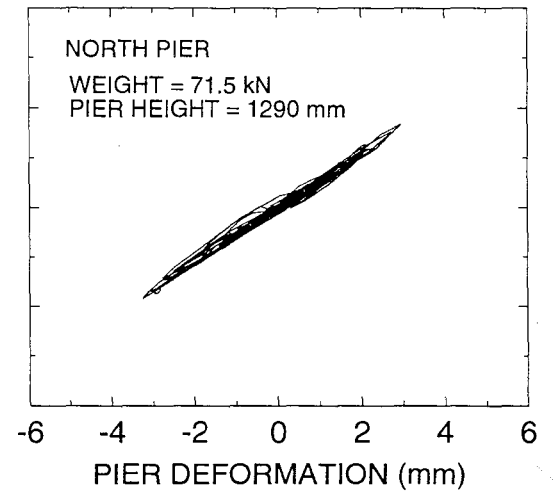
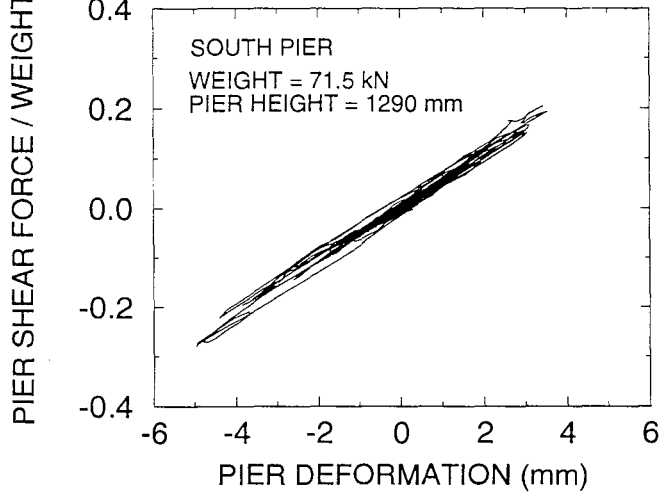
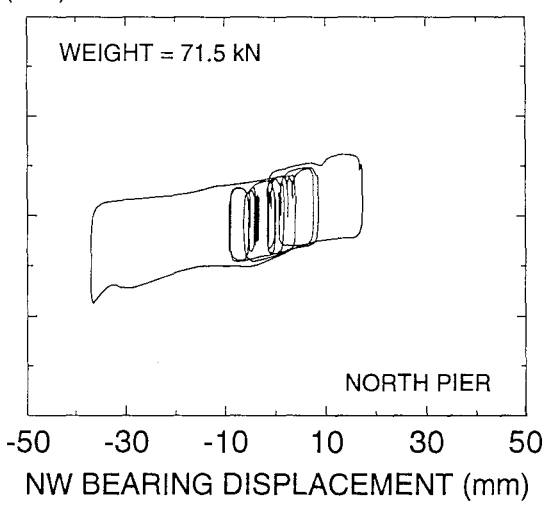
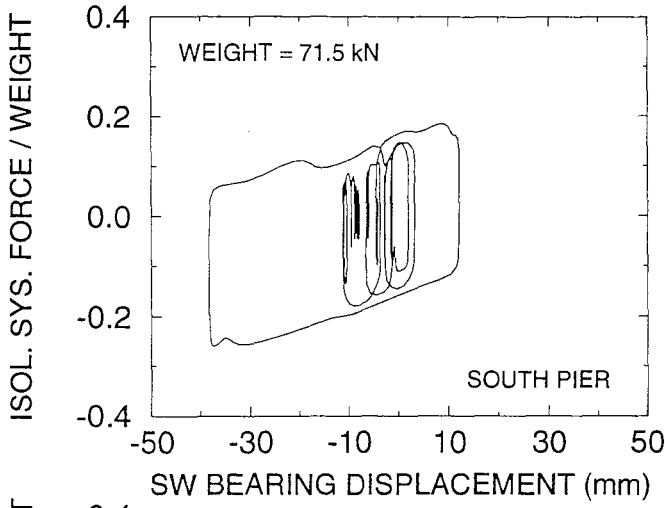
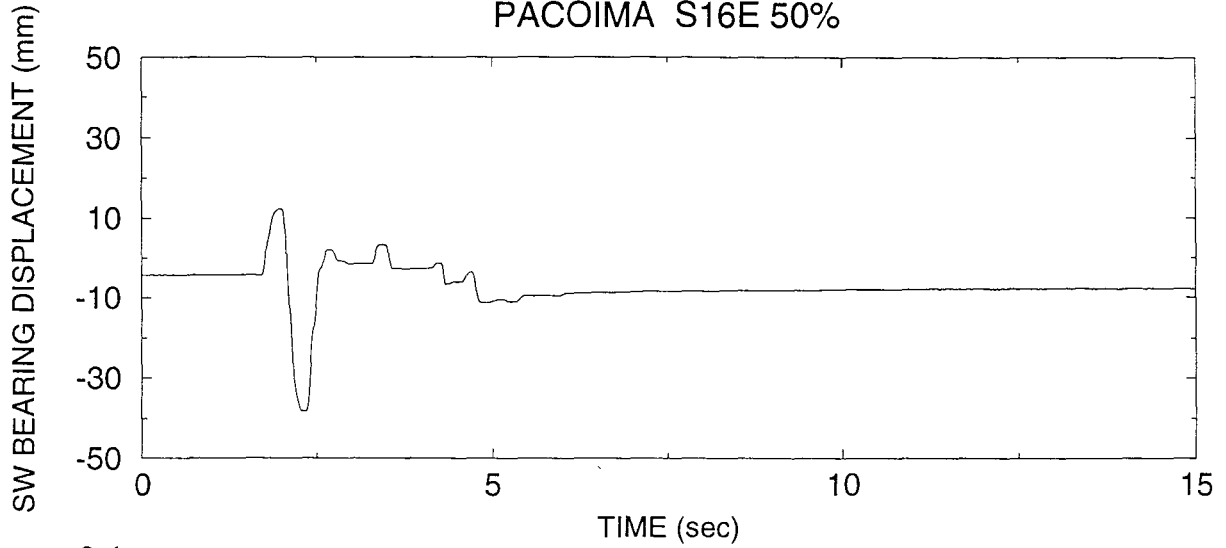
SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN33  
 JP. LEVEL 2 G.C. 1 75%



SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN34  
 JP. LEVEL 2 G.C. 2 75%



SYSTEM T2-No.3 / C1-No.2, TEST No. RMLRUN36  
PACOIMA S16E 50%

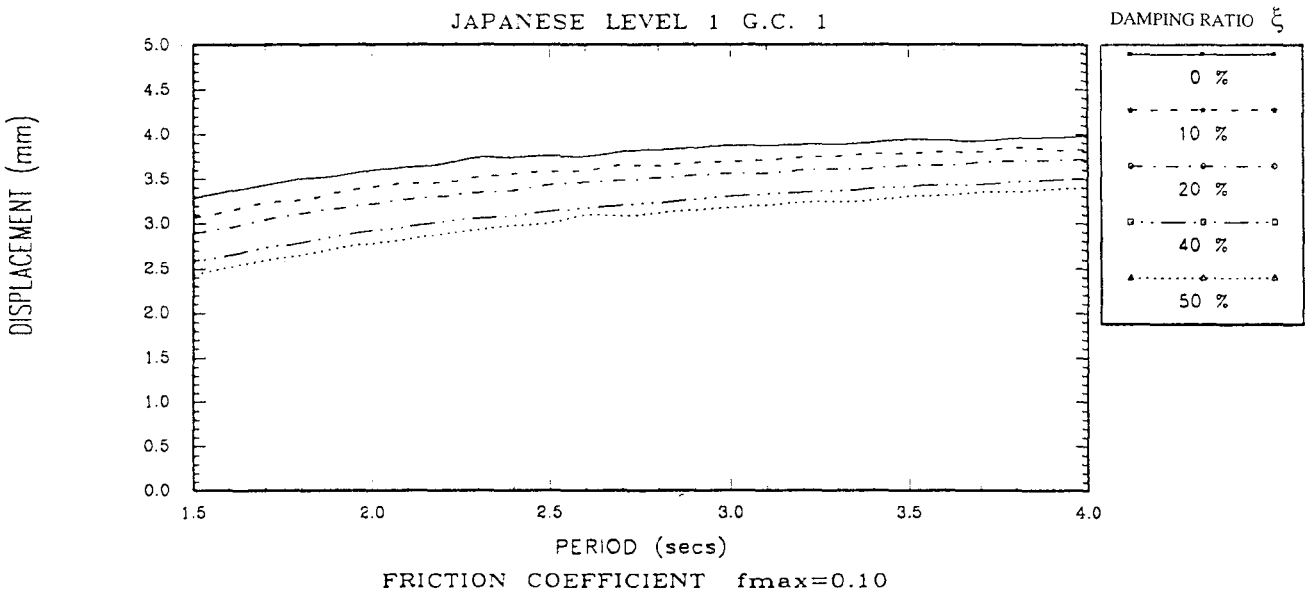
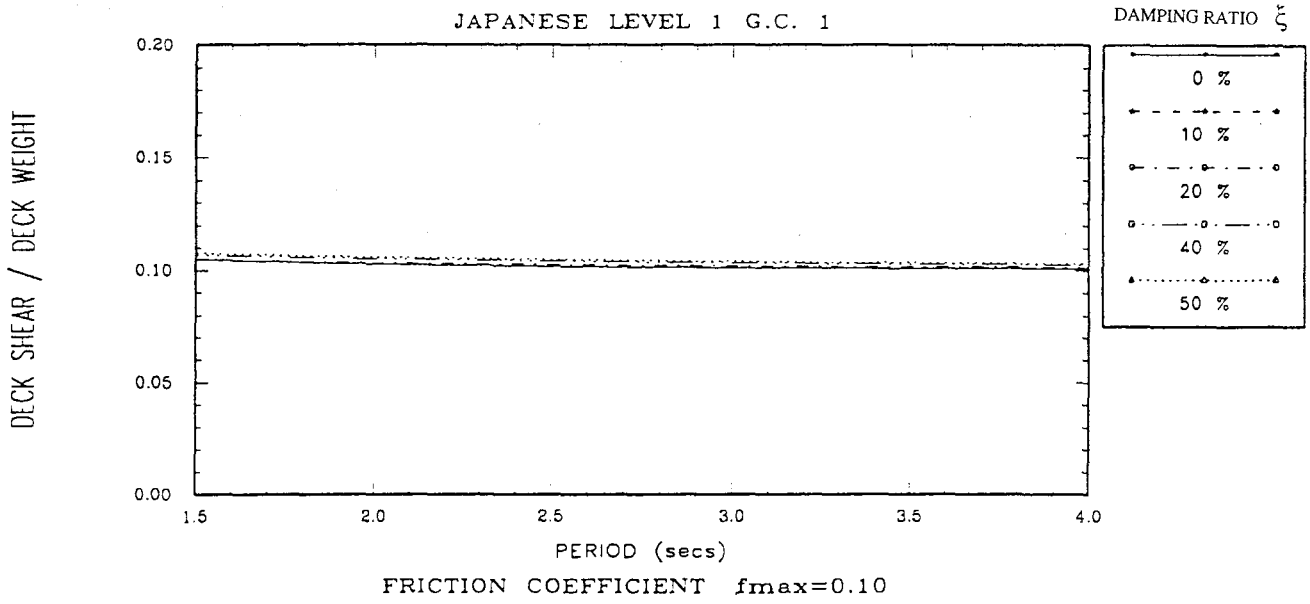




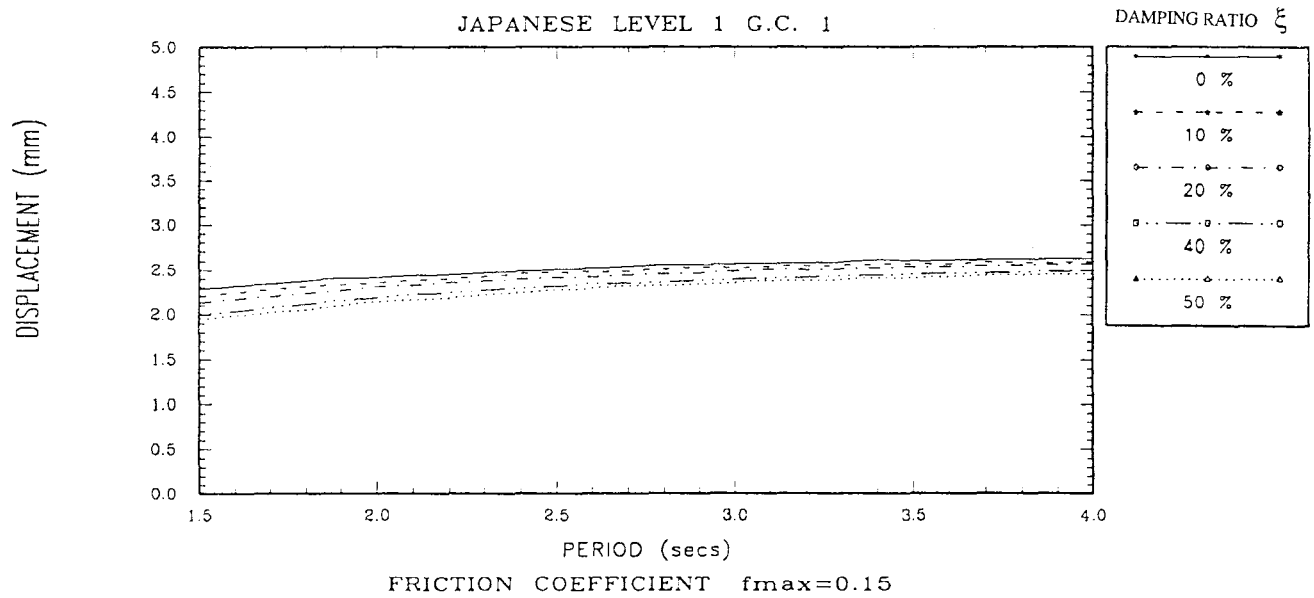
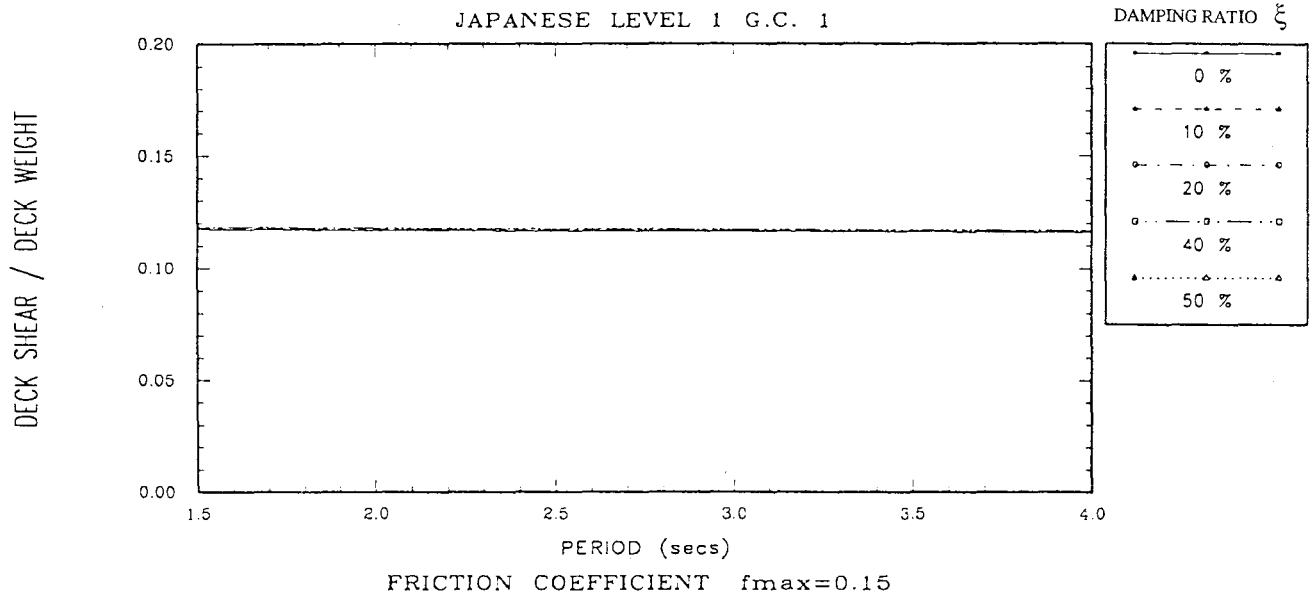
## APPENDIX B

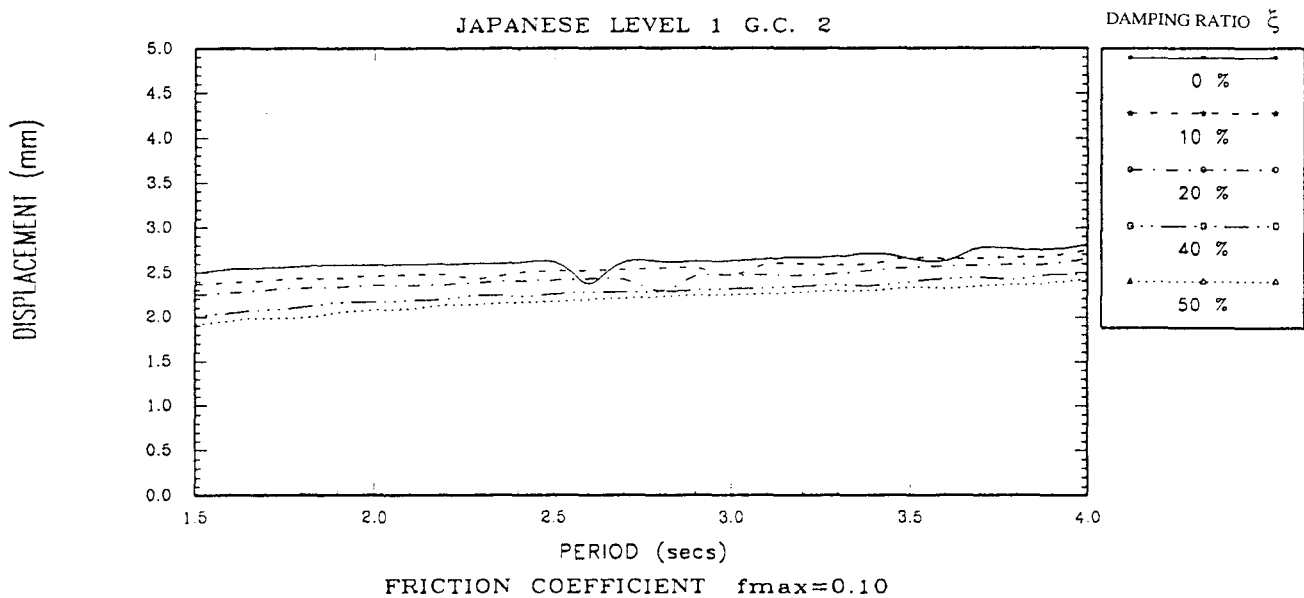
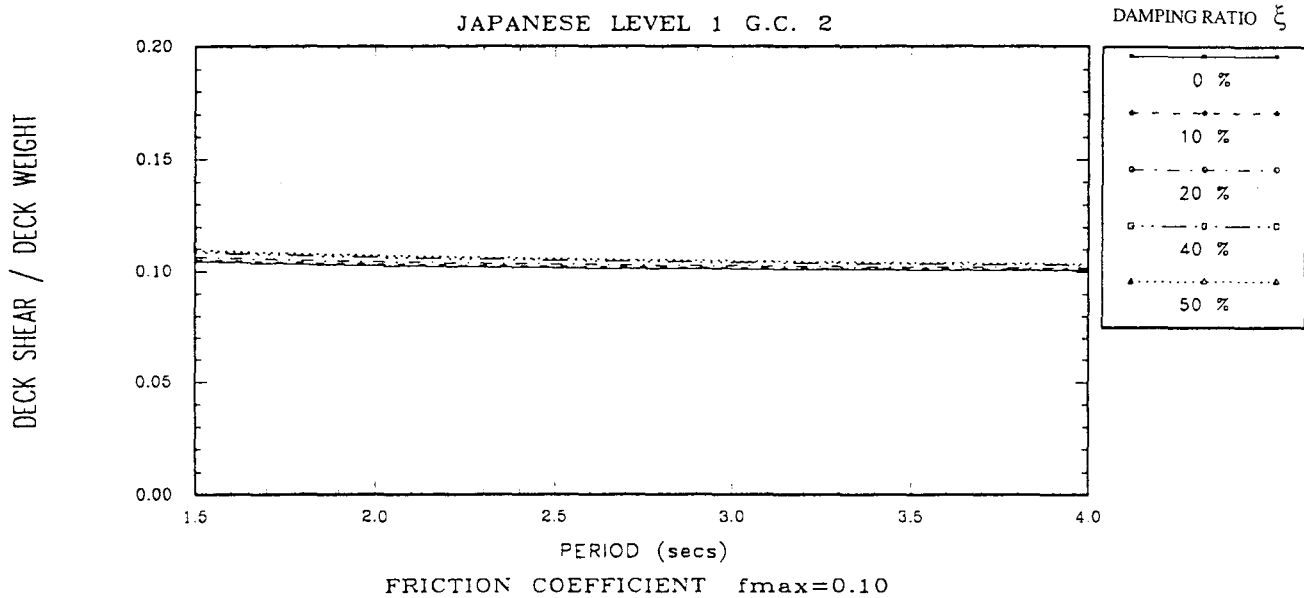
### NON-LINEAR RESPONSE SPECTRA OF SIMPLIFIED DECK MODEL

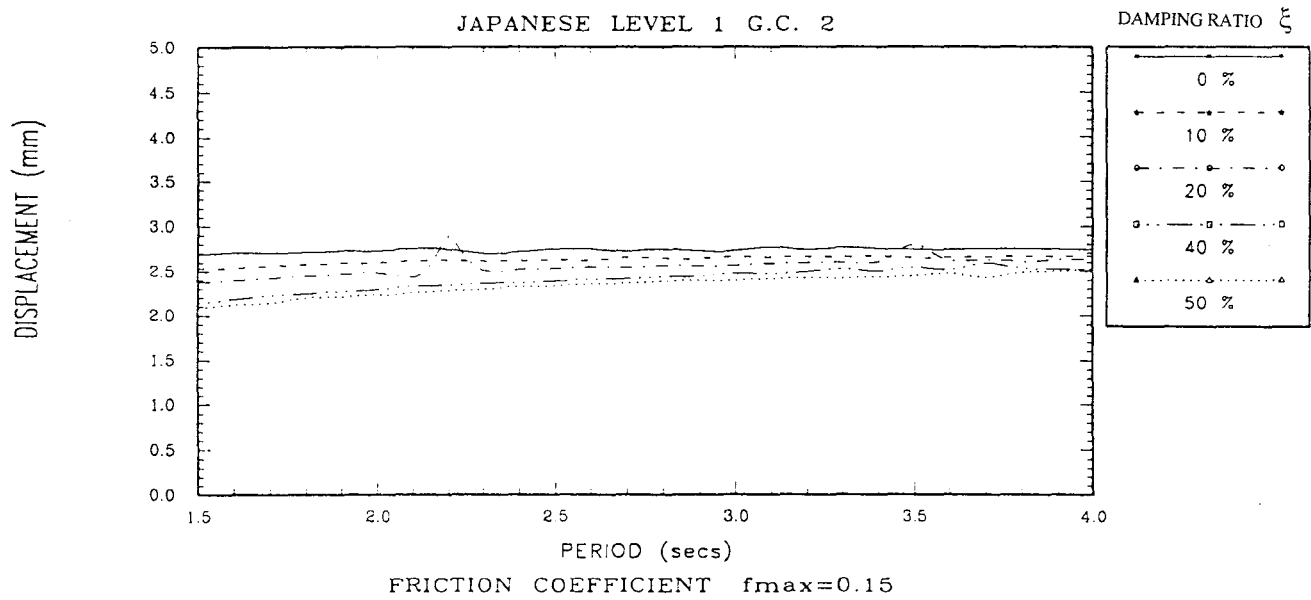
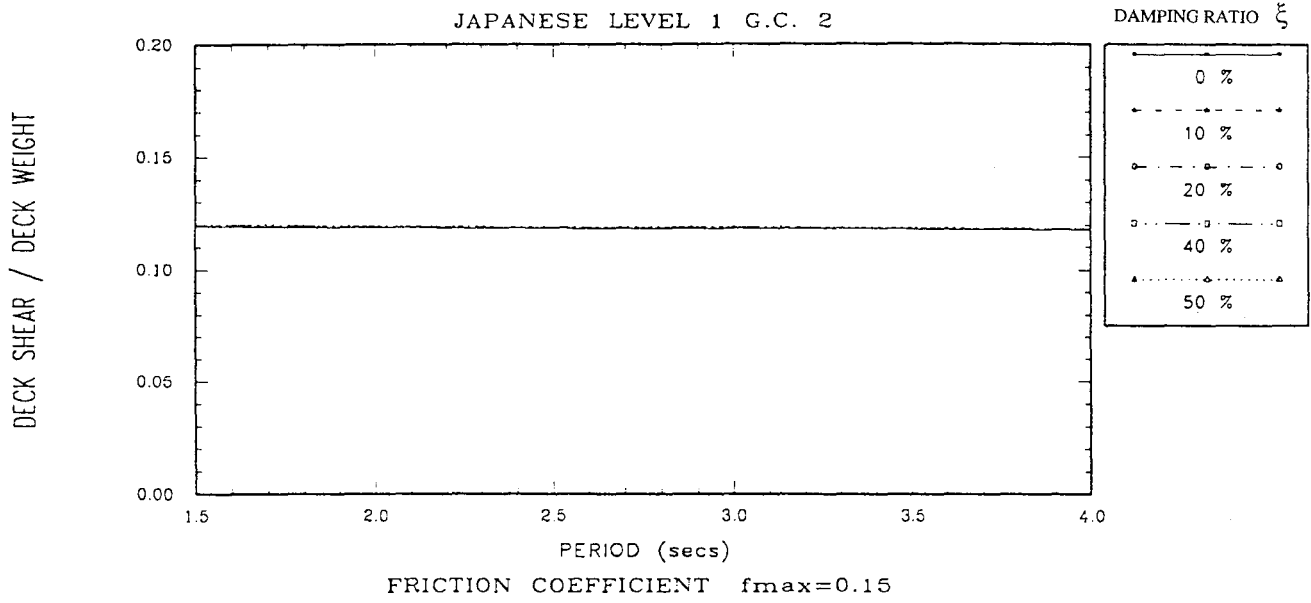
This Appendix contains non-linear response spectra of the simplified deck model (see Section 8.2). Each page of the appendix contains spectra of the isolation system shear force and the bearing displacement for periods in the range of 1.5 to 4.0 secs, viscous damping ratio of 0, 0.1, 0.2, 0.4 and 0.5 of critical and a value of the coefficient of friction  $f_{max}$ . This value of the coefficient of friction and the input motion are identified in each figure.

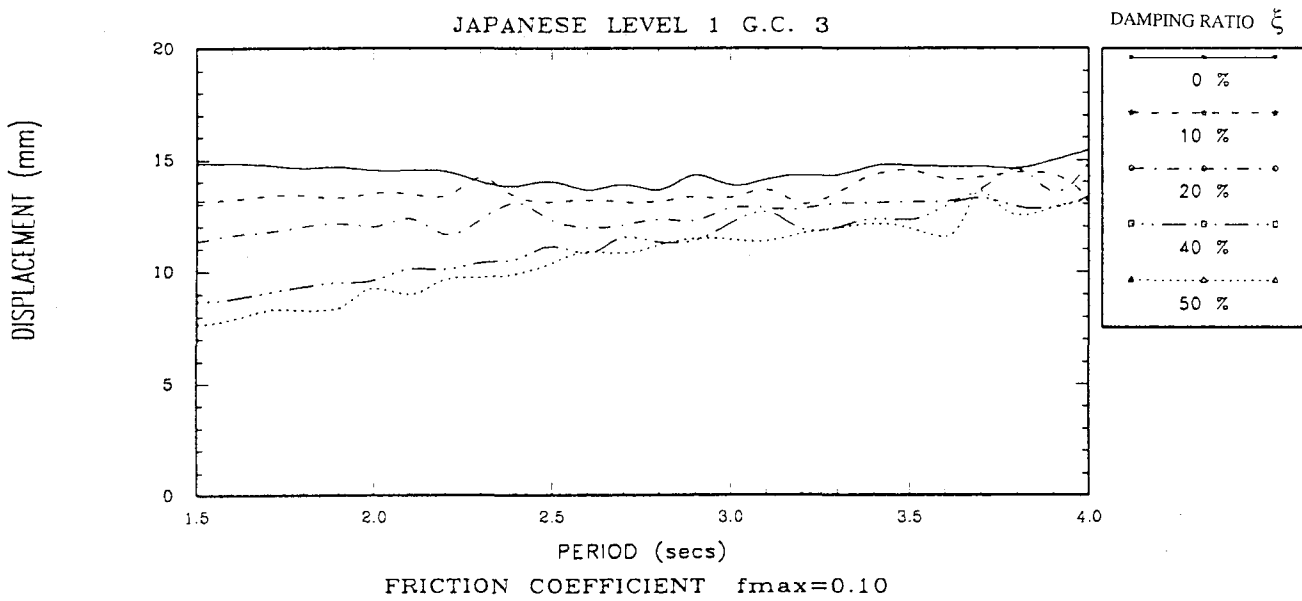
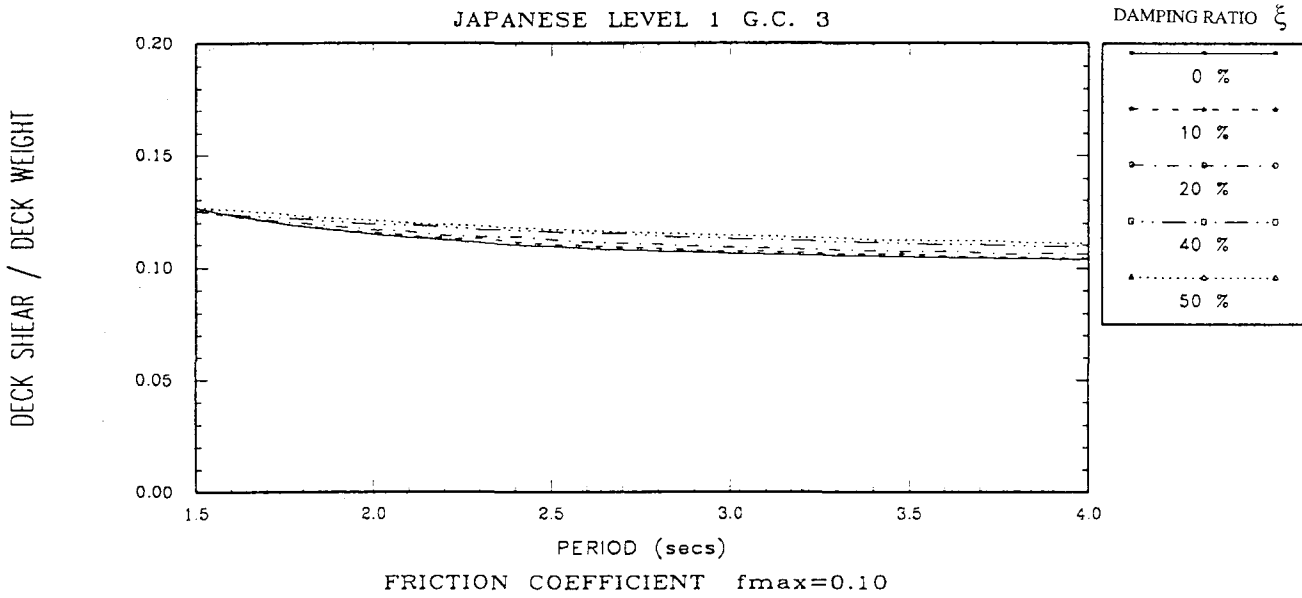


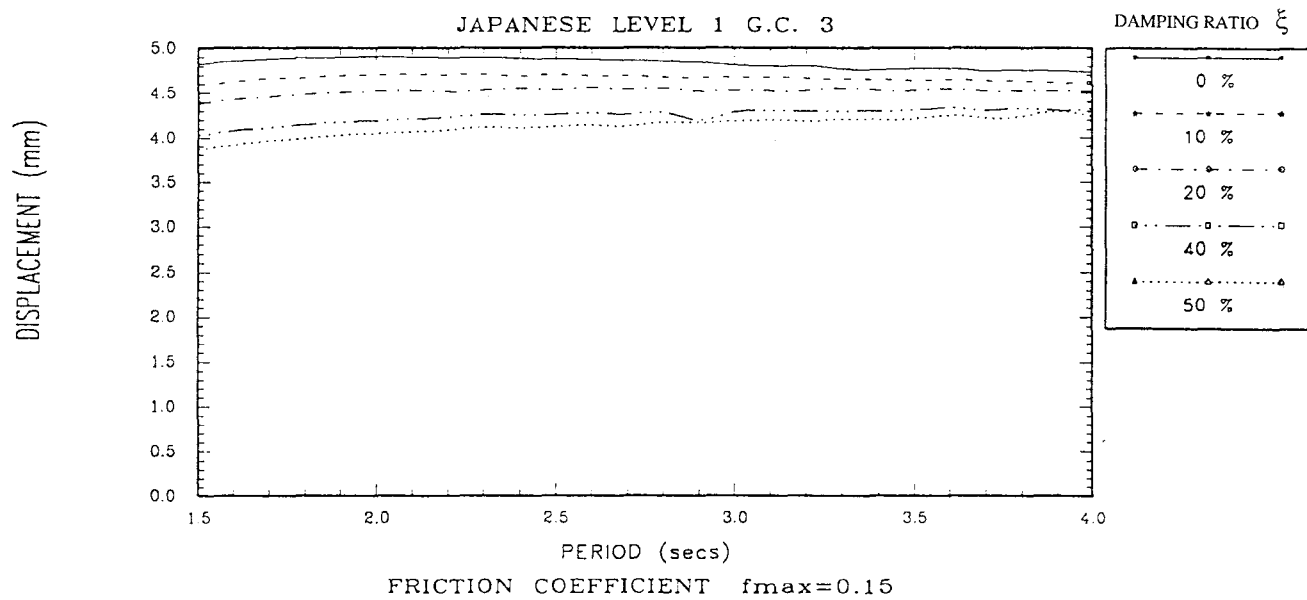
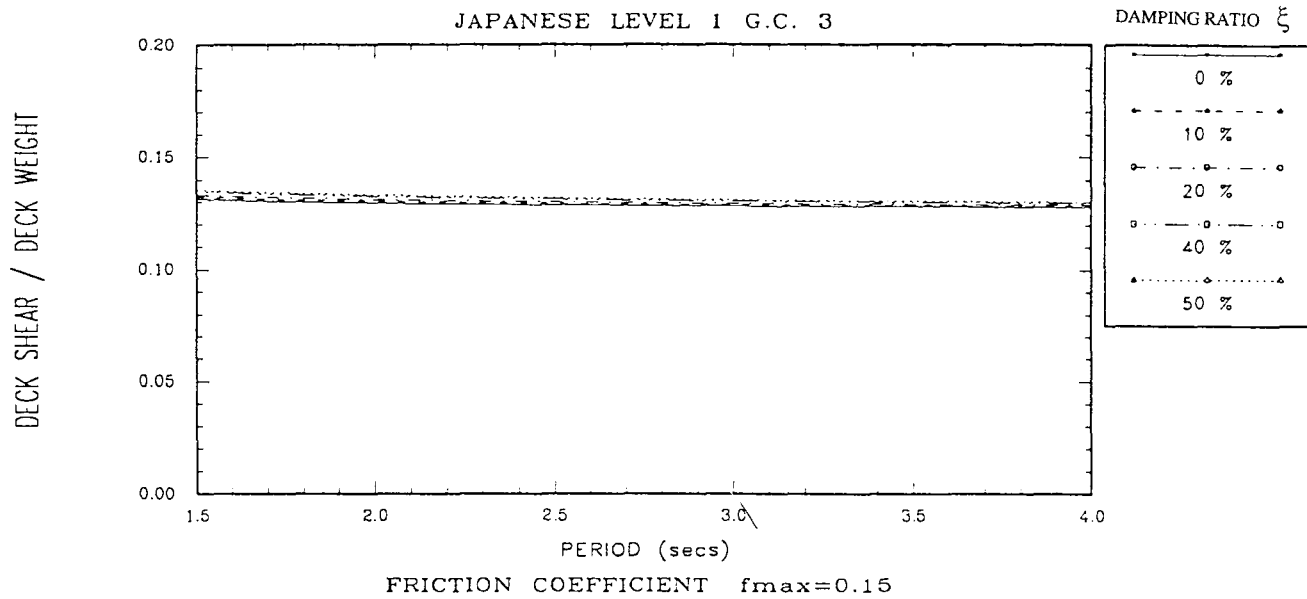


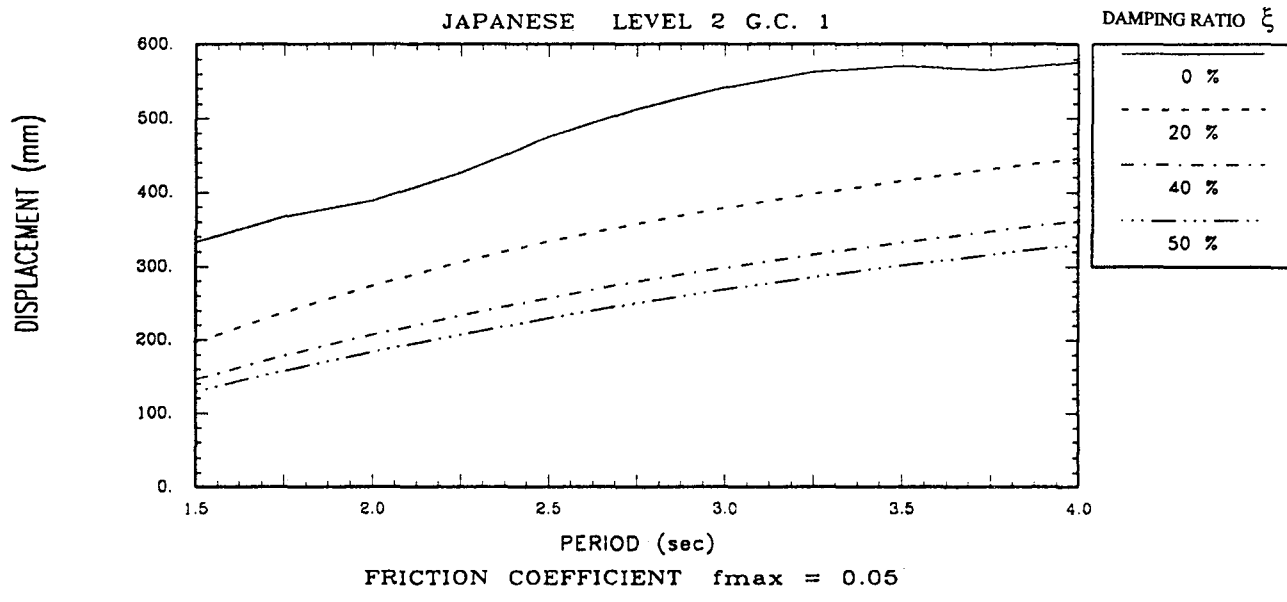
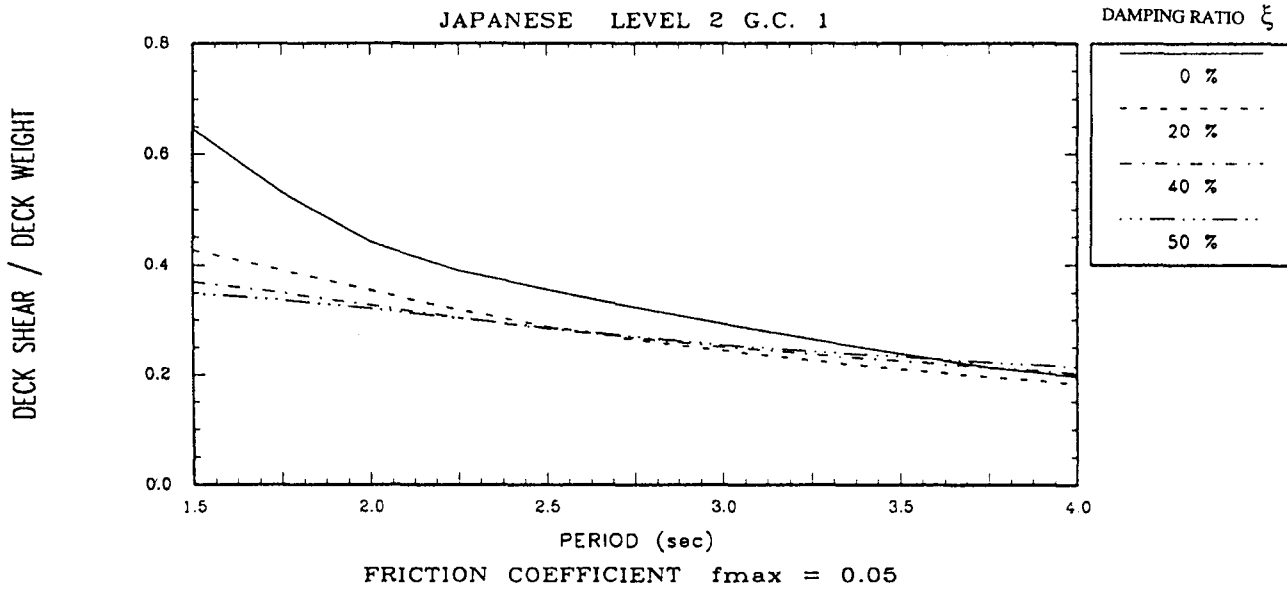


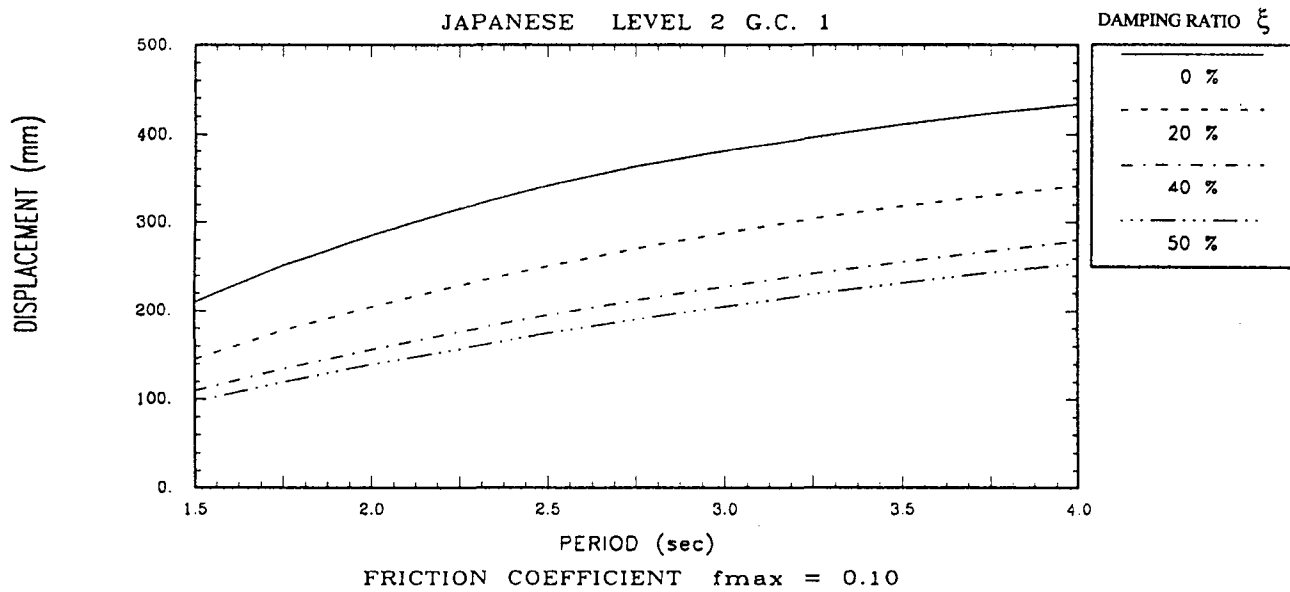
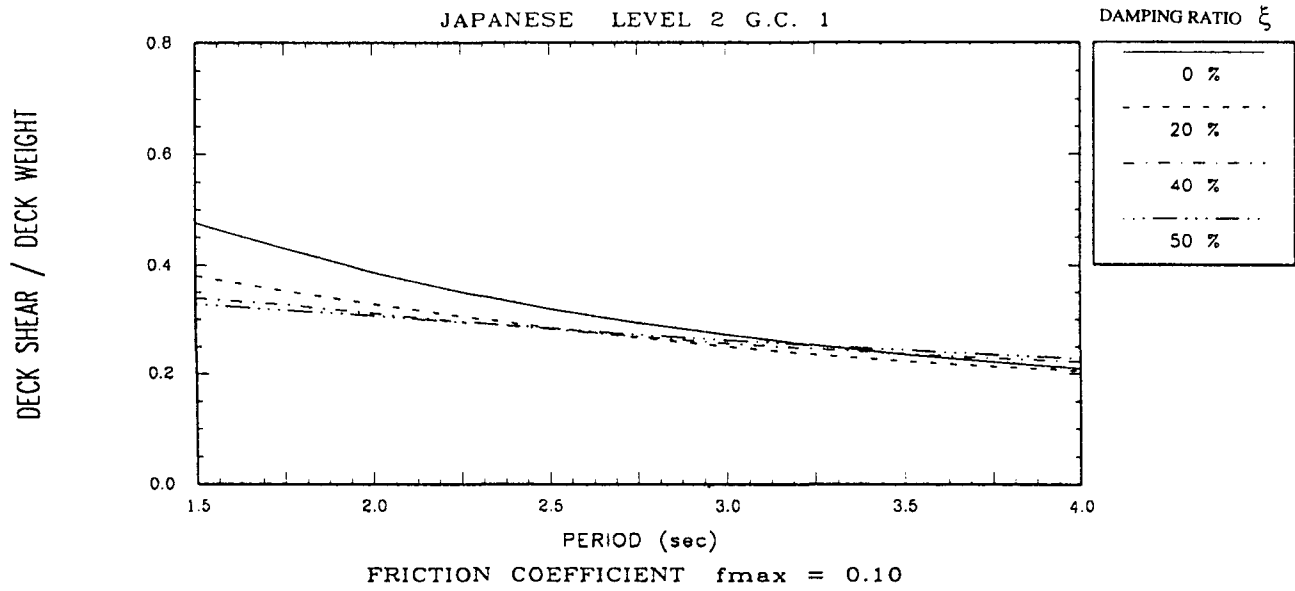


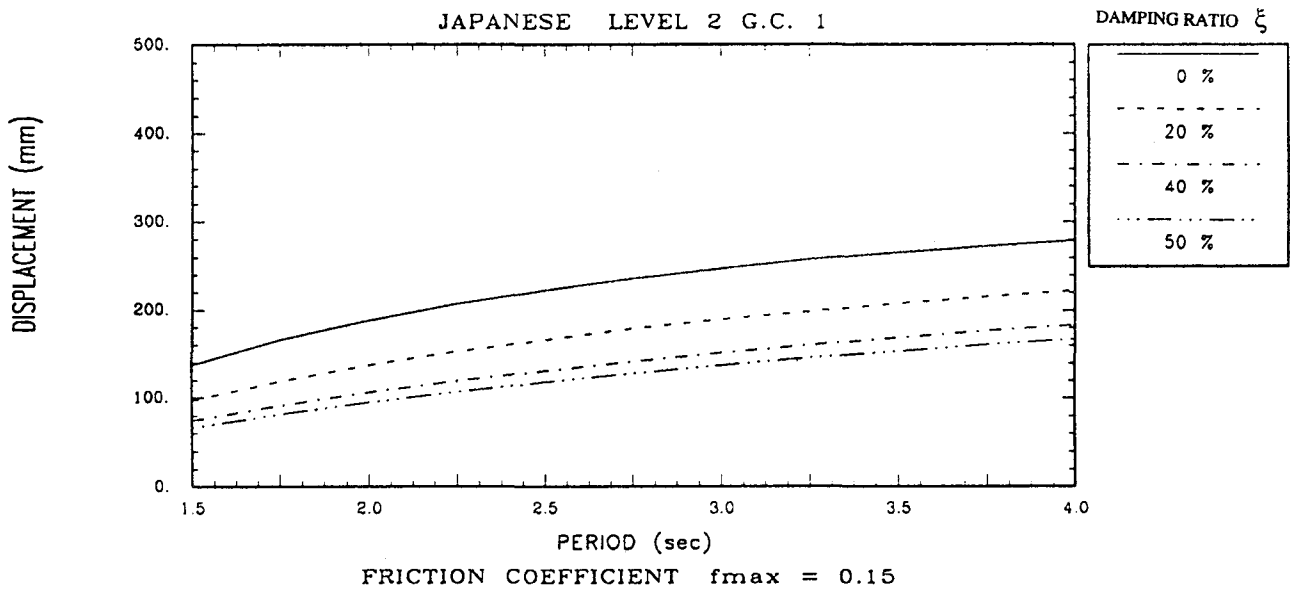
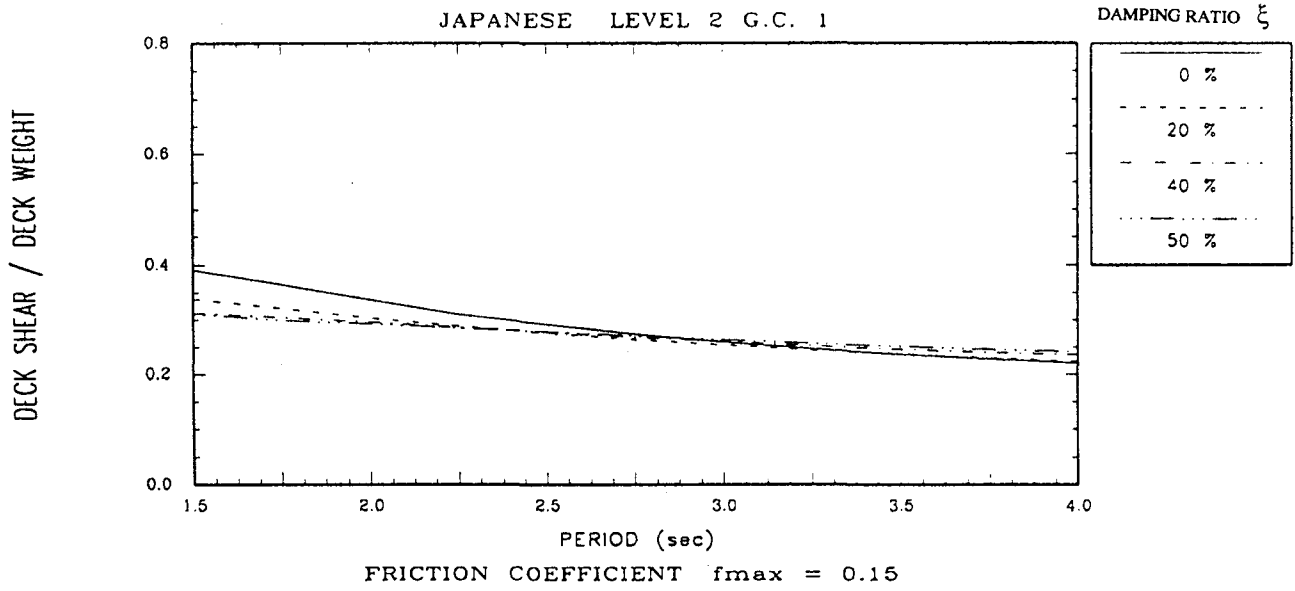




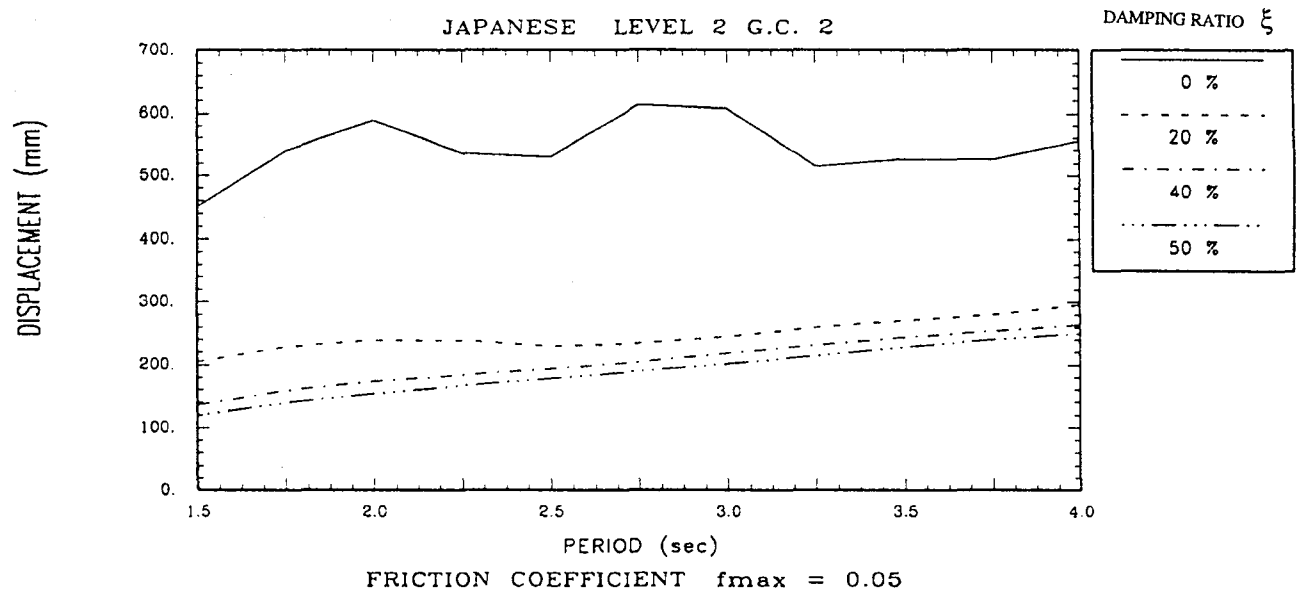
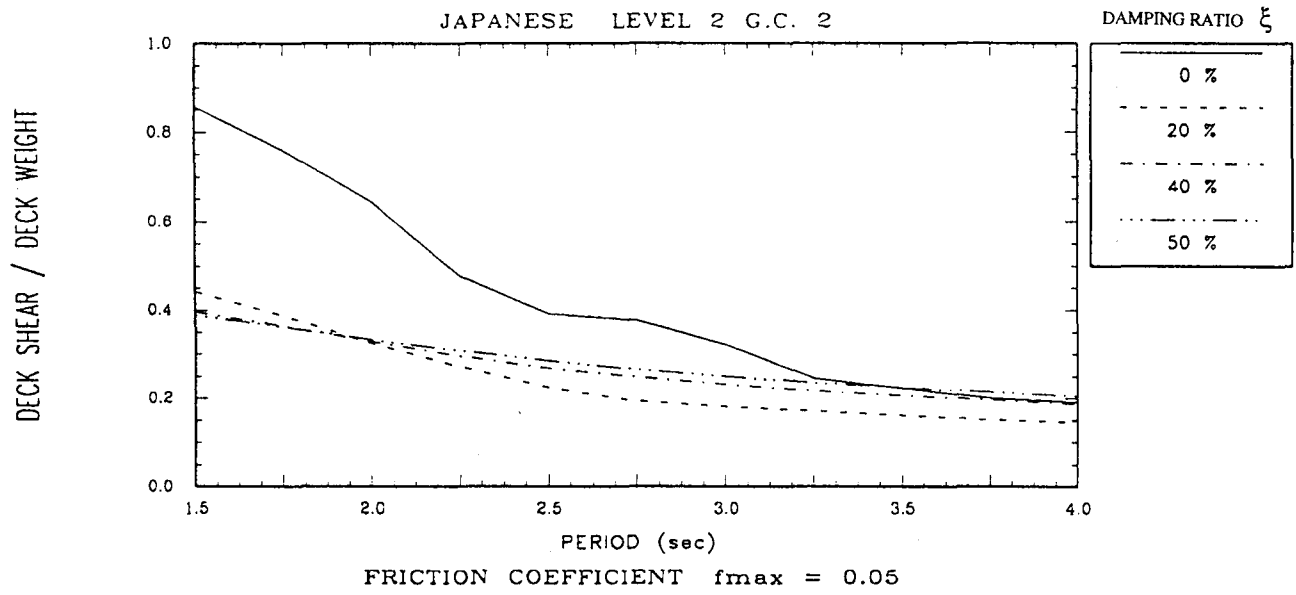


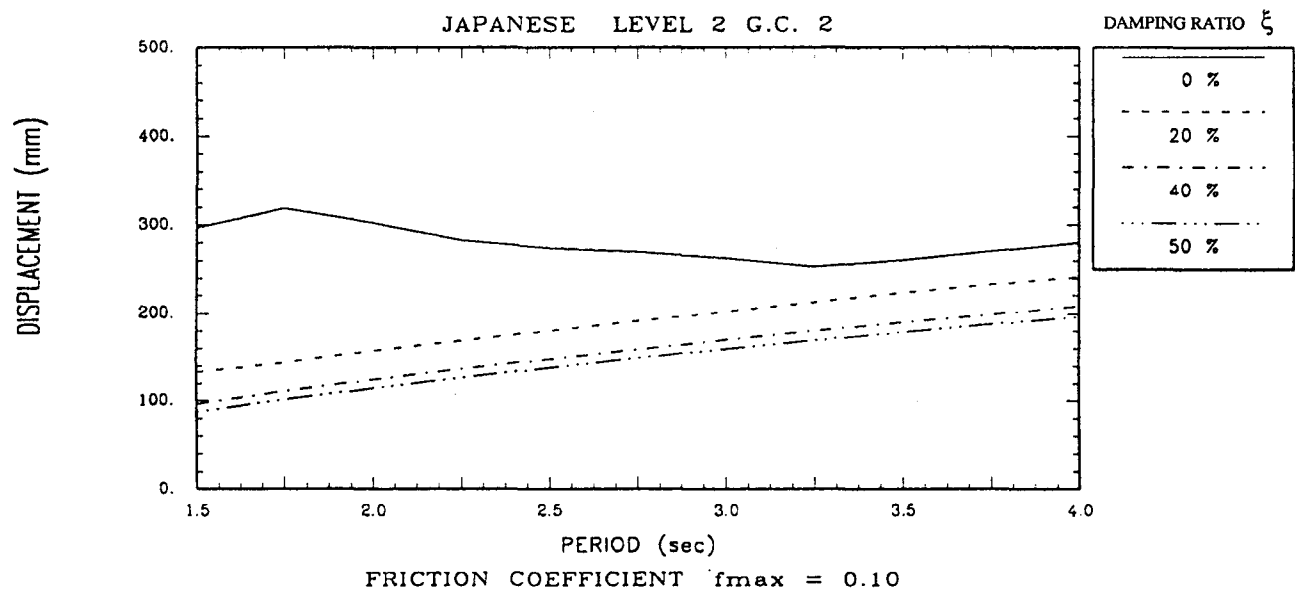
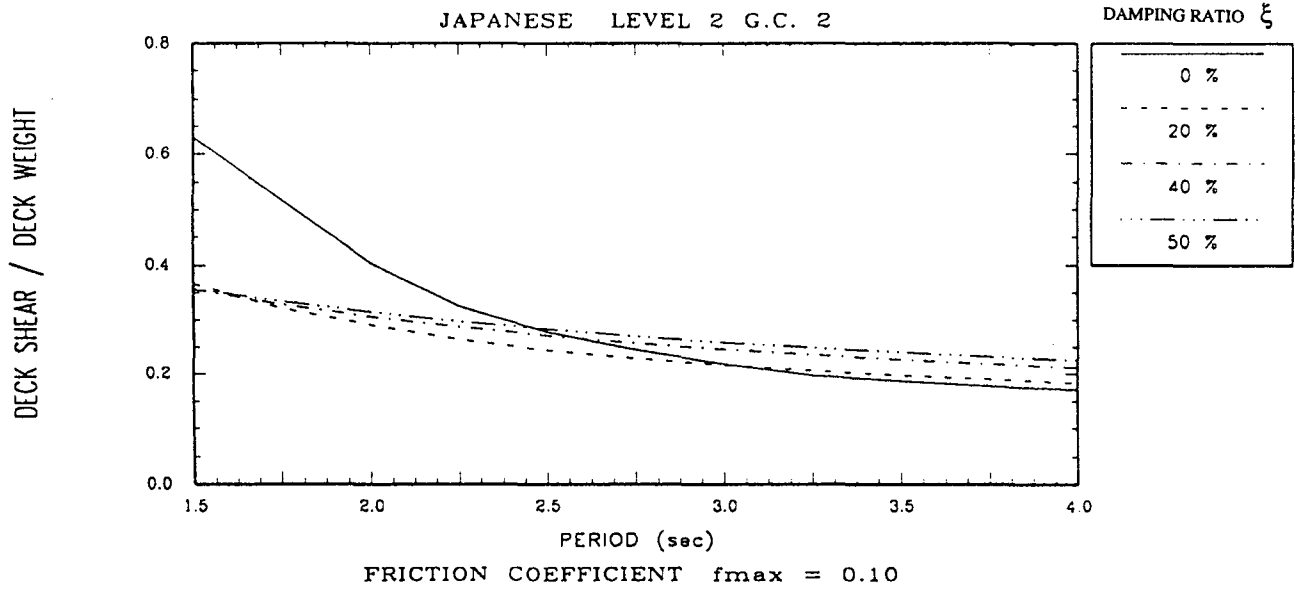


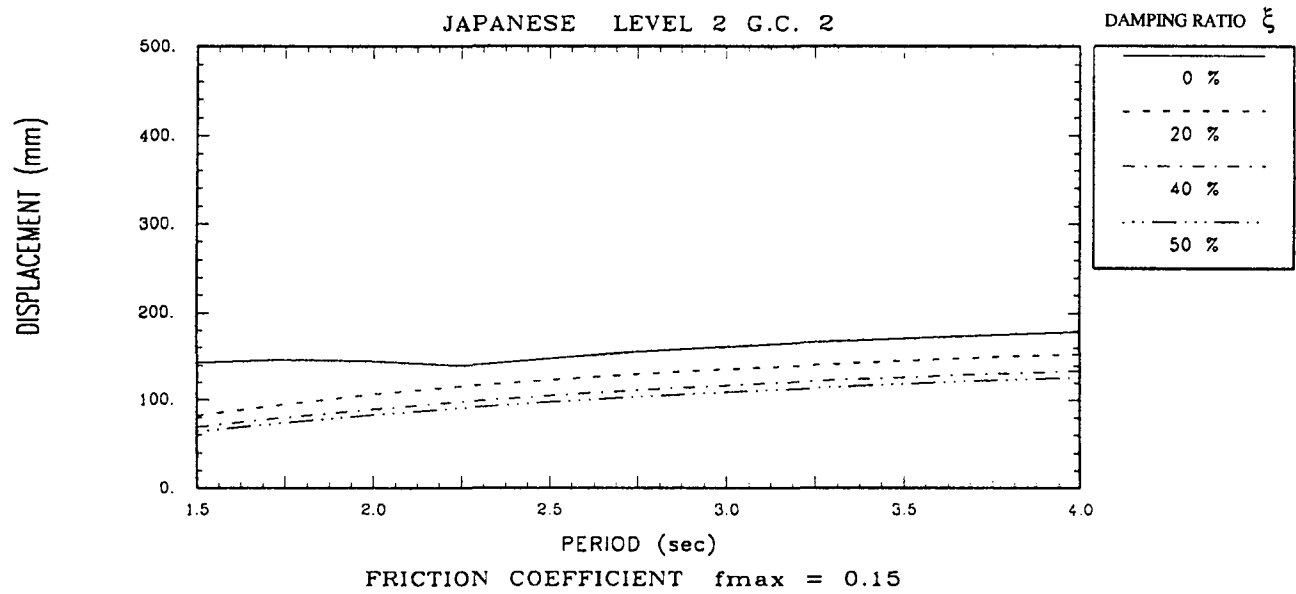
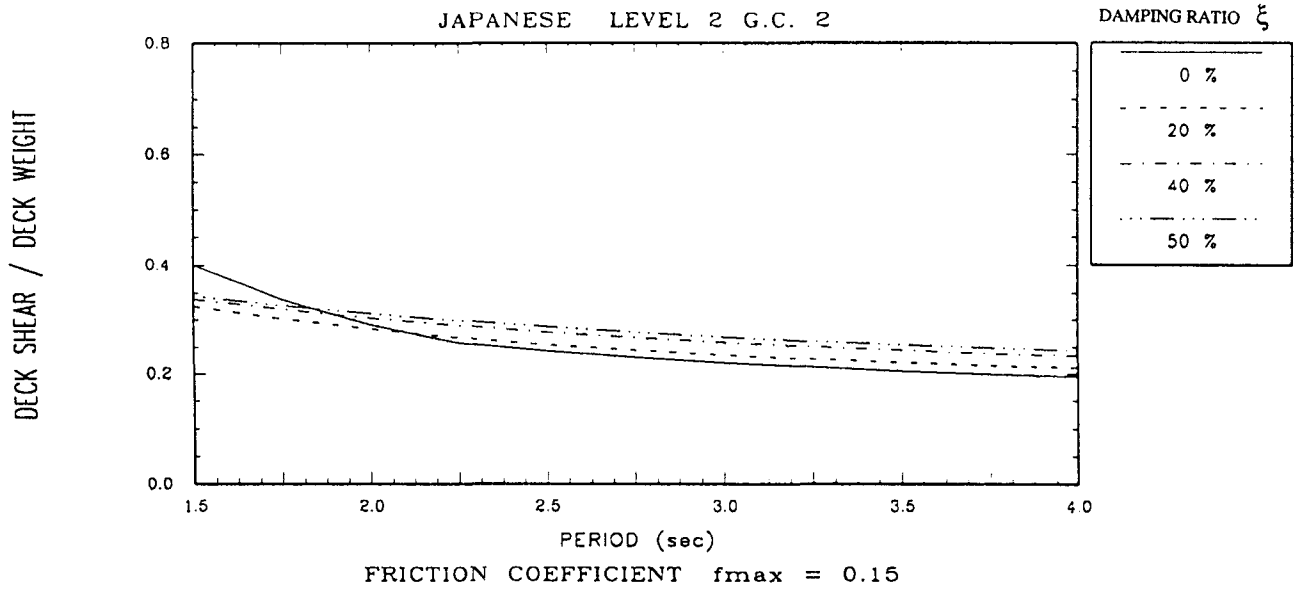


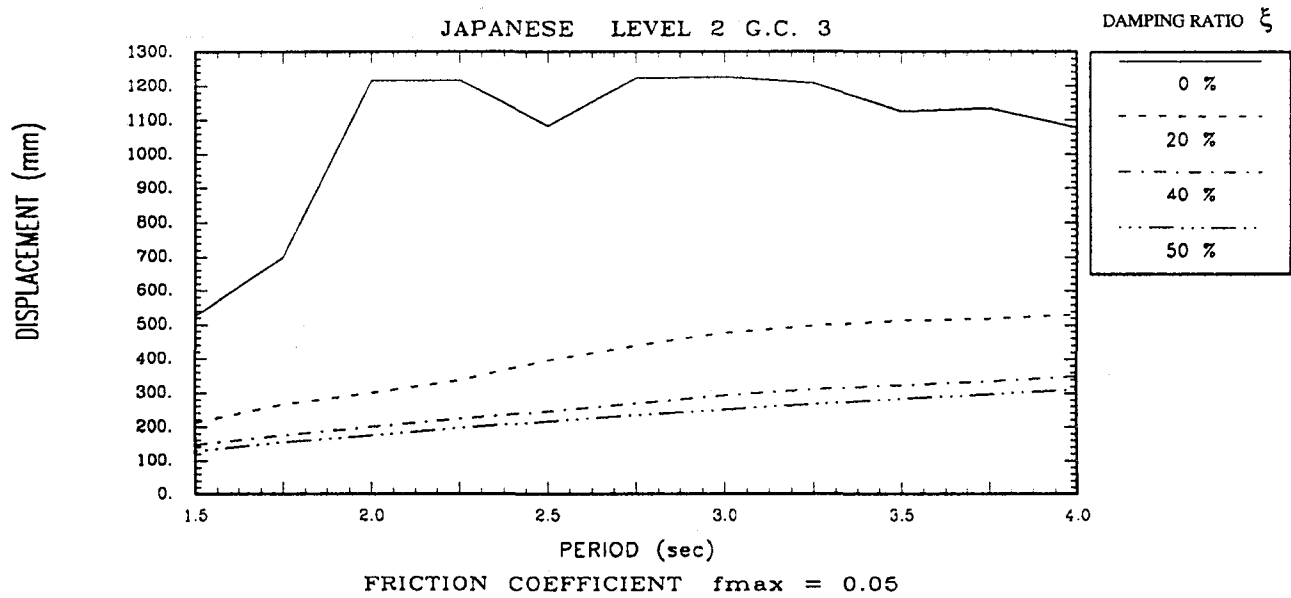
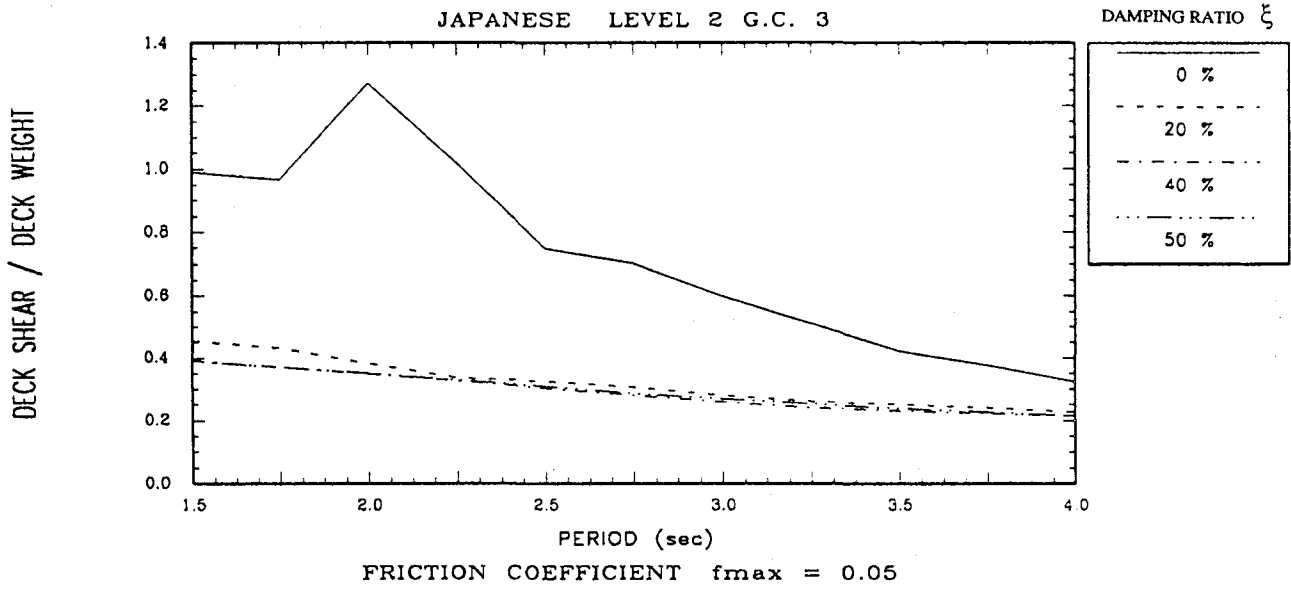


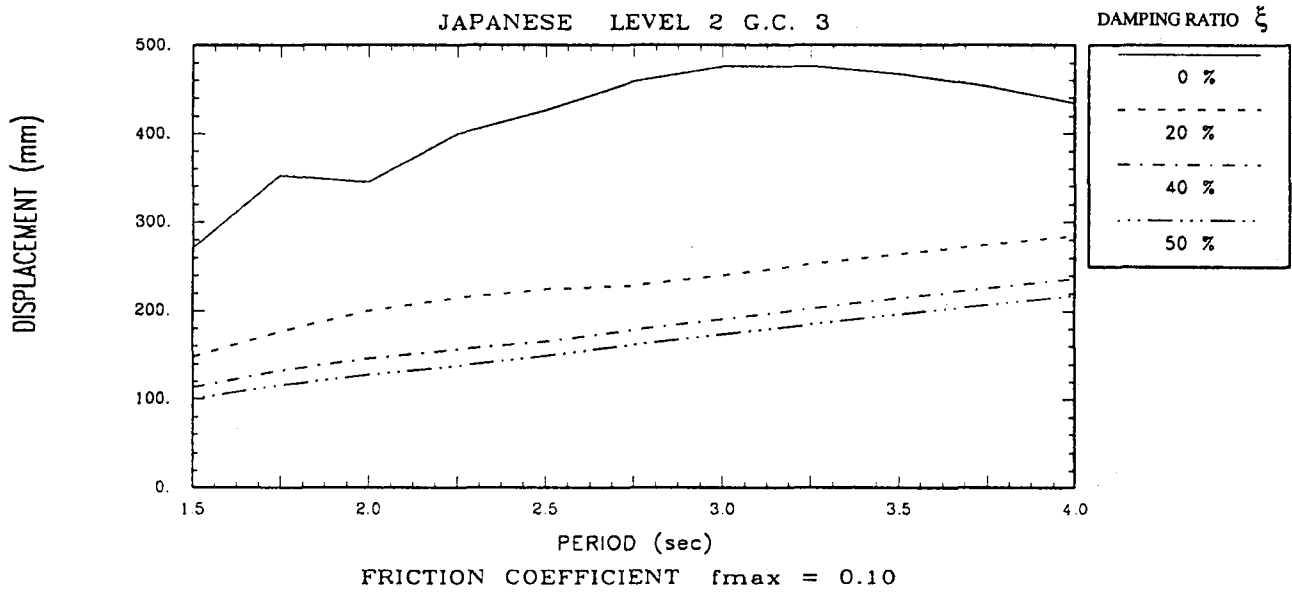
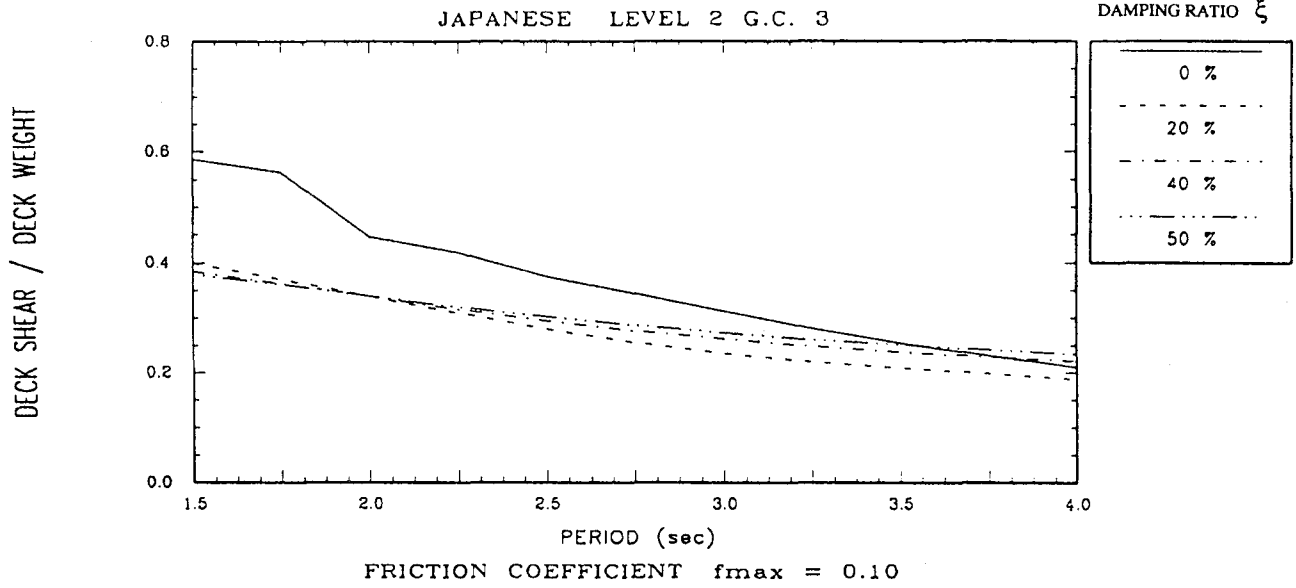


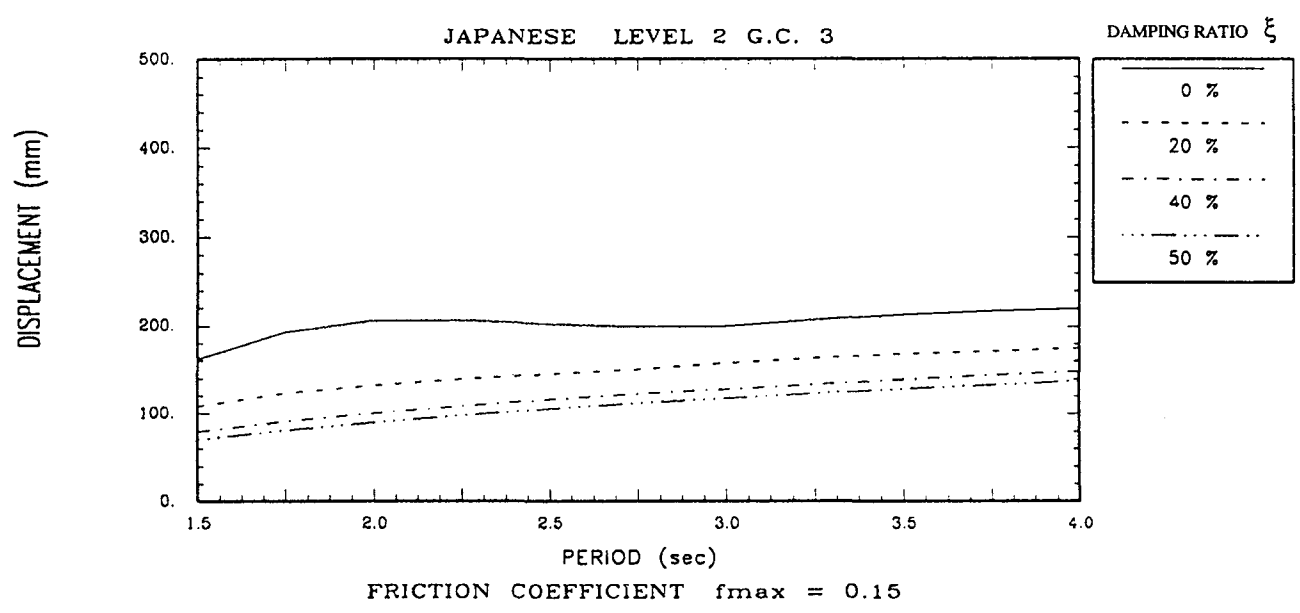
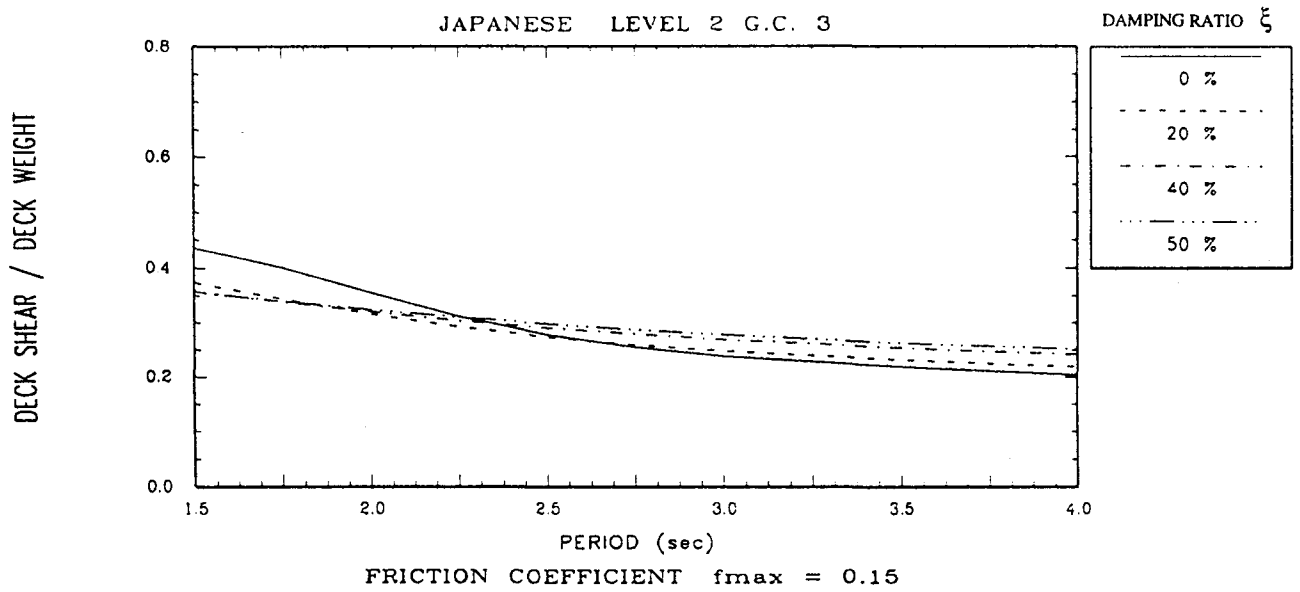












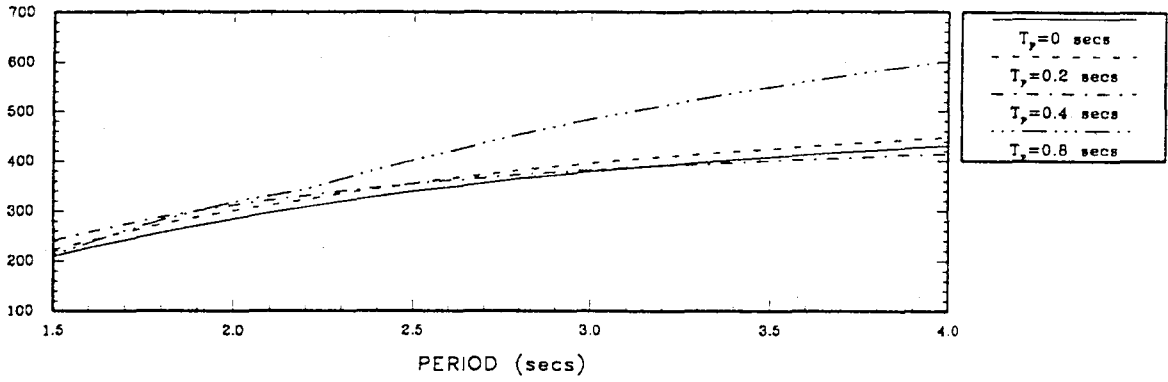
## APPENDIX C

### NON-LINEAR RESPONSE SPECTRA OF PIER-DECK MODEL

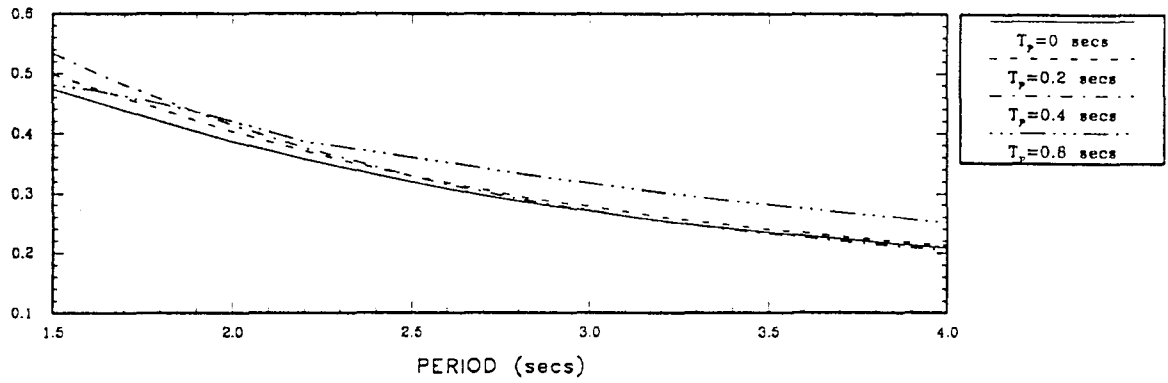
This Appendix contains non-linear response spectra of the pier-deck model (see Section 8.3). Each page of the appendix contains spectra of the bearing displacement with respect to the pier, the isolation system shear force and the pier shear force for isolation system periods in the range of 1.5 to 4.0 secs, pier period ( $T_p$ ) of 0, 0.2, 0.4 and 0.8 secs and specific values of isolation system viscous damping ratio, pier to deck weight ratio and coefficient of friction  $\mu = f_{max}$ . These values and the input motion are identified in each figure.

LEVEL 2 G.C. 1

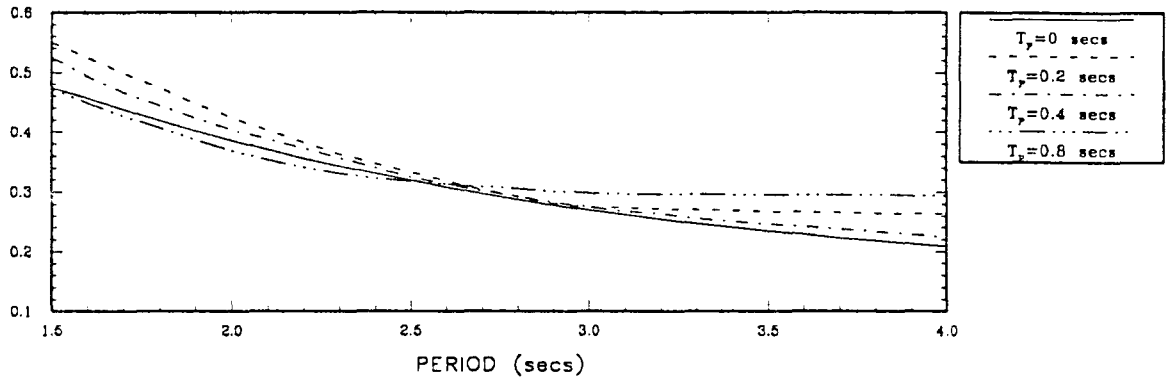
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



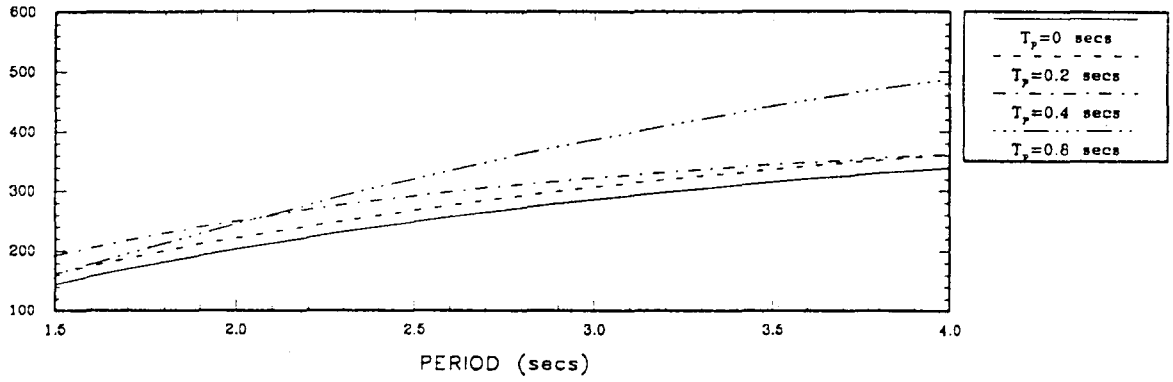
$$\xi=0, \quad \mu=0.10$$

$$W_p/W_d=1/5$$

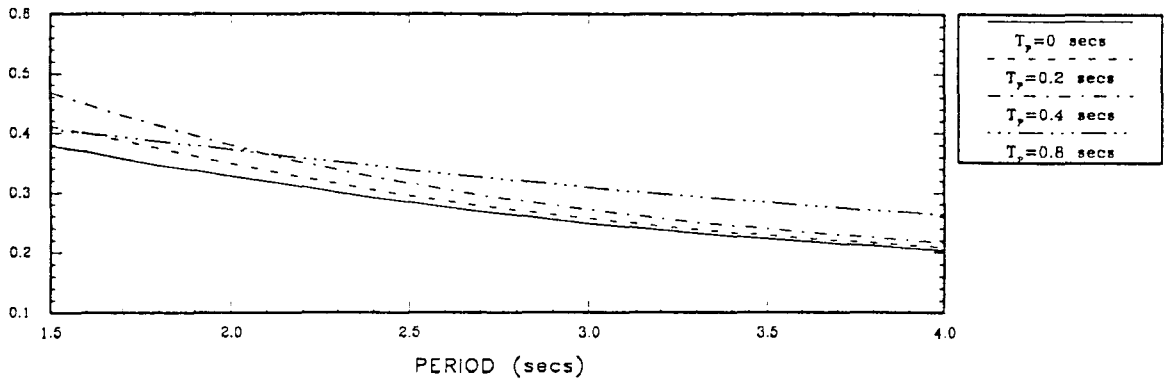


LEVEL 2 G.C. 1

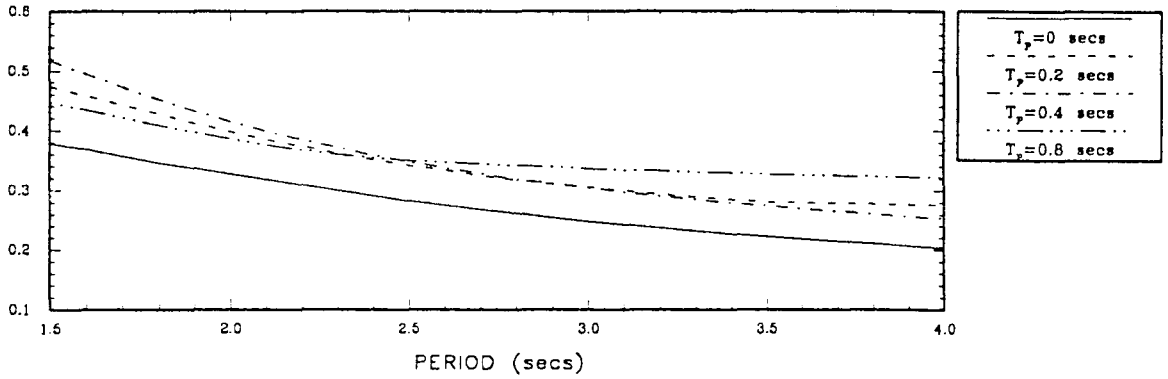
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

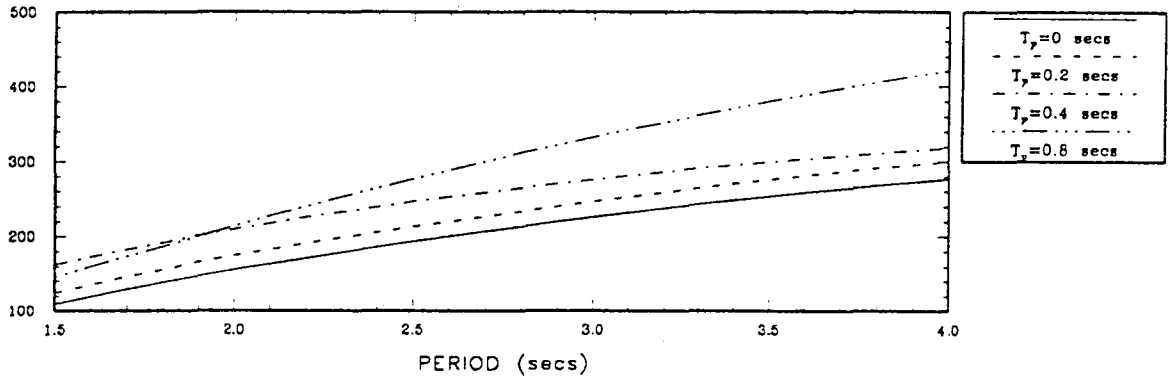


$$\xi = 0.20, \quad \mu = 0.10$$

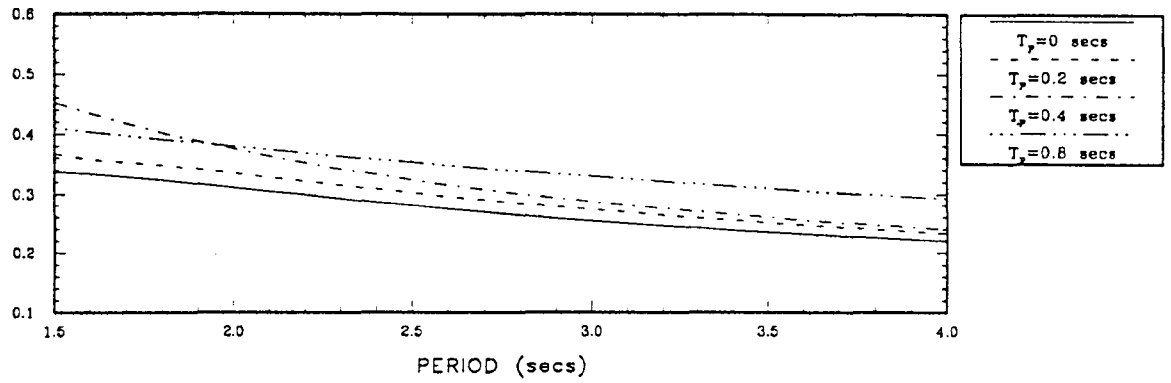
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 1

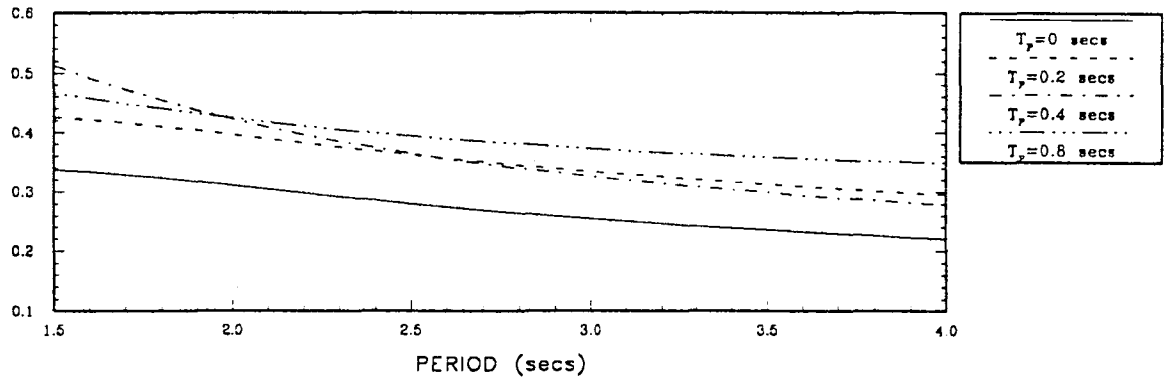
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

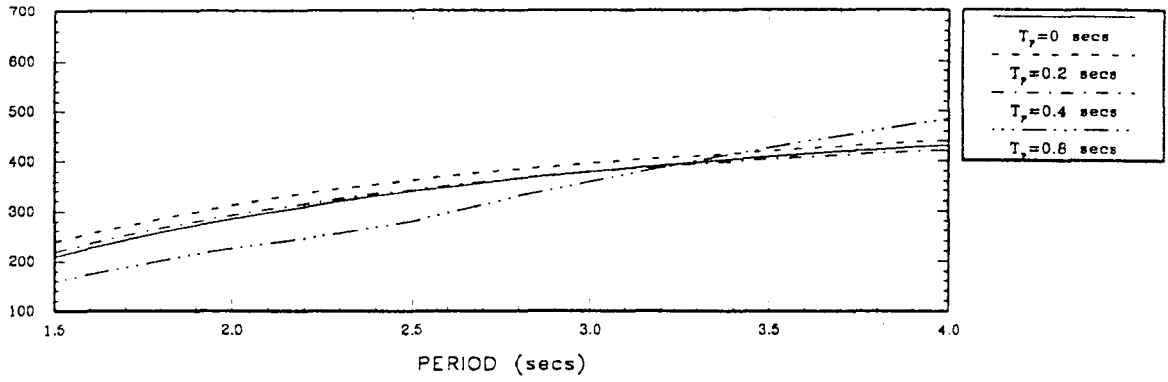


$$\xi=0.40, \quad \mu=0.10$$

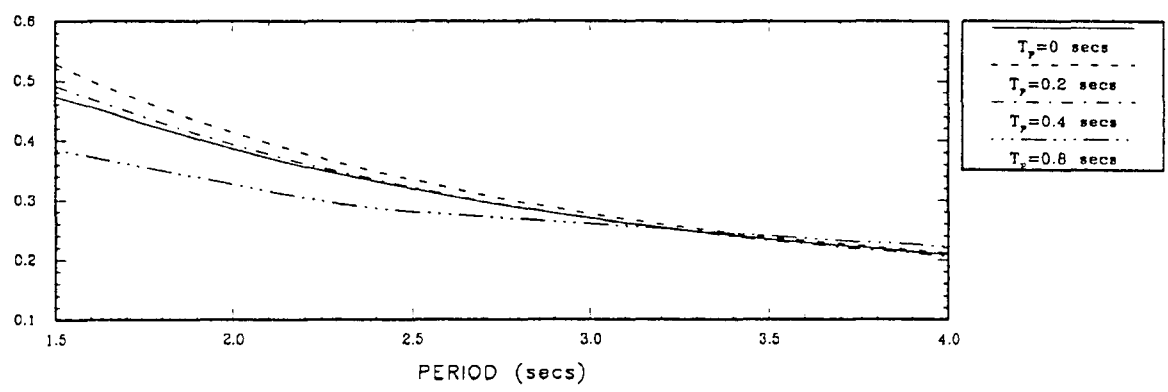
$$W_p/W_d=1/5$$

LEVEL 2 G.C. 1

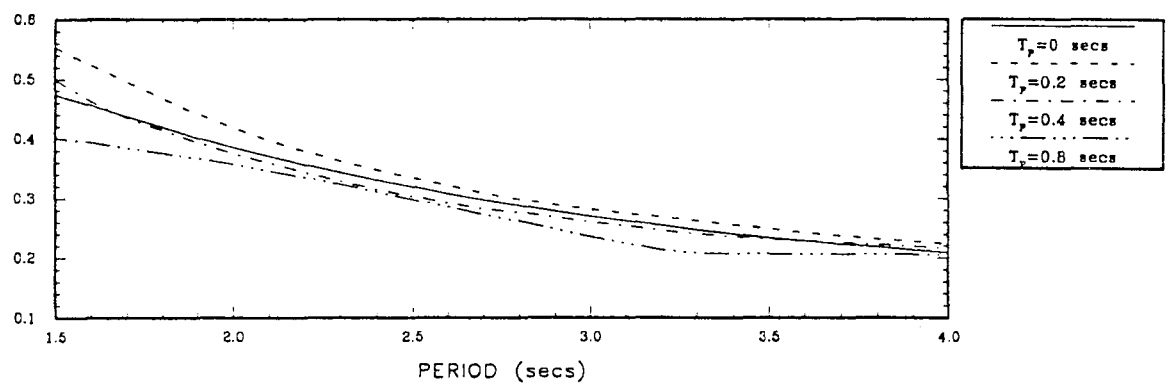
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

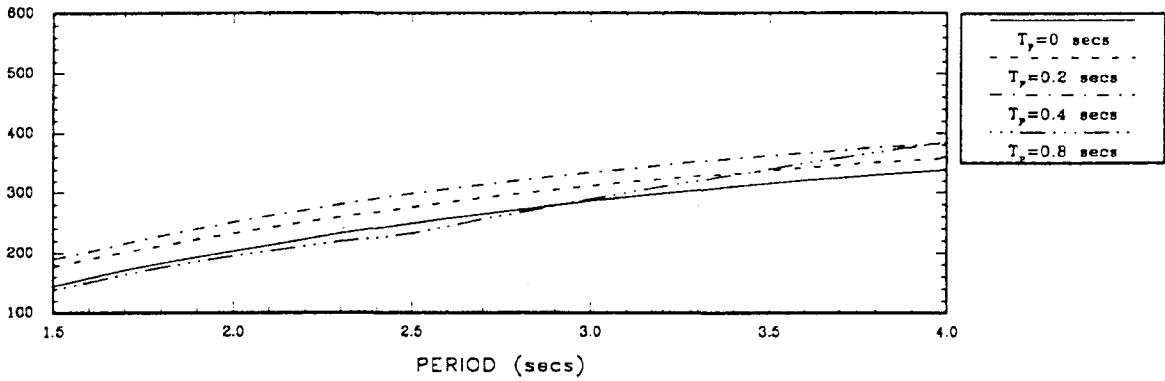


$$\xi = 0, \quad \mu = 0.10$$

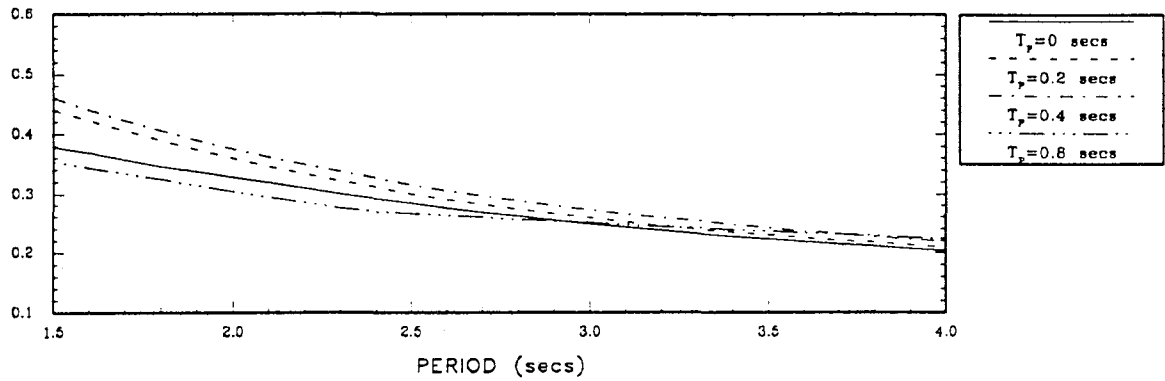
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 1

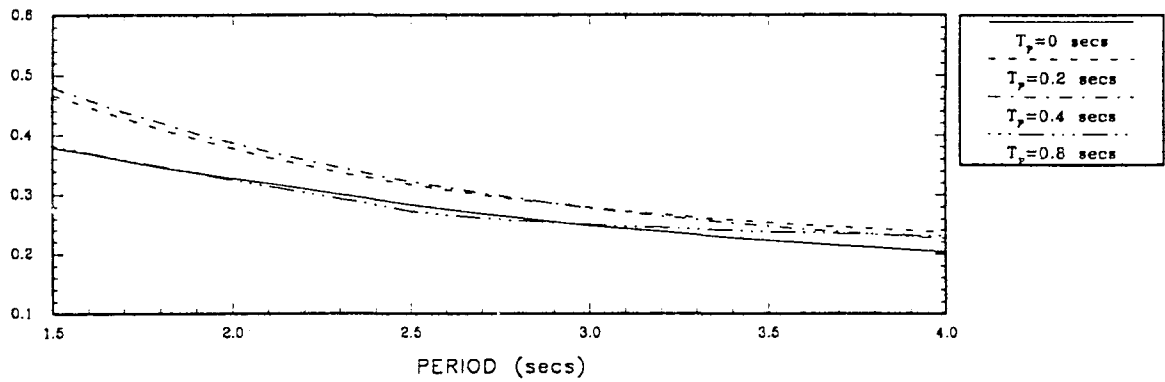
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

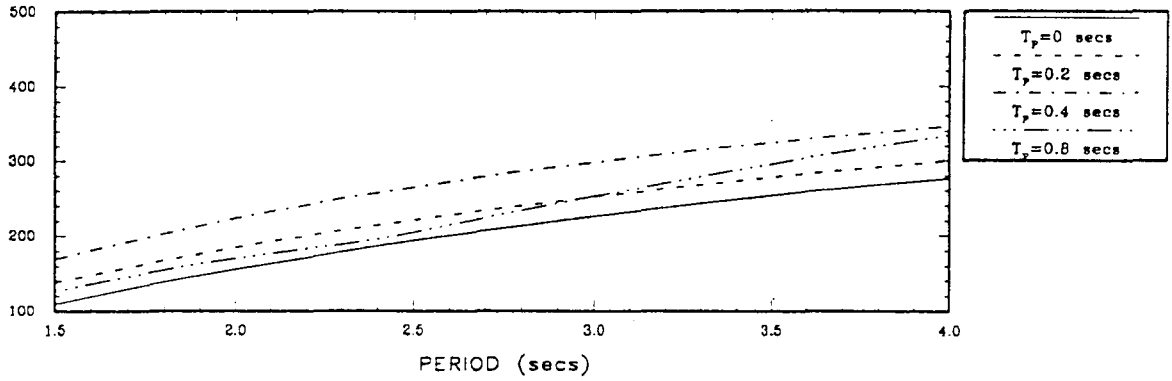


$$\xi=0.20, \quad \mu=0.10$$

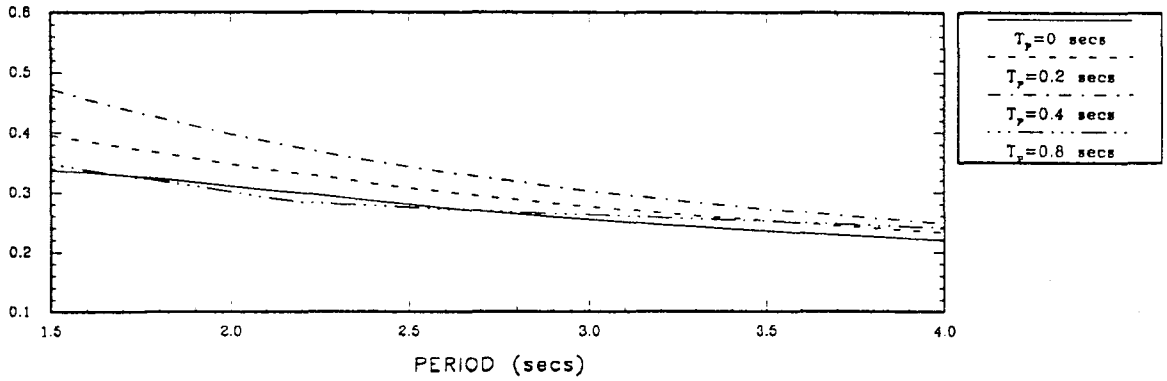
$$W_p/W_d=1/10$$

LEVEL 2 G.C. 1

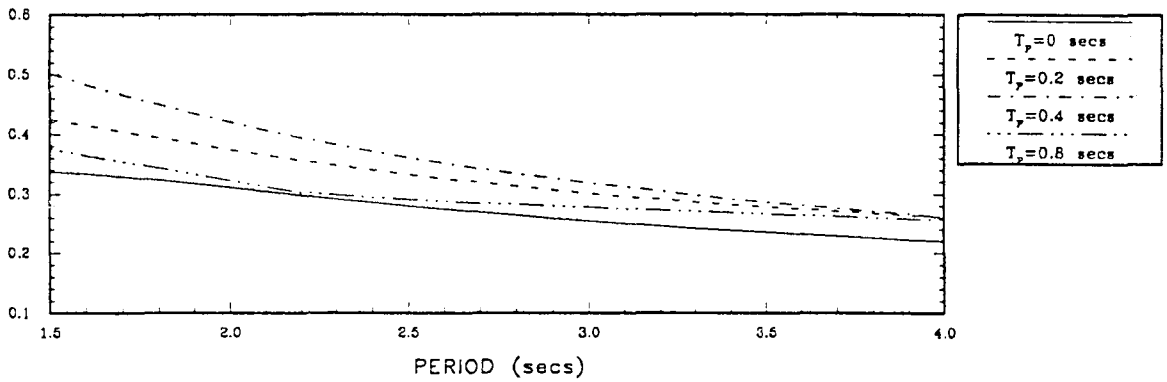
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

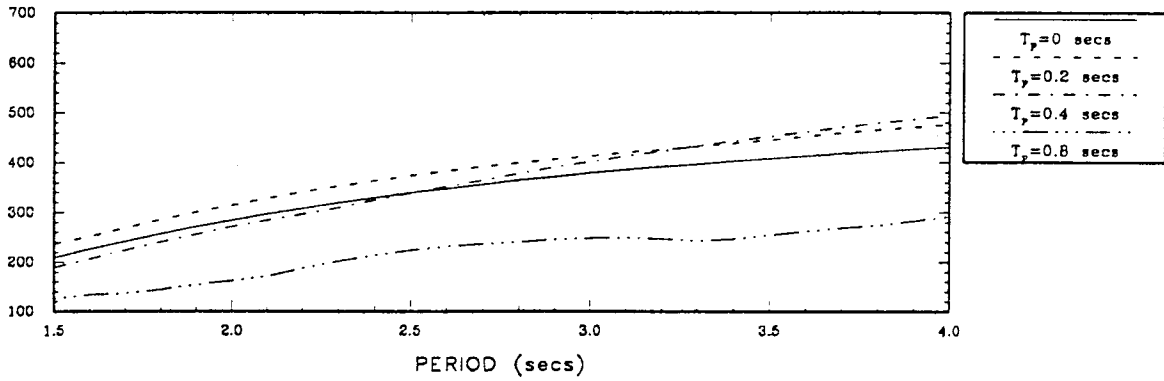


$$\xi = 0.40, \quad \mu = 0.10$$

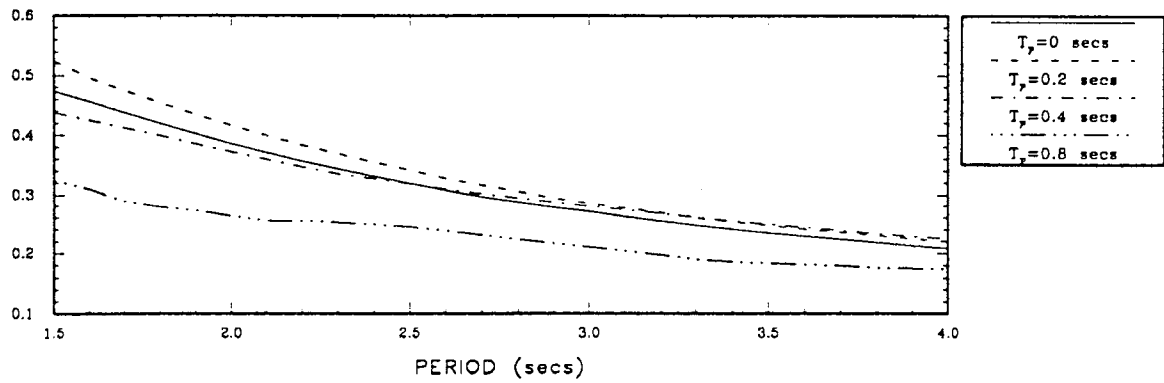
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 1

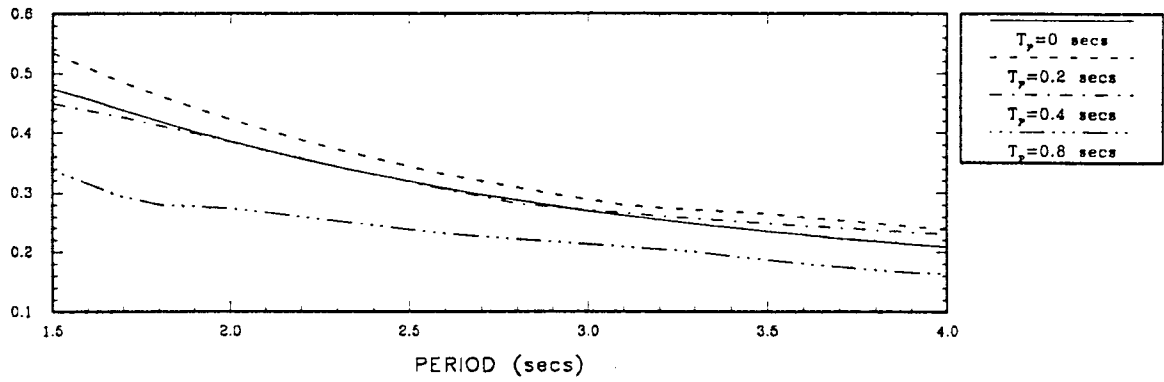
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

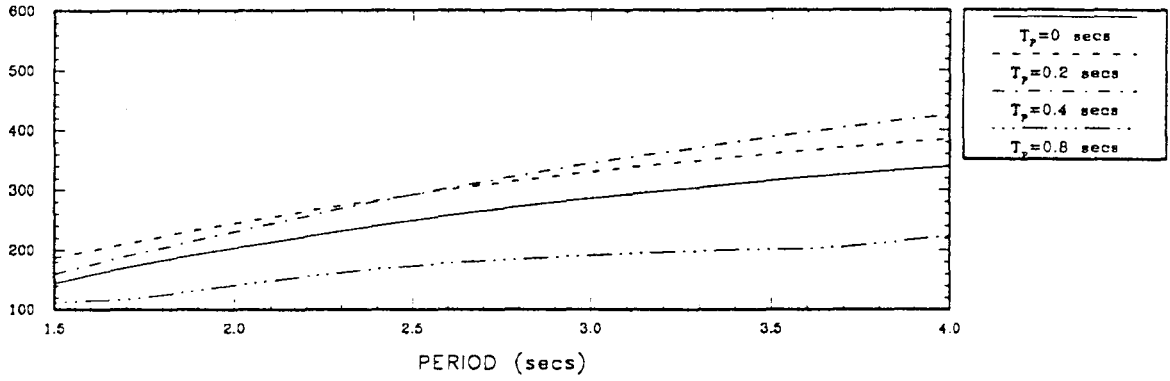


$$\xi = 0, \quad \mu = 0.10$$

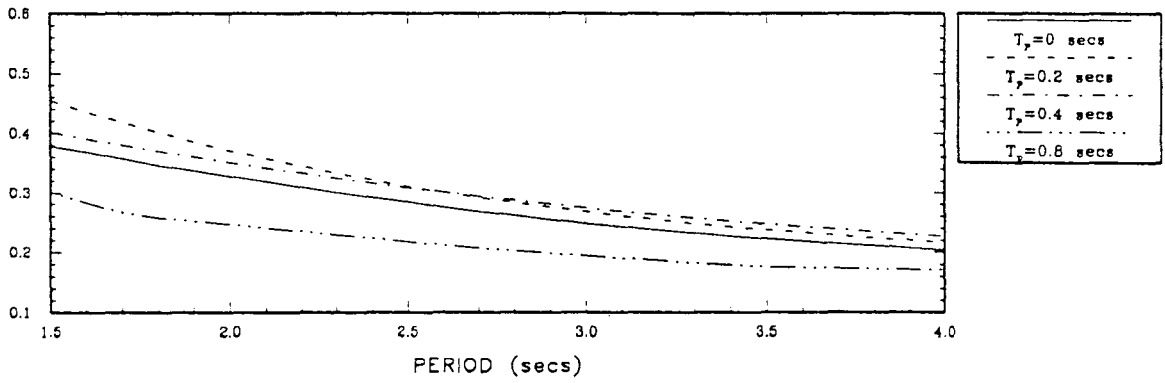
$$W_p / W_d = 1/20$$

LEVEL 2 G.C. 1

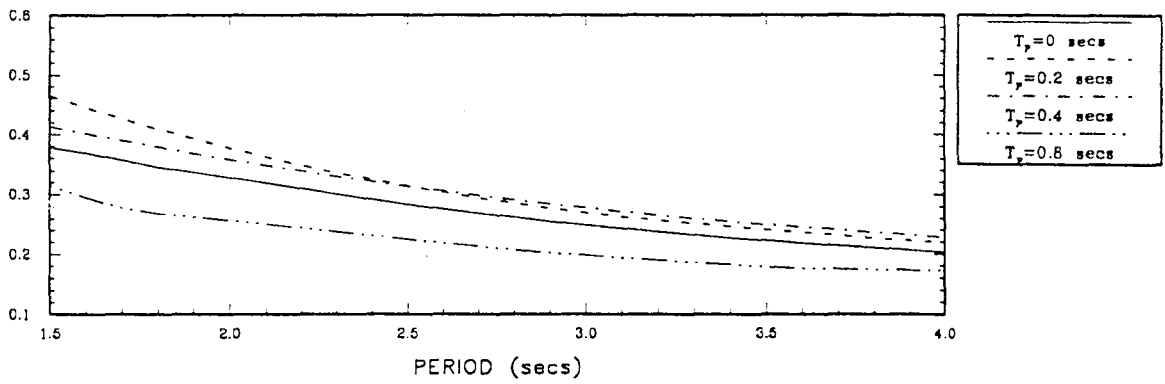
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

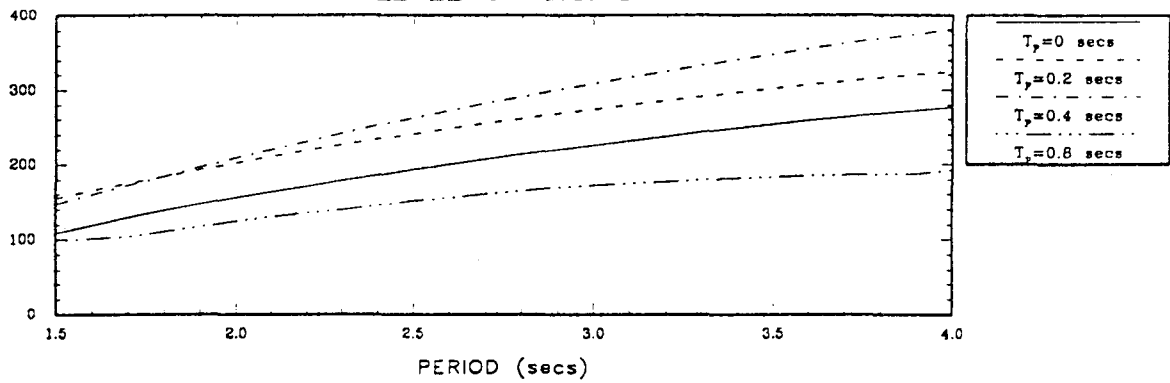


$$\xi=0.20, \quad \mu=0.10$$

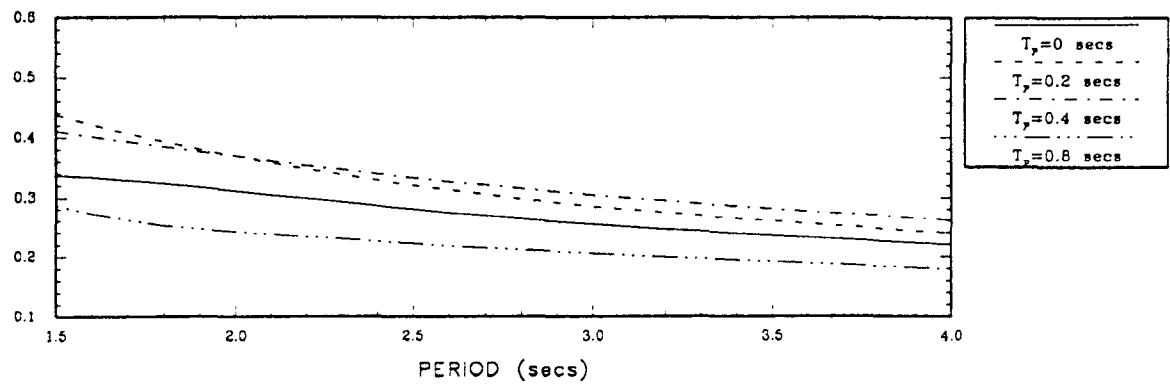
$$W_p/W_d=1/20$$

LEVEL 2 G.C. 1

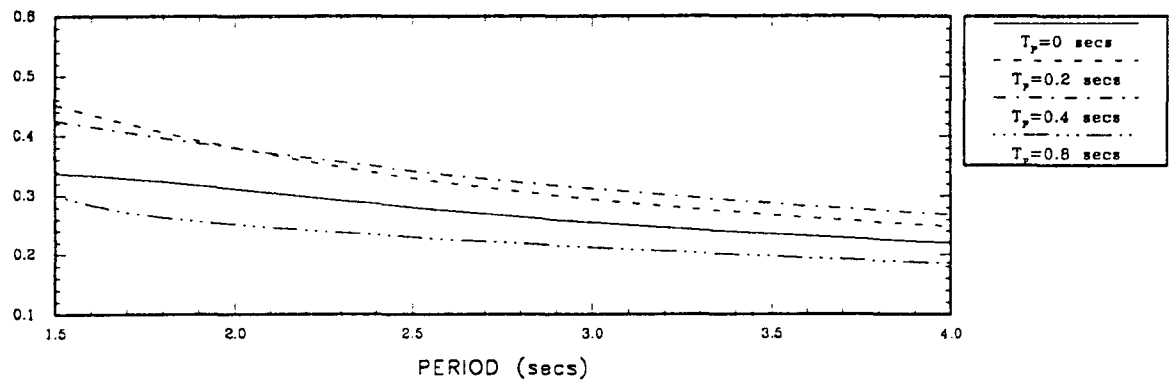
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



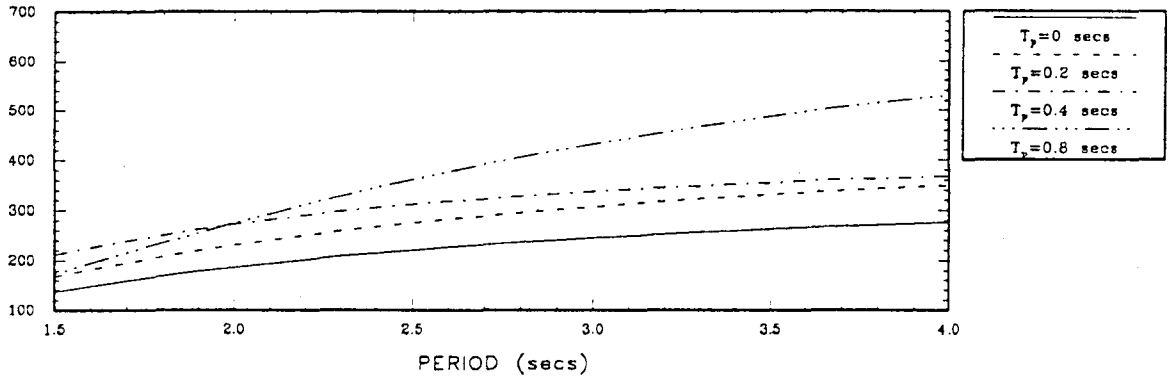
$$\xi = 0.40, \quad \mu = 0.10$$

$$W_p / W_d = 1/20$$

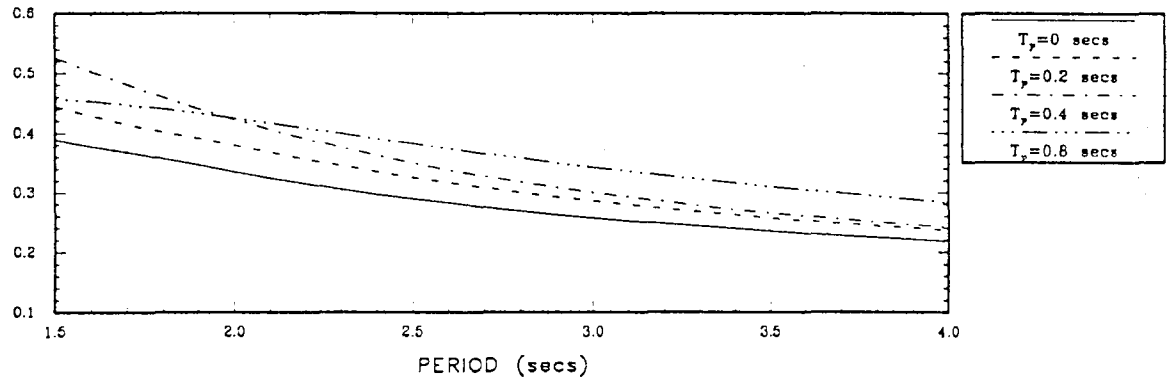


LEVEL 2 G.C. 1

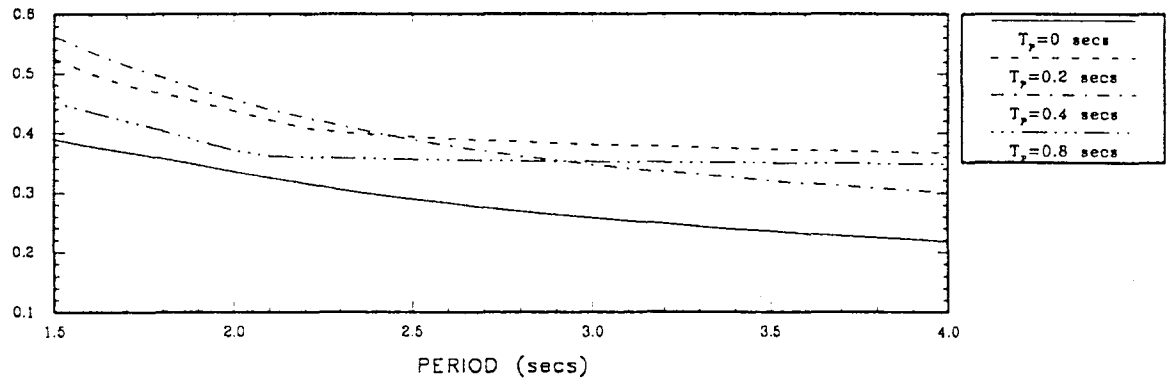
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

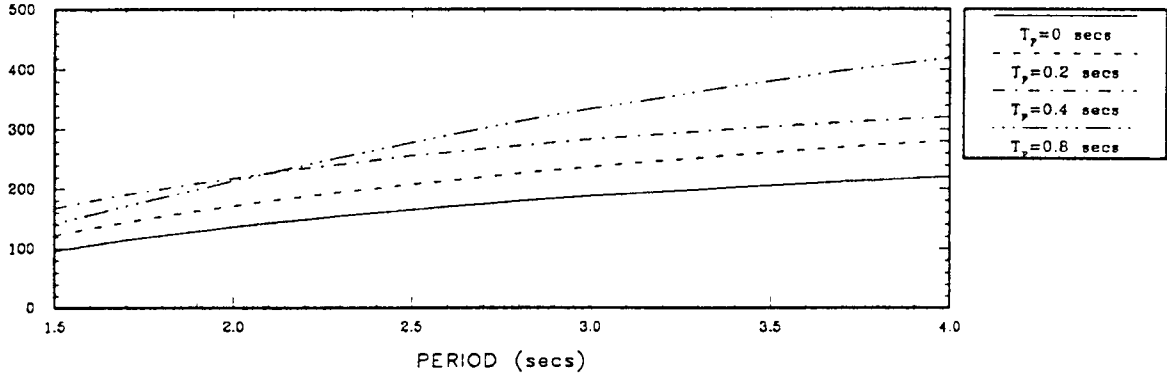


$$\xi=0, \quad \mu=0.15$$

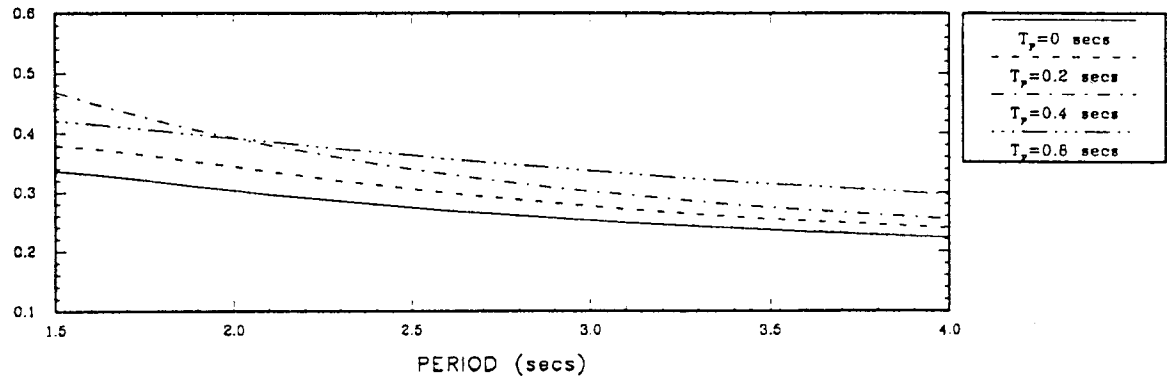
$$W_p/W_d=1/5$$

LEVEL 2 G.C. 1

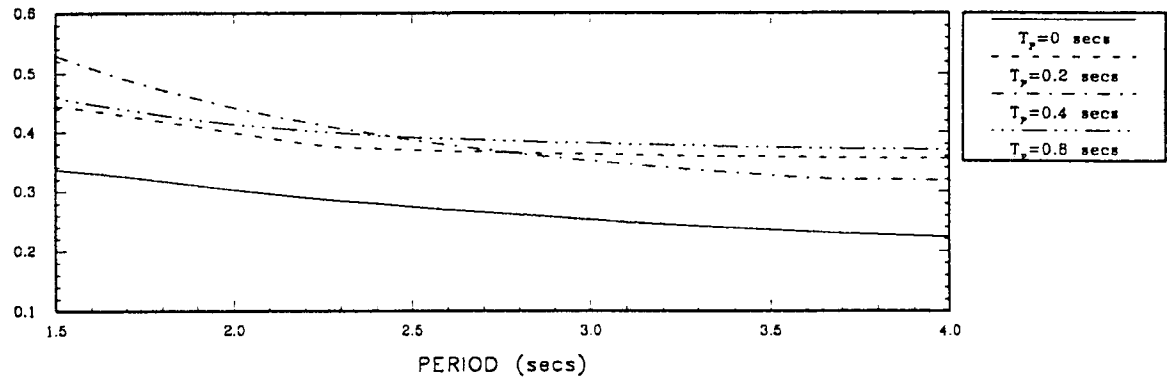
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

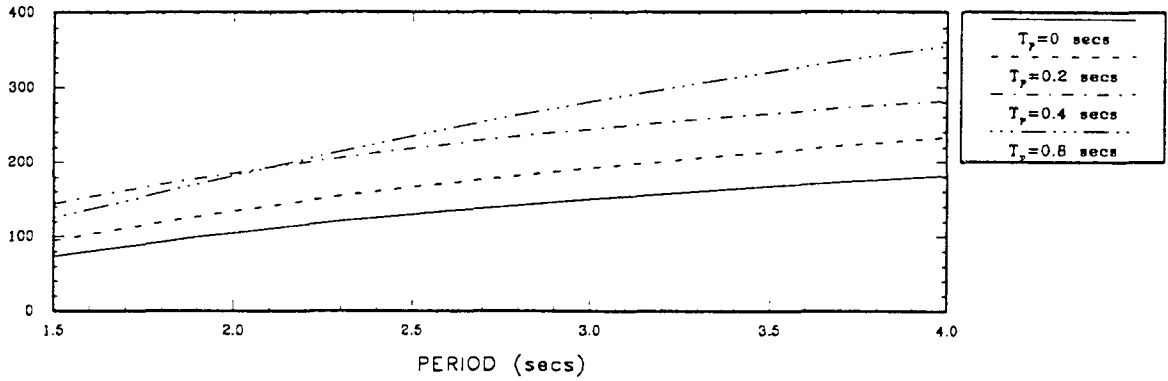


$$\xi = 0.20, \quad \mu = 0.15$$

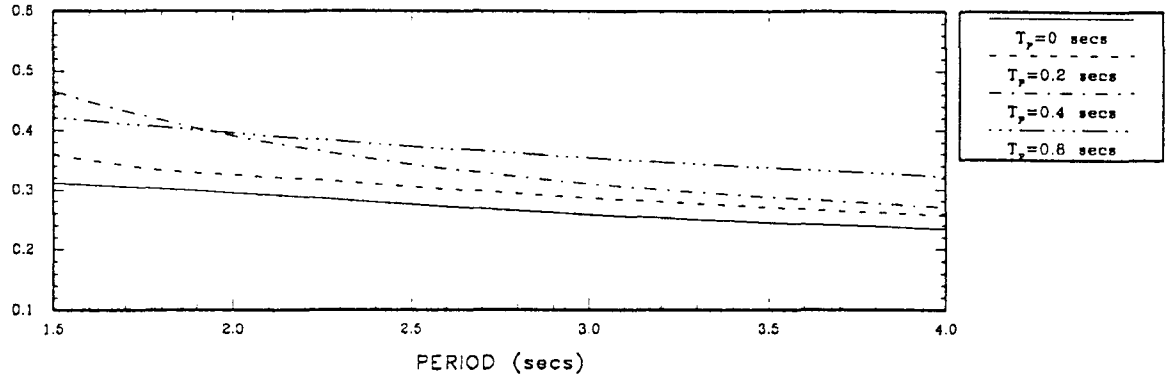
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 1

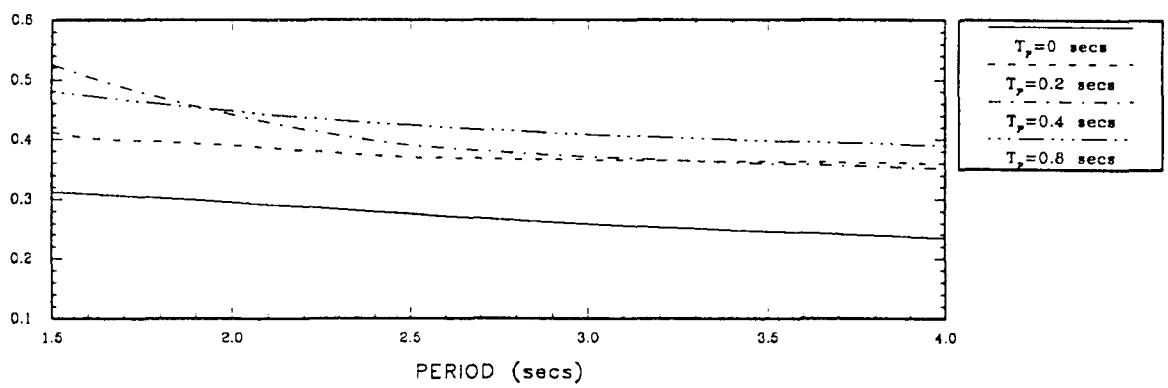
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

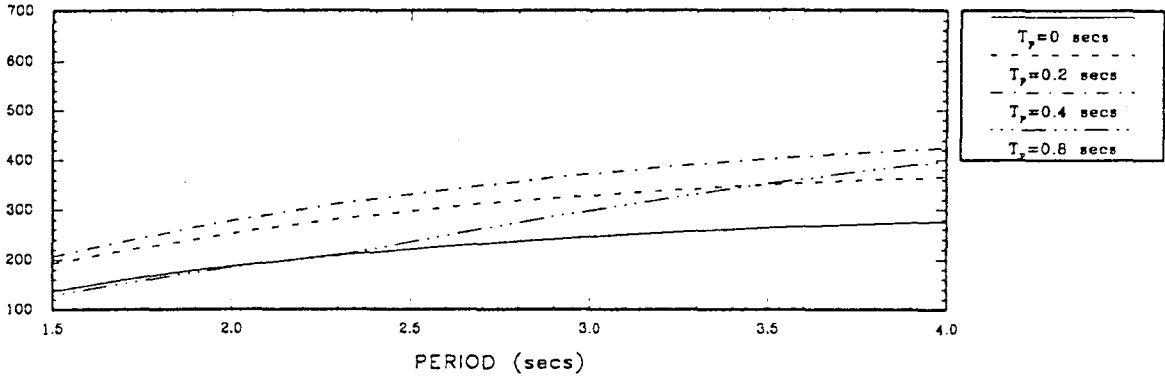


$$\xi = 0.40, \quad \mu = 0.15$$

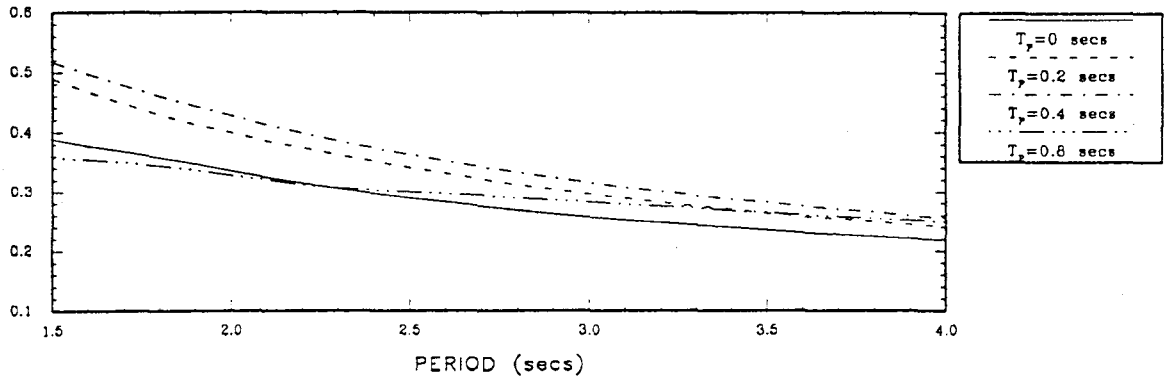
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 1

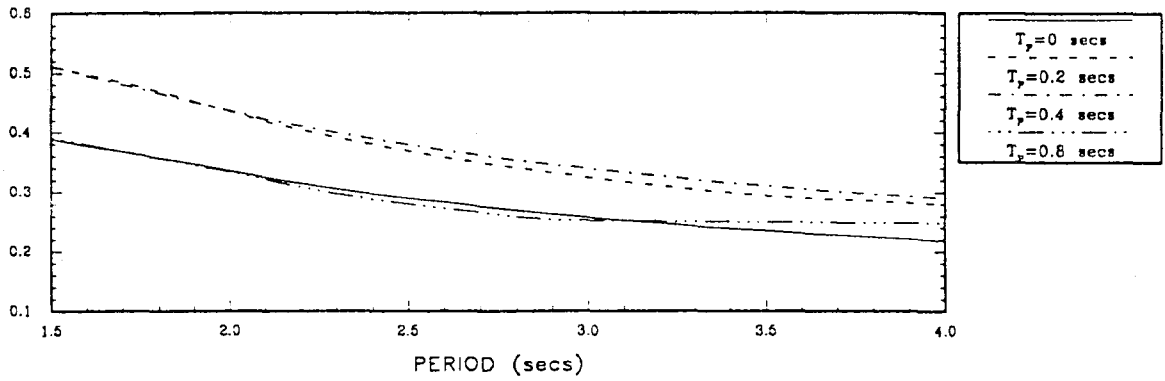
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT

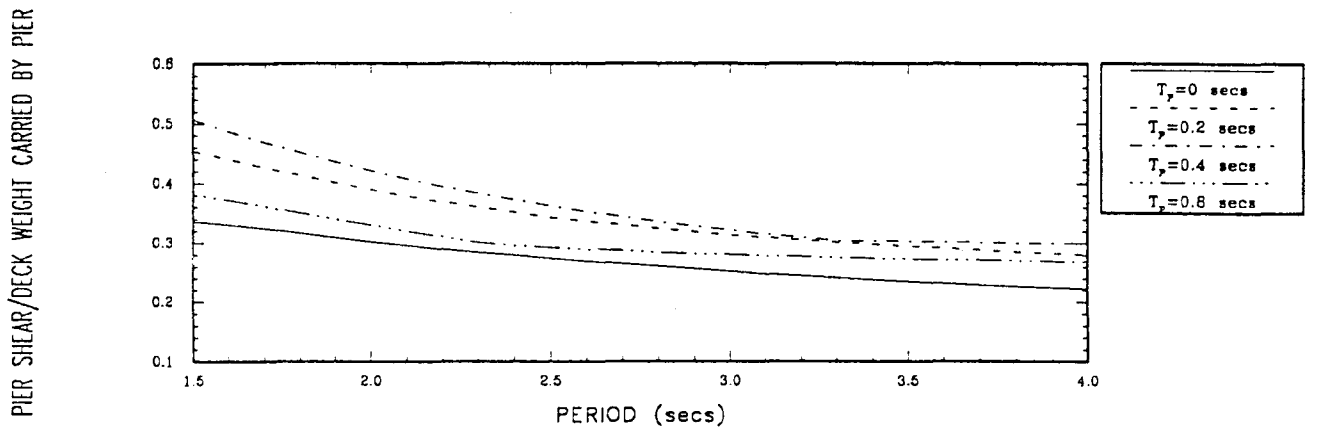
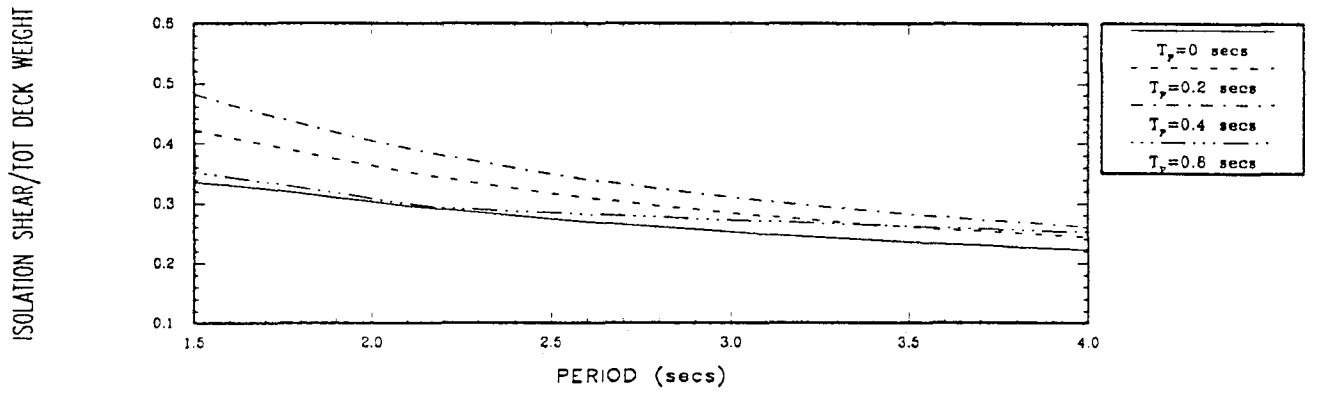
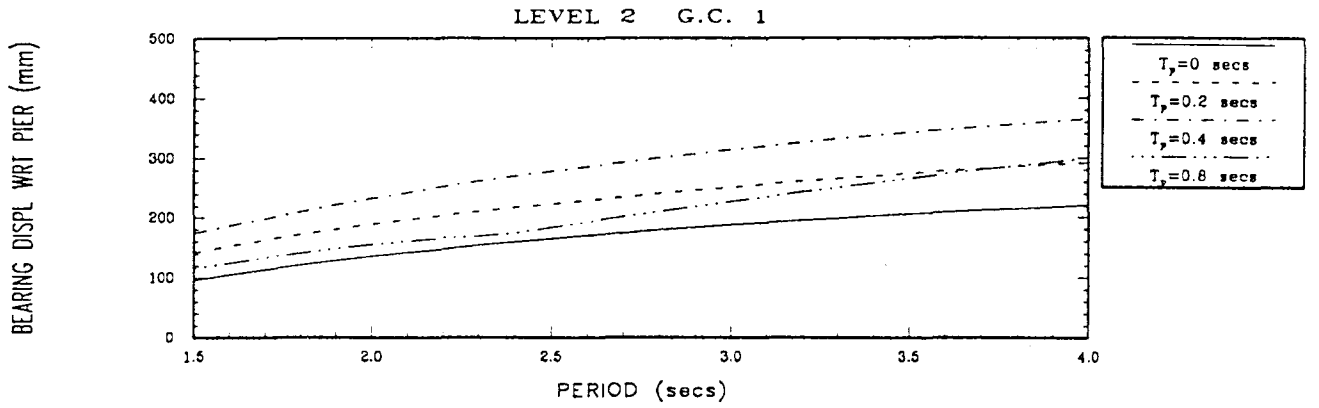


PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi=0, \quad \mu=0.15$$

$$W_p/W_d=1/10$$

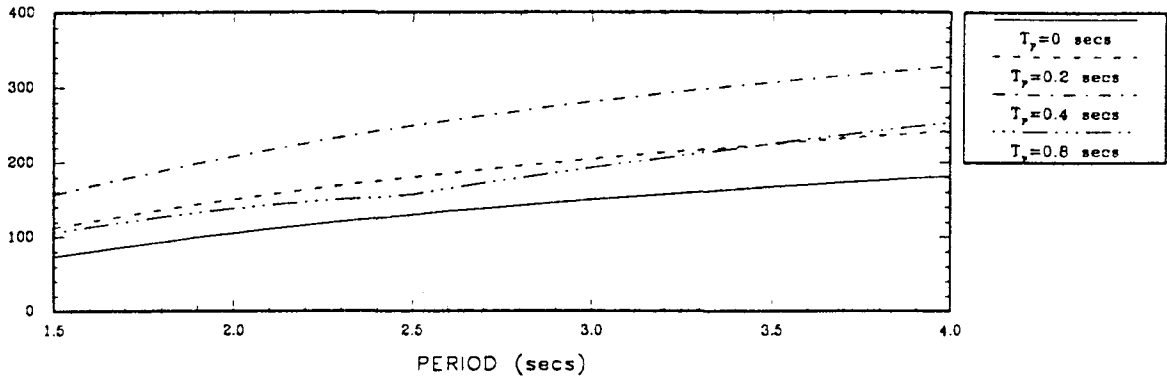


$$\xi = 0.20, \quad \mu = 0.15$$

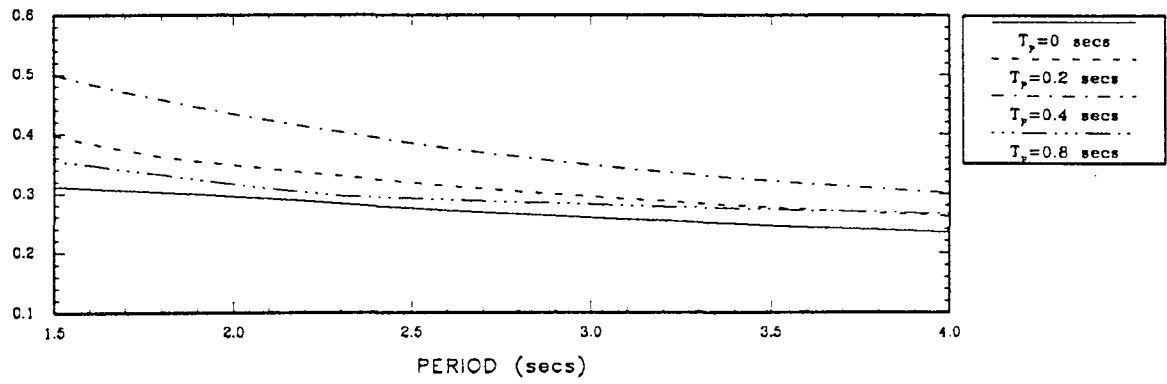
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 1

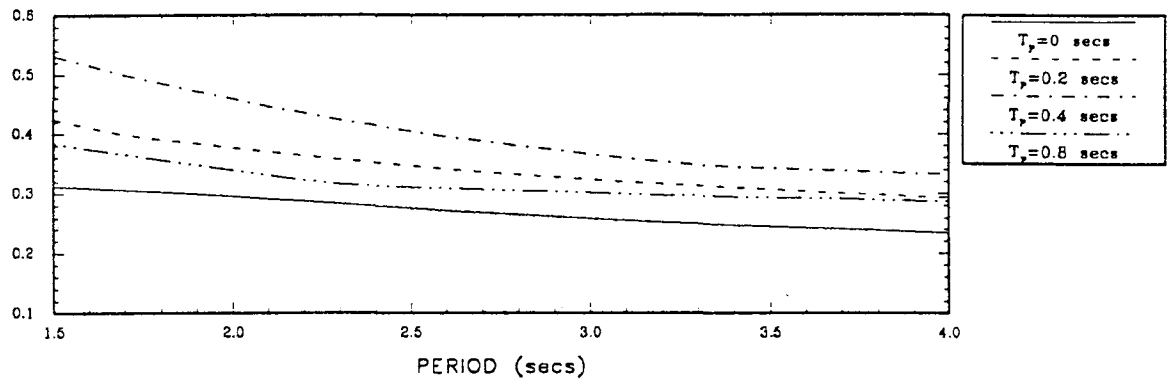
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



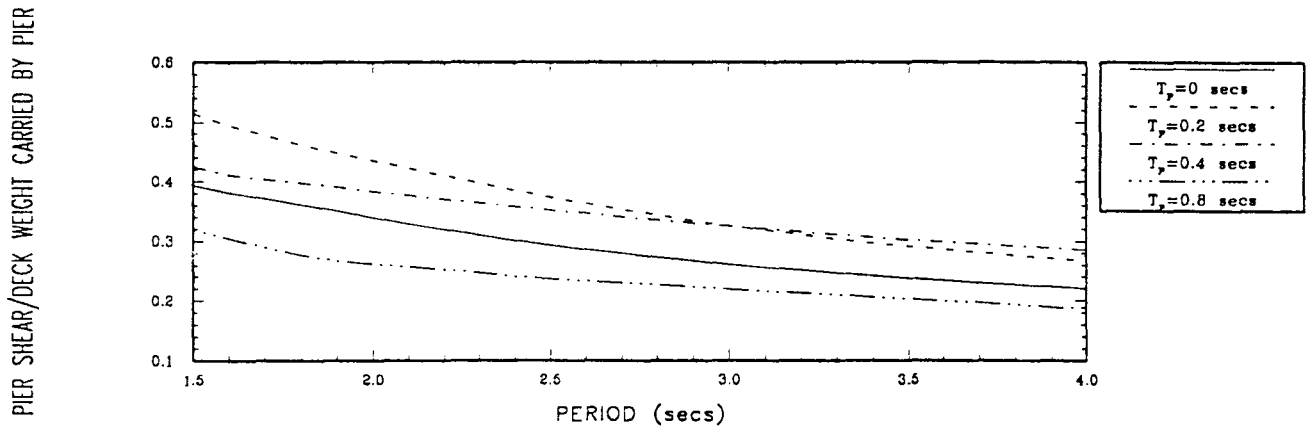
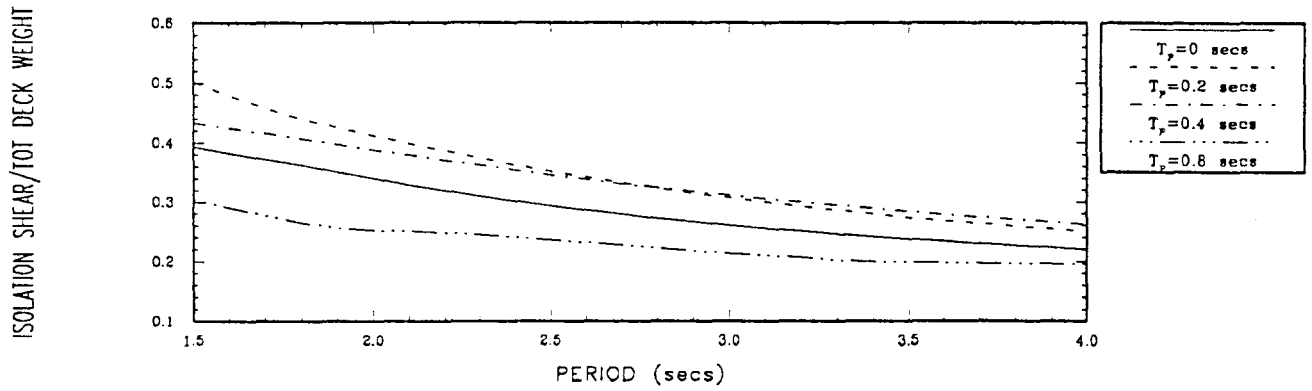
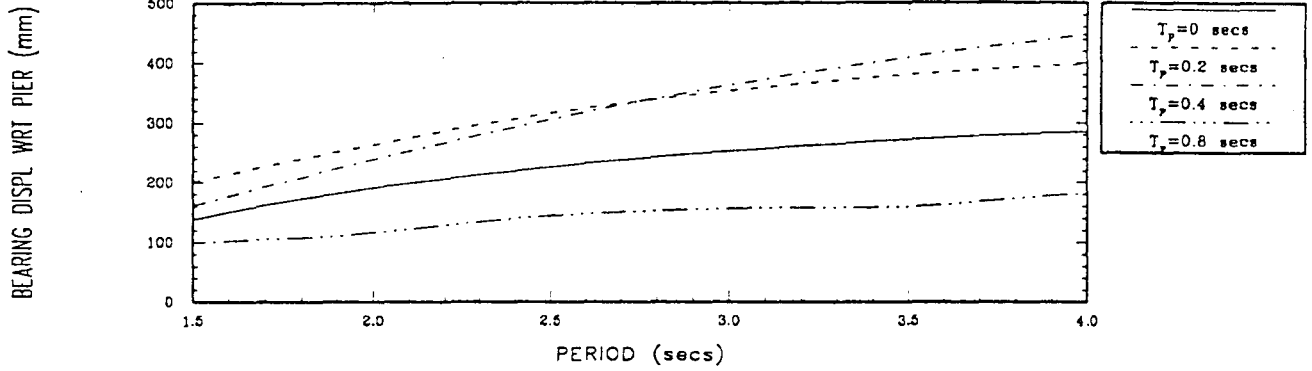
PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi = 0.40, \quad \mu = 0.15$$

$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 1

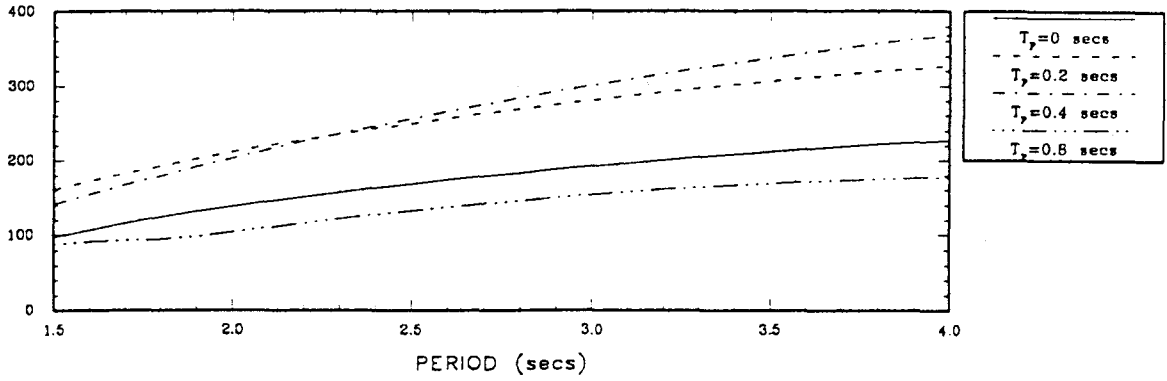


$$\xi=0, \quad \mu=0.15$$

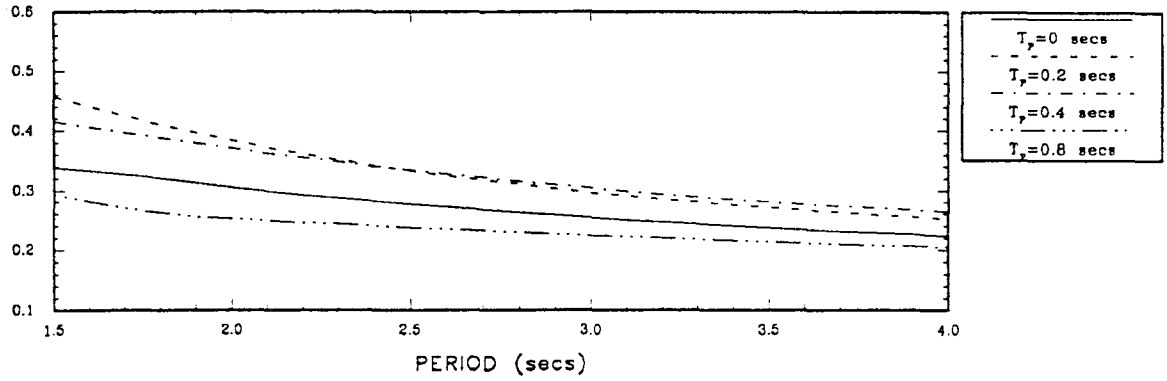
$$W_p/W_d=1/20$$

LEVEL 2 G.C. 1

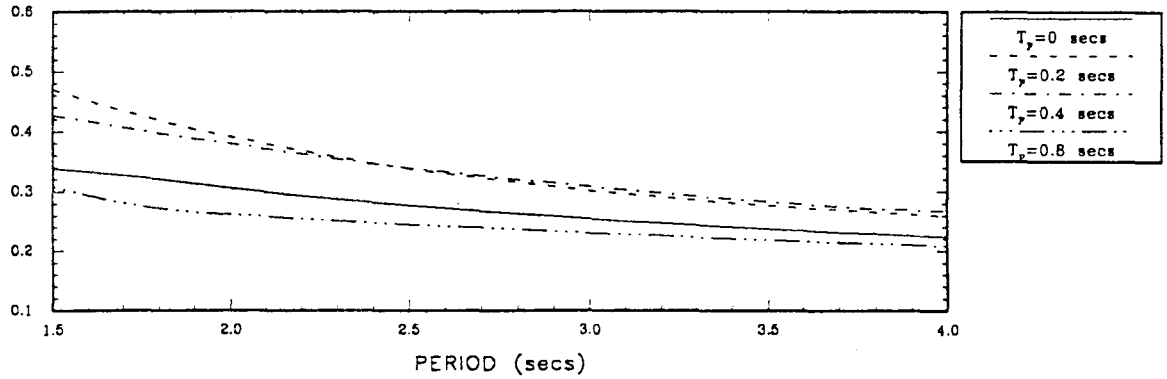
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



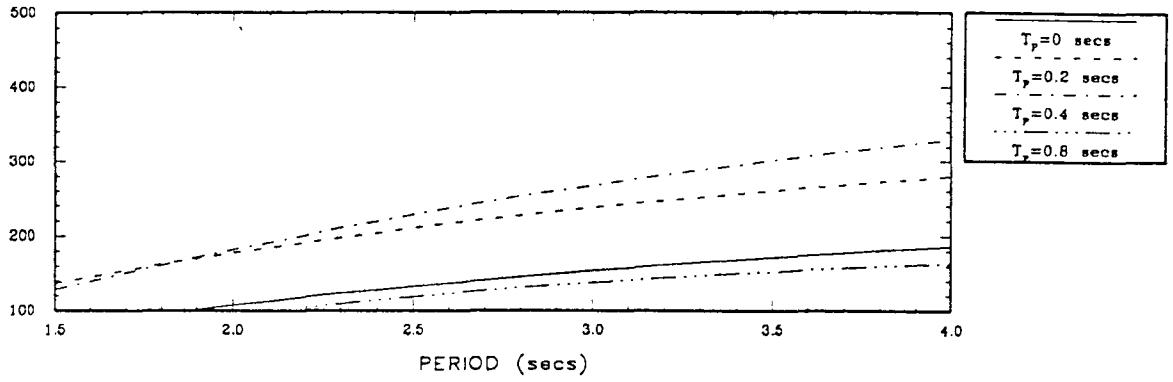
$$\xi = 0.20, \quad \mu = 0.15$$

$$W_p / W_d = 1/20$$

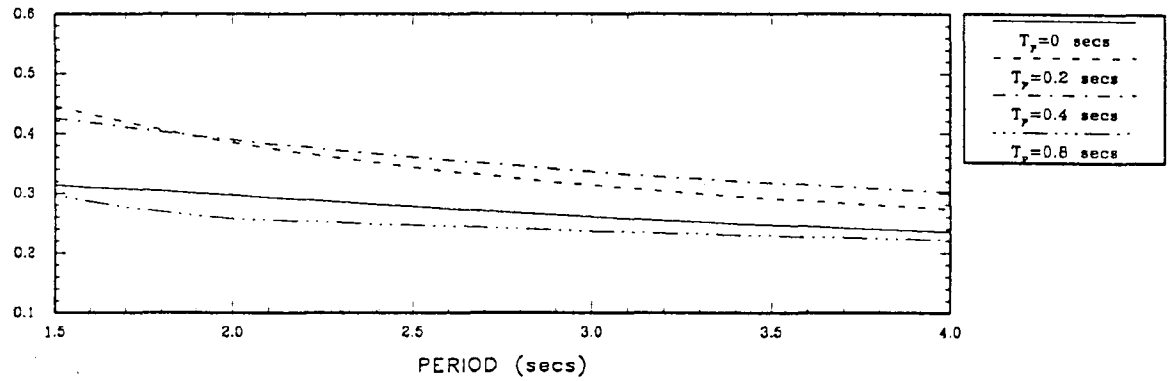


LEVEL 2 G.C. 1

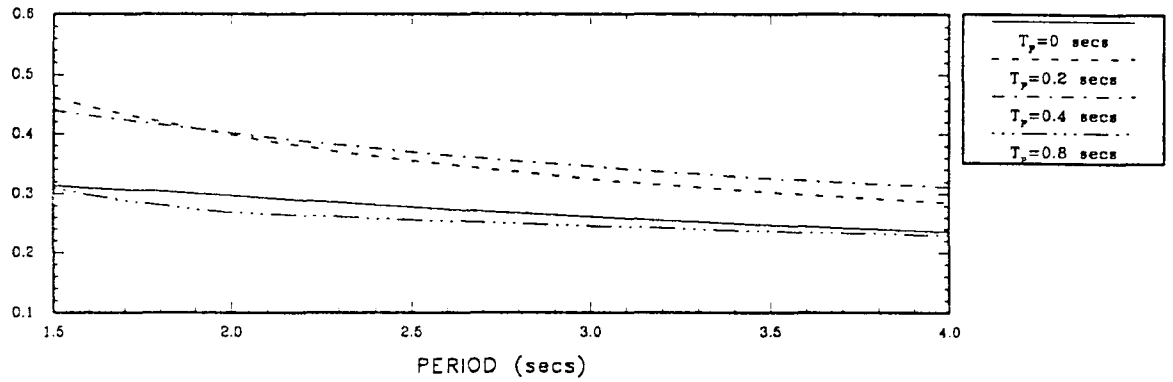
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

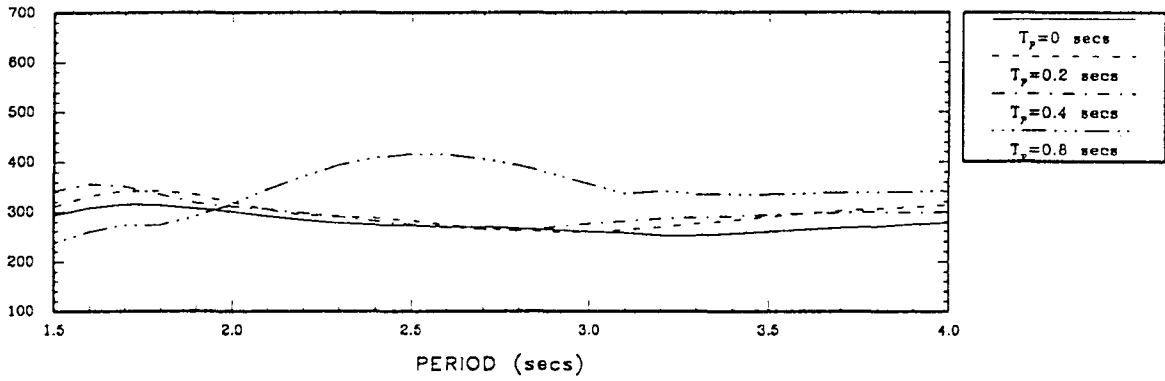


$$\xi=0.40, \quad \mu=0.15$$

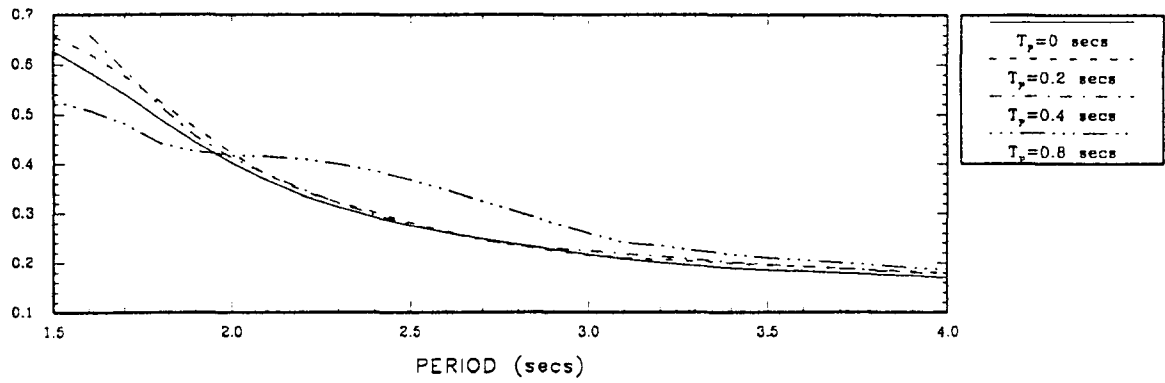
$$W_p/W_d=1/20$$

LEVEL 2 G.C. 2

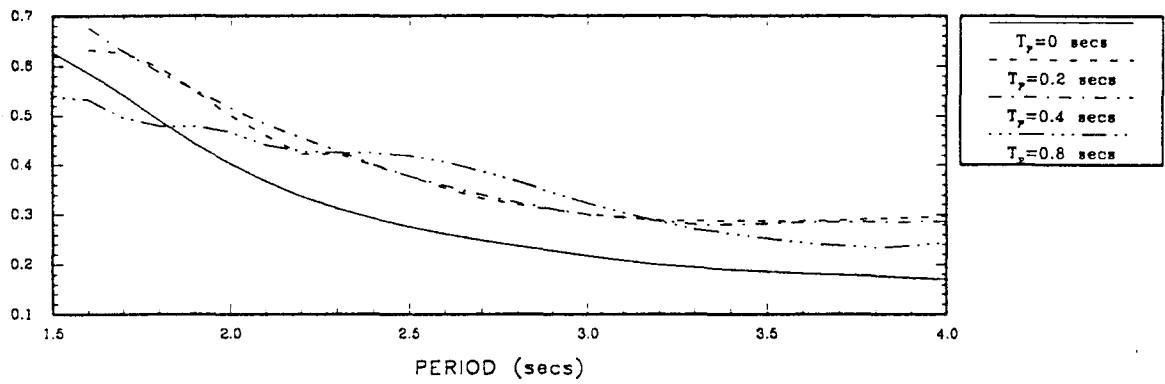
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

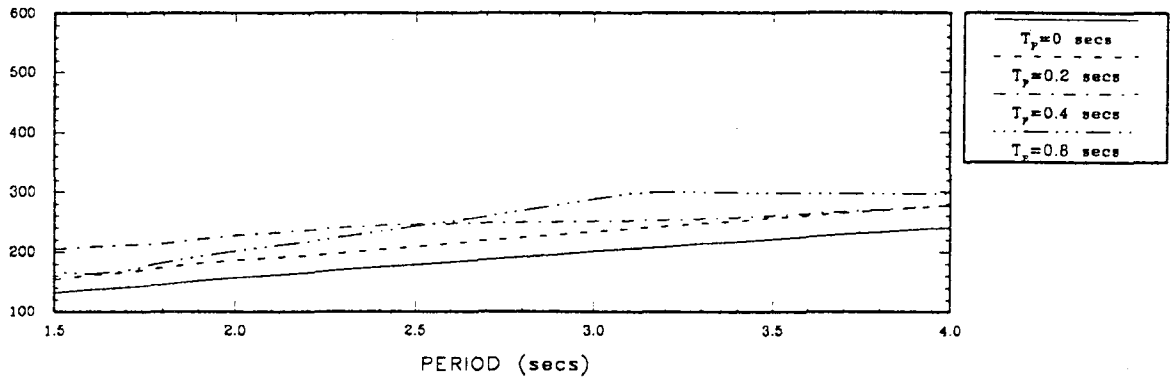


$$\xi=0, \quad \mu=0.10$$

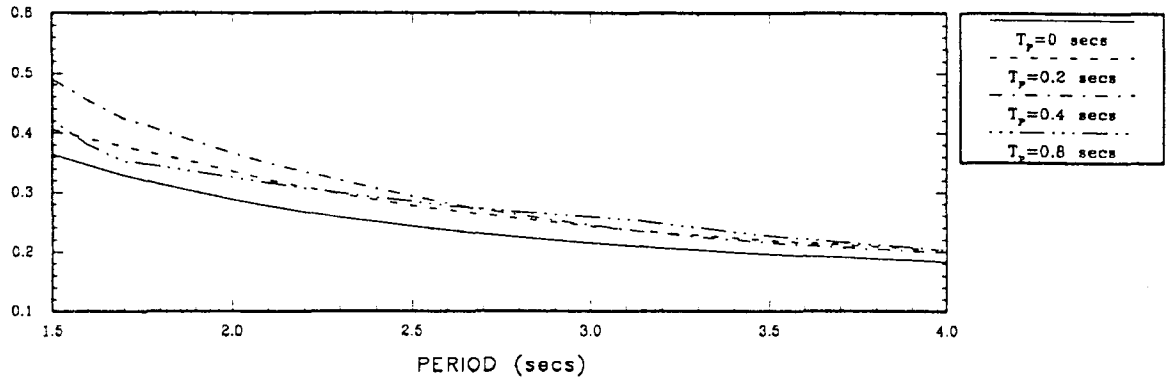
$$W_p/W_d=1/5$$

LEVEL 2 G.C. 2

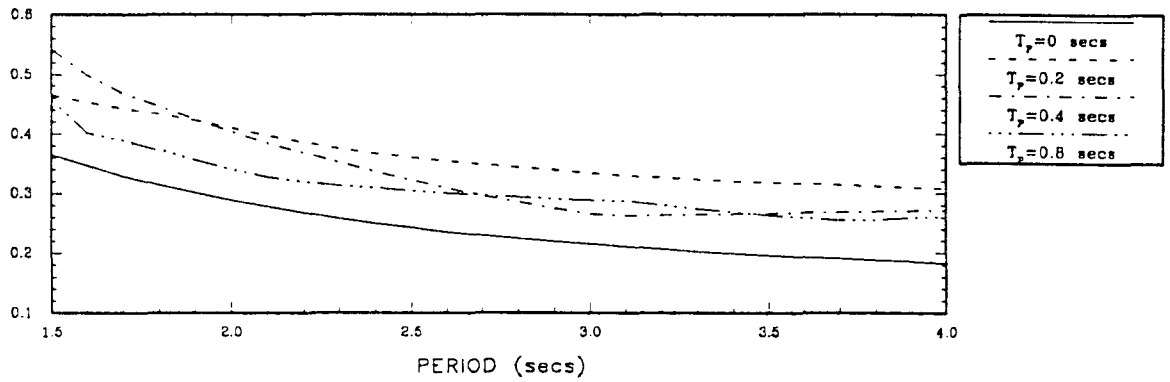
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

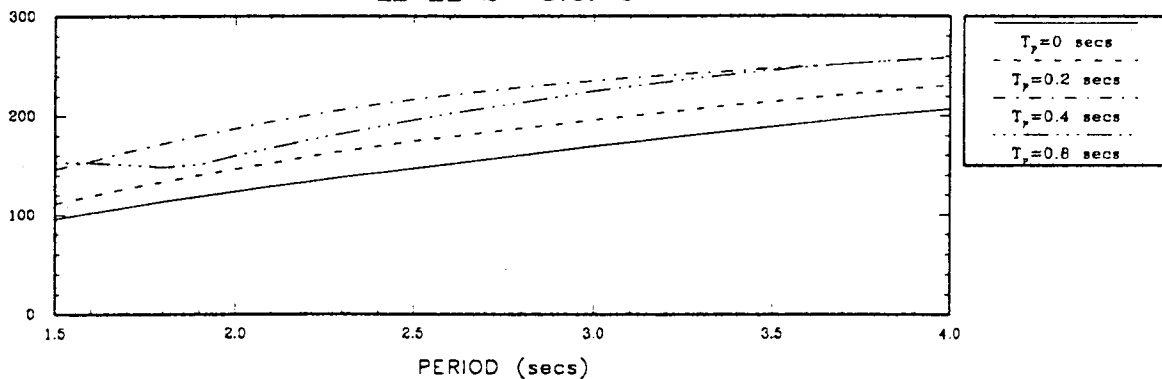


$$\xi=0.20, \quad \mu=0.10$$

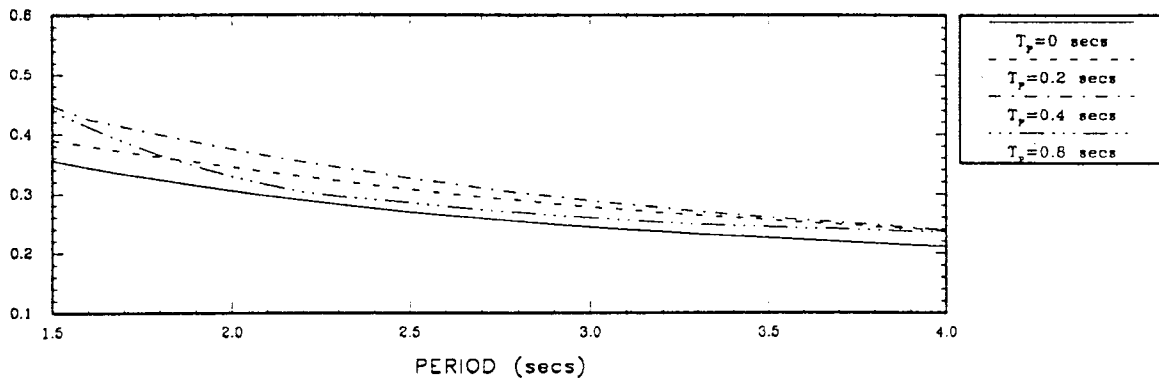
$$W_p/W_d=1/5$$

LEVEL 2 G.C. 2

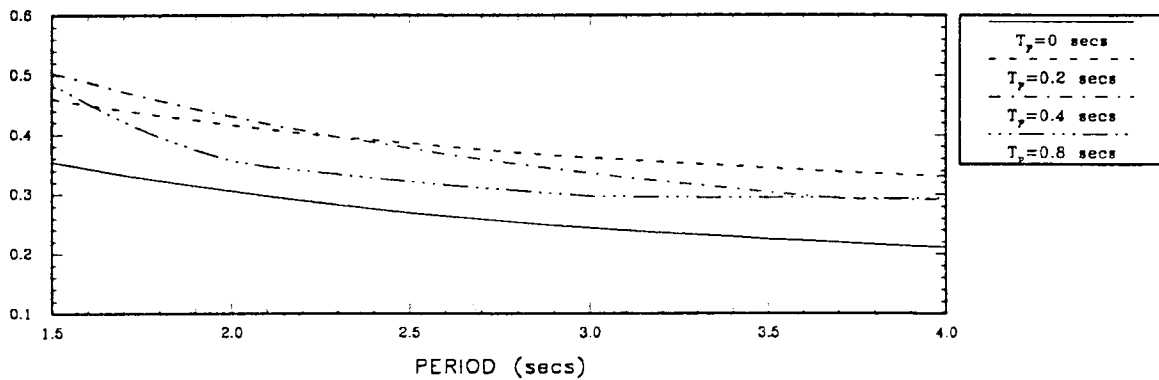
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/10T DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

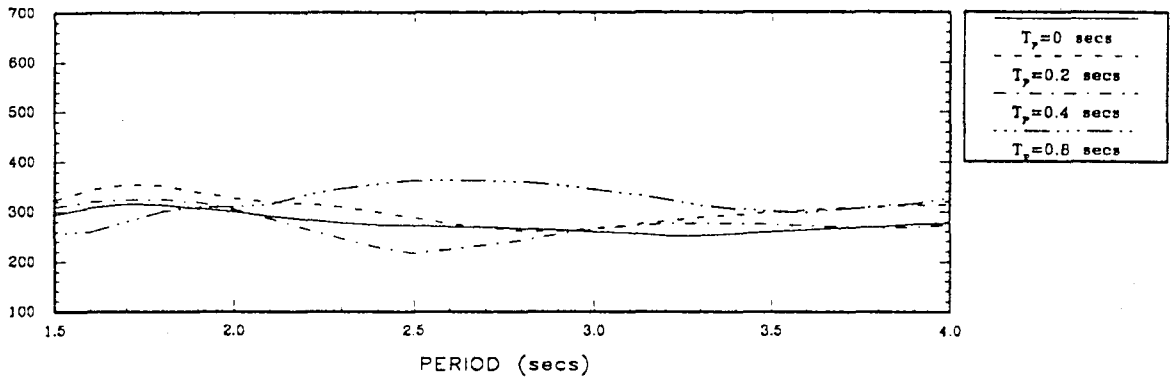


$$\xi = 0.40, \quad \mu = 0.10$$

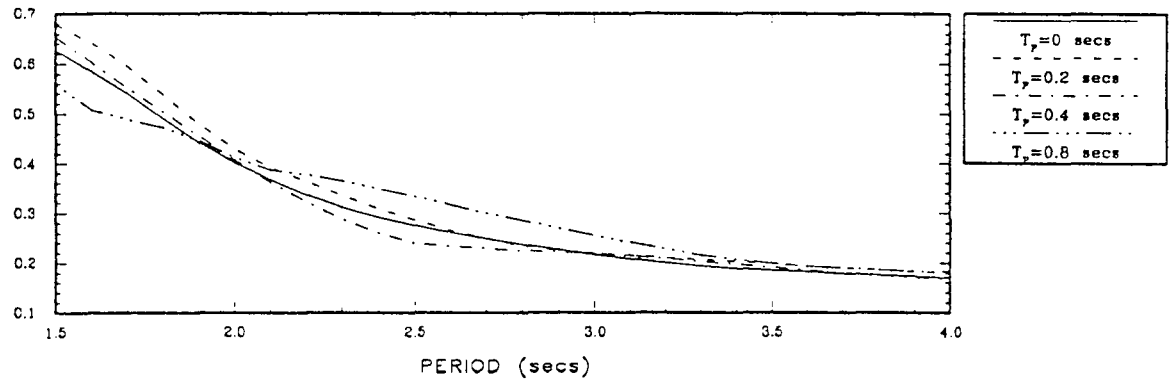
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 2

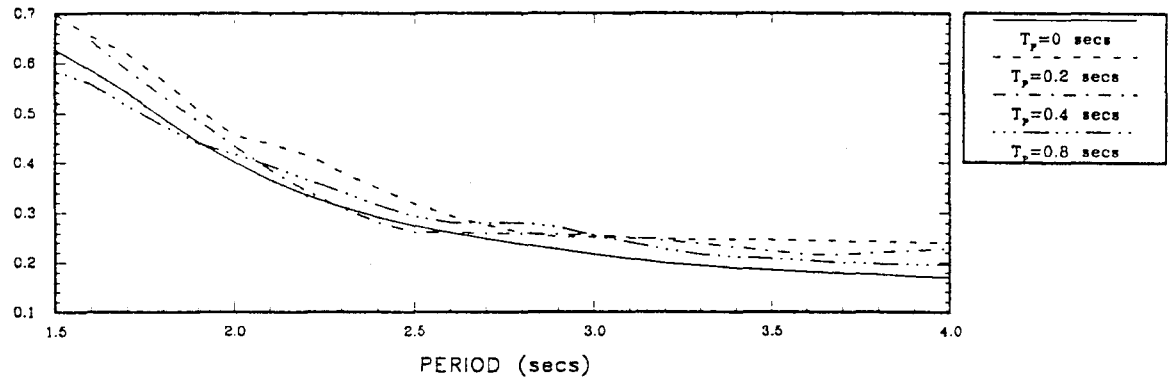
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

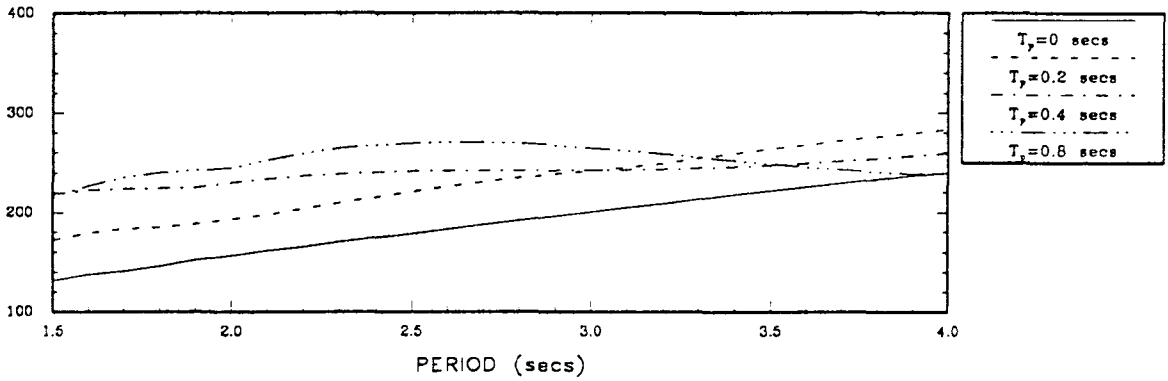


$$\xi=0, \quad \mu=0.10$$

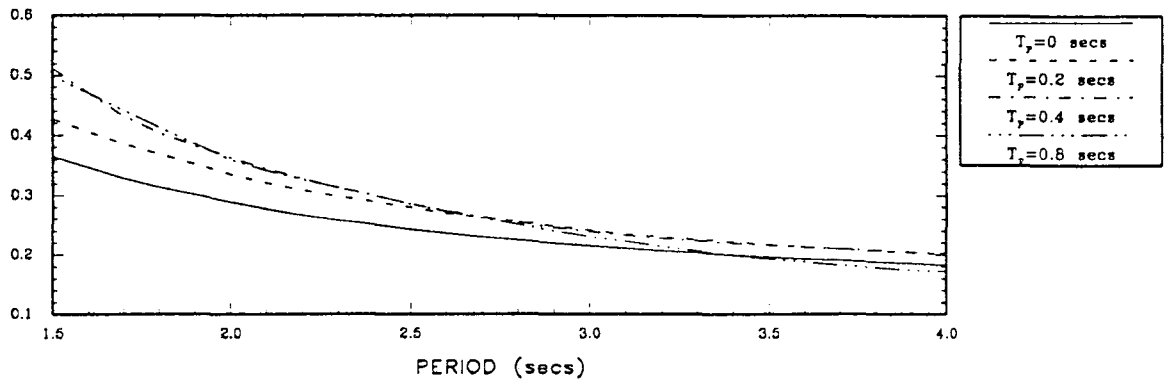
$$W_p/W_d=1/10$$

LEVEL 2 G.C. 2

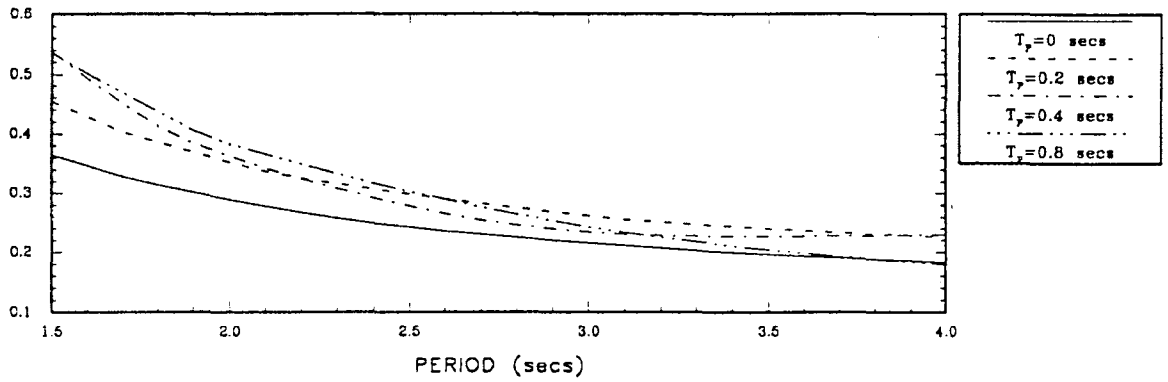
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

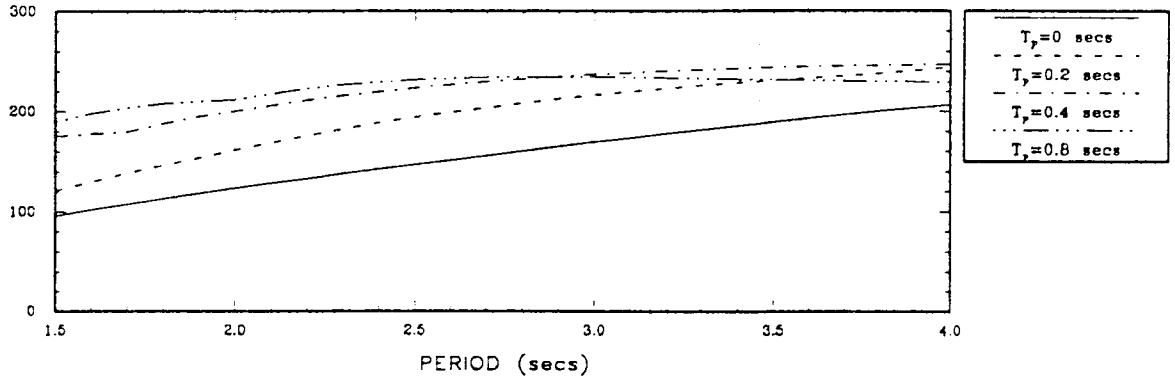


$$\xi = 0.20 \quad , \quad \mu = 0.10$$

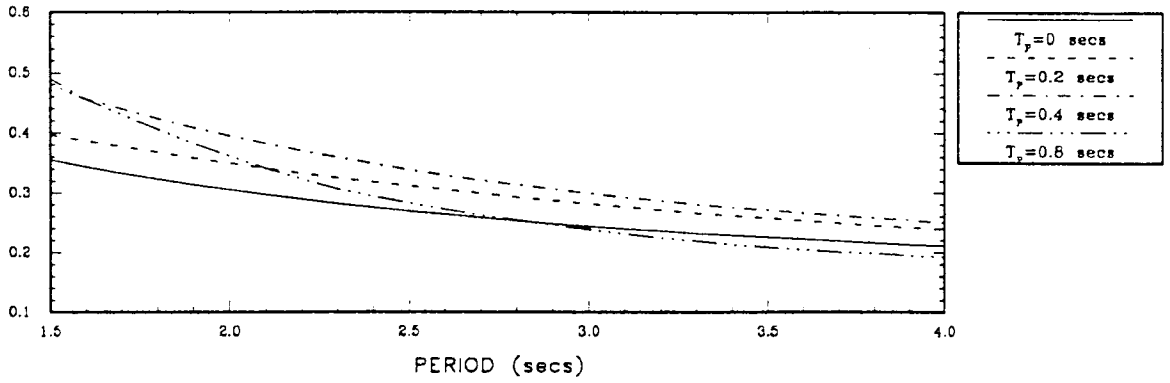
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 2

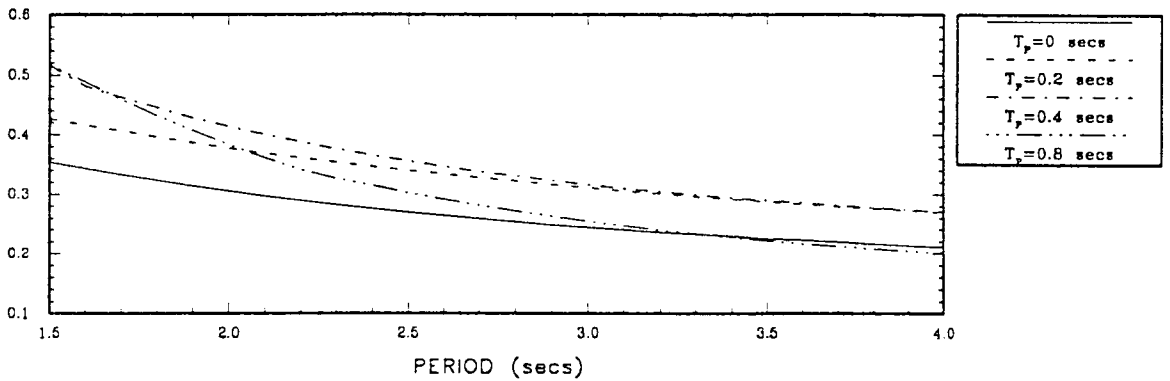
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

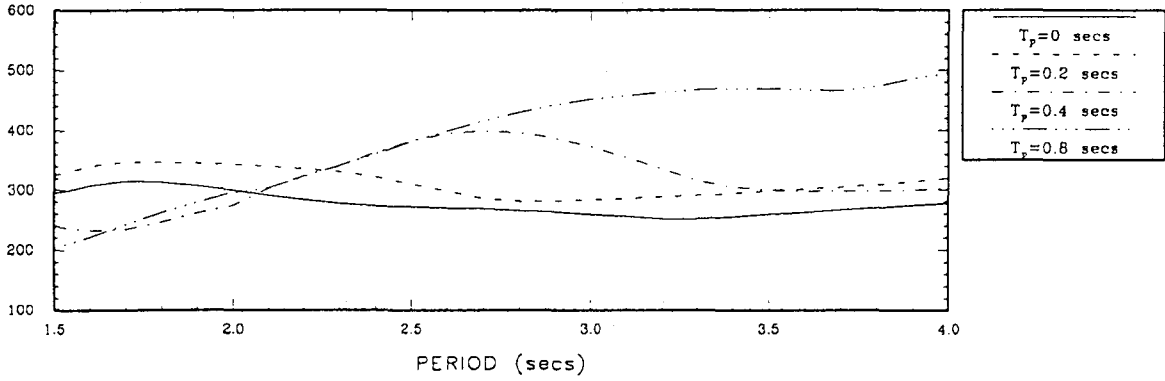


$$\xi = 0.40, \quad \mu = 0.10$$

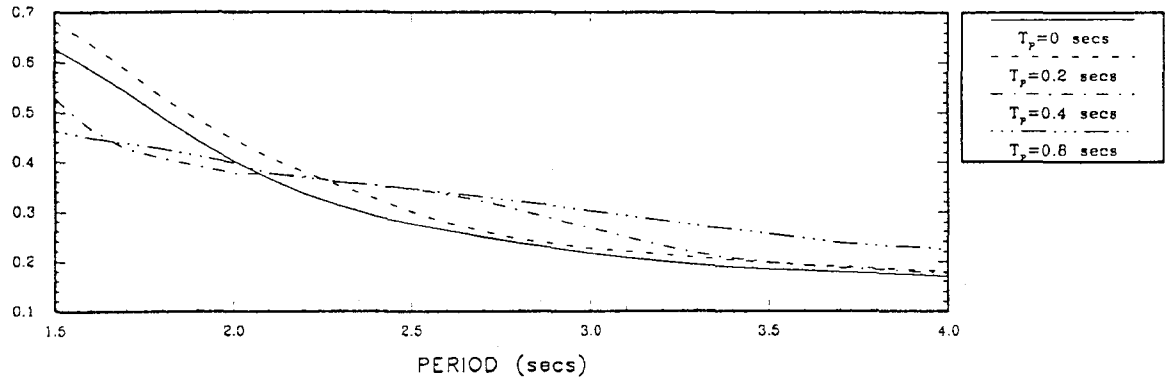
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 2

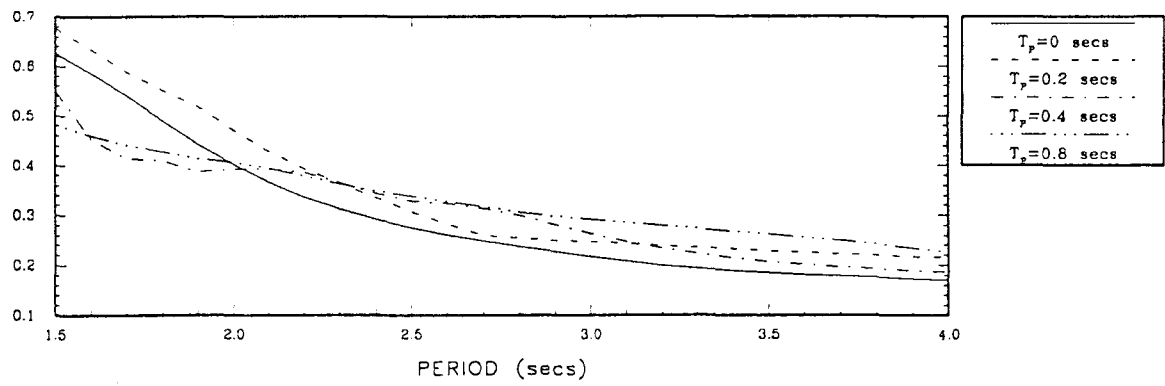
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



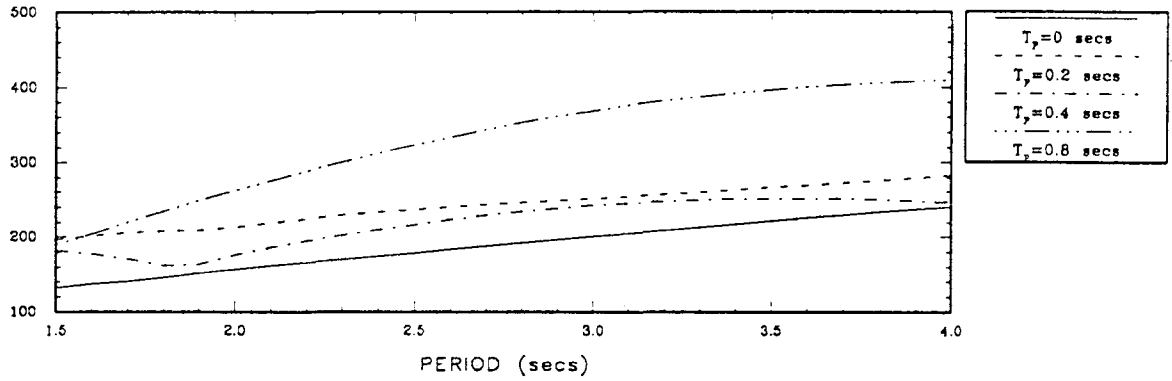
$$\xi=0, \quad \mu=0.10$$

$$W_p/W_d=1/20$$

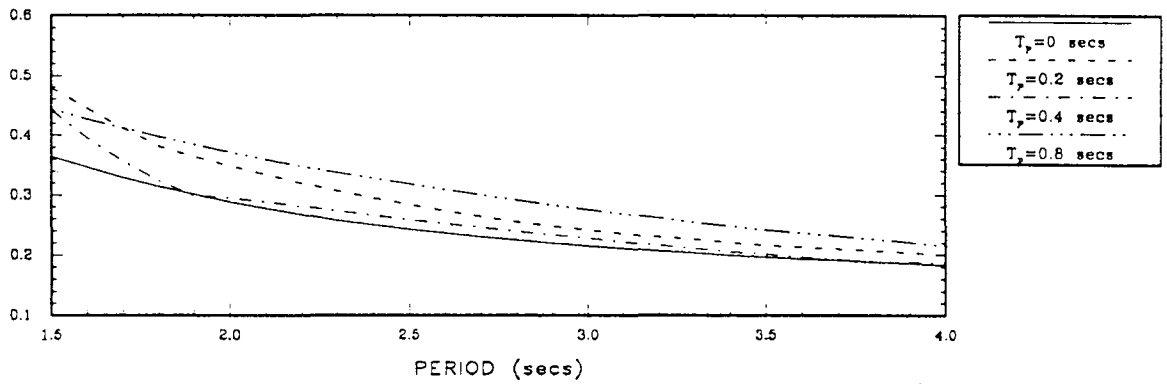


LEVEL 2 G.C. 2

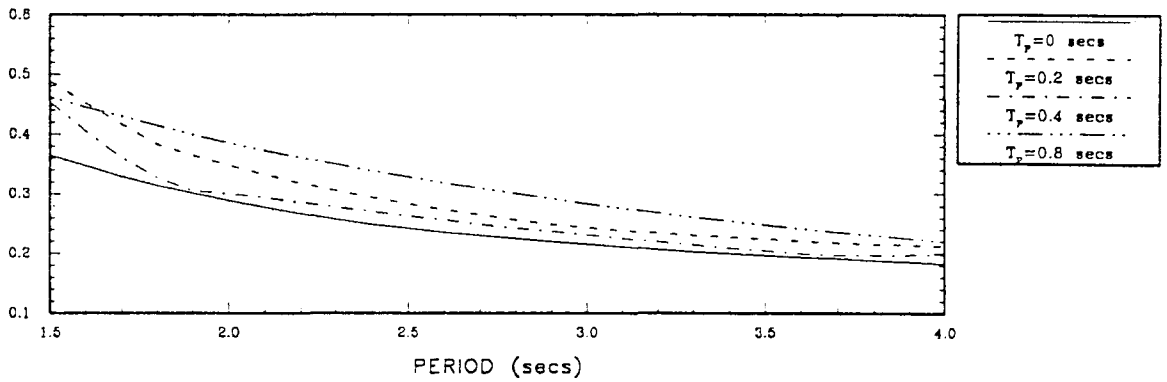
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

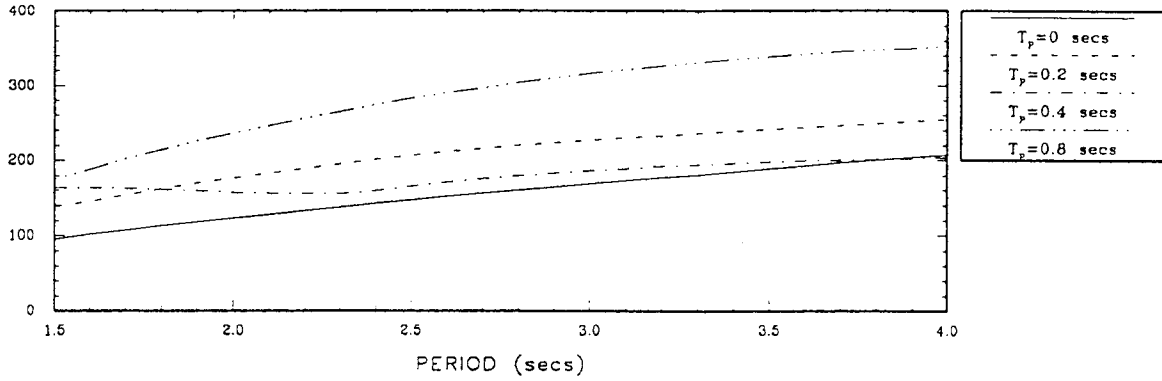


$$\xi=0.20, \quad \mu=0.10$$

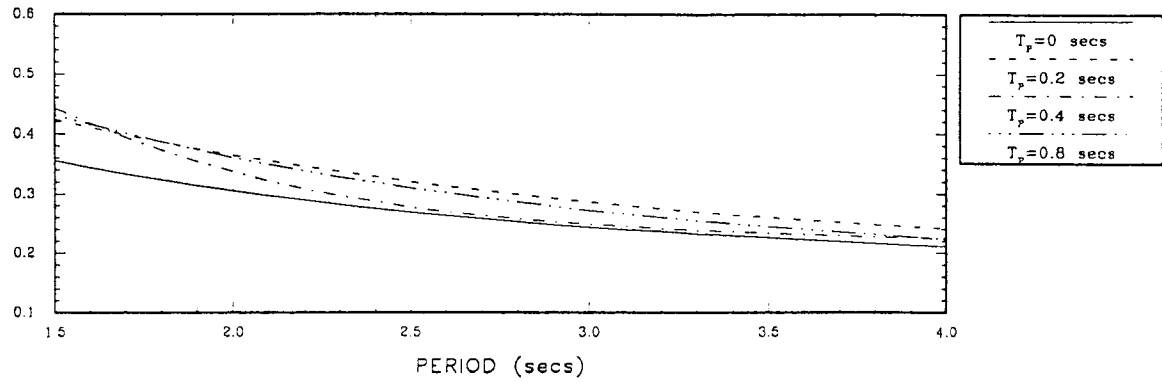
$$W_p/W_d=1/20$$

LEVEL 2 G.C. 2

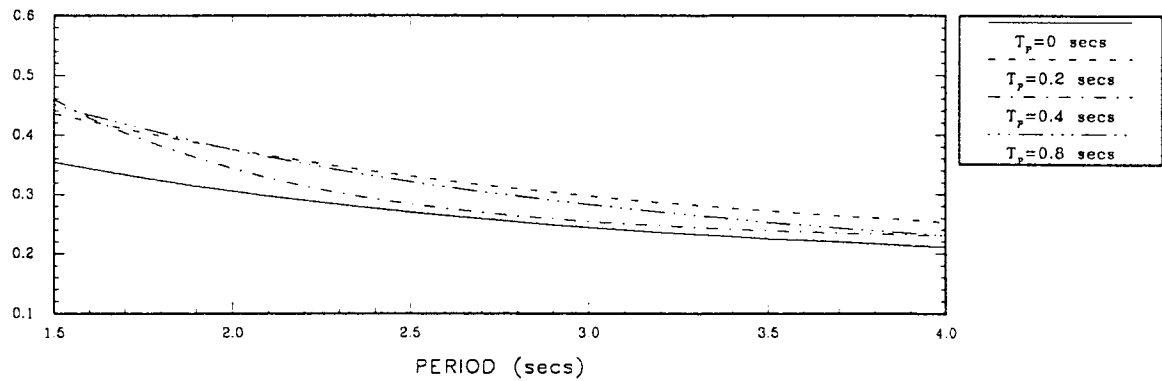
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



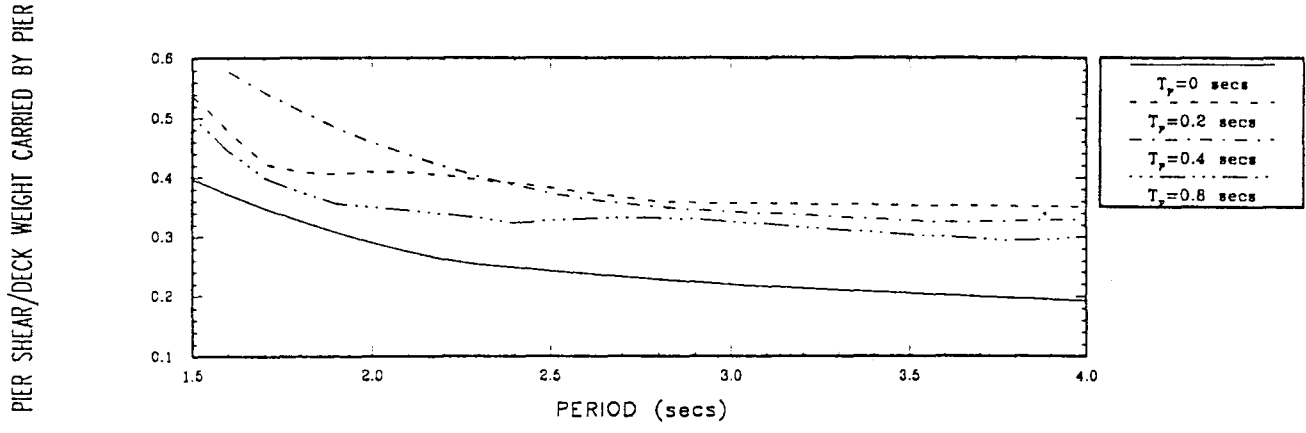
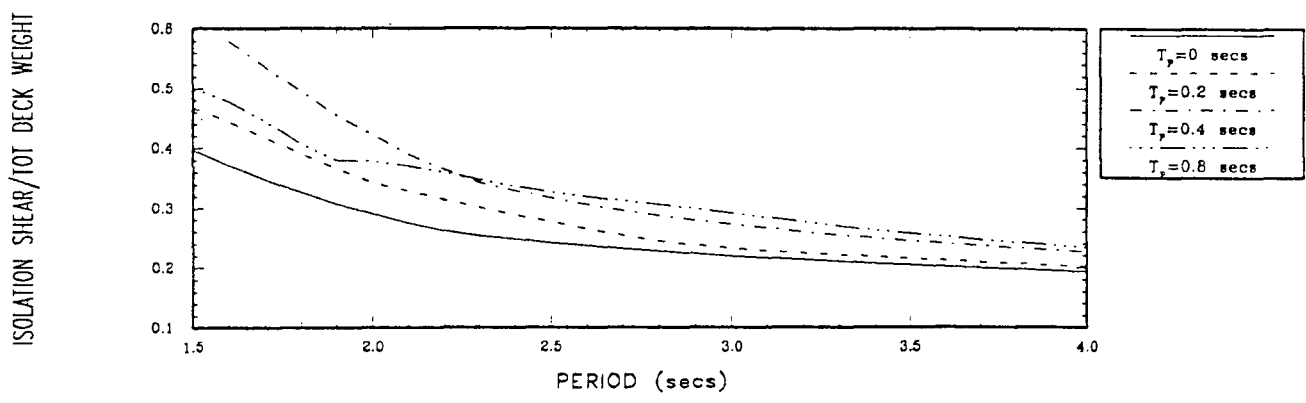
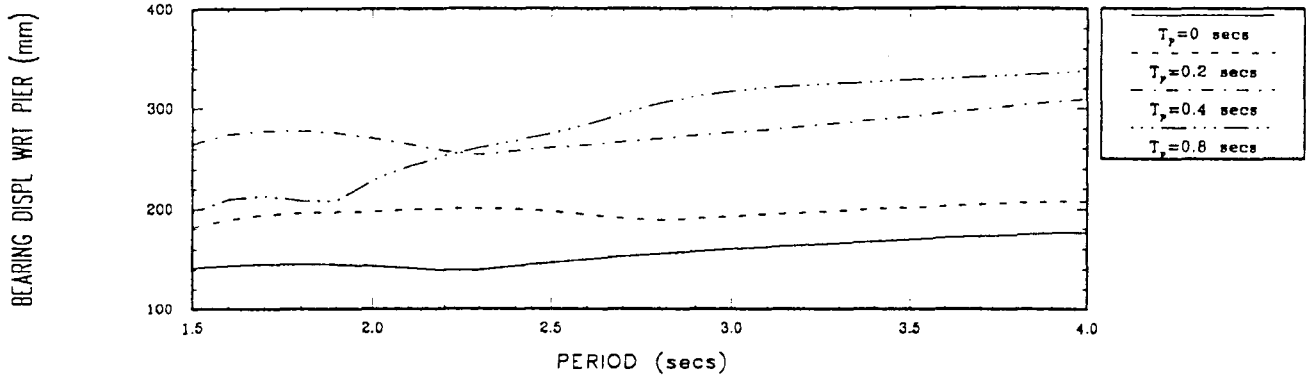
PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi = 0.40, \quad \mu = 0.10$$

$$W_p / W_d = 1/20$$

LEVEL 2 G.C. 2

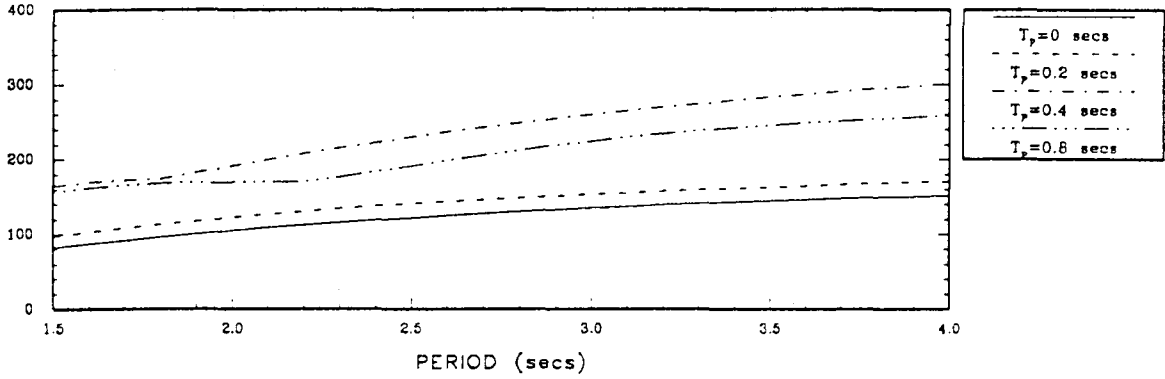


$$\xi = 0, \quad \mu = 0.15$$

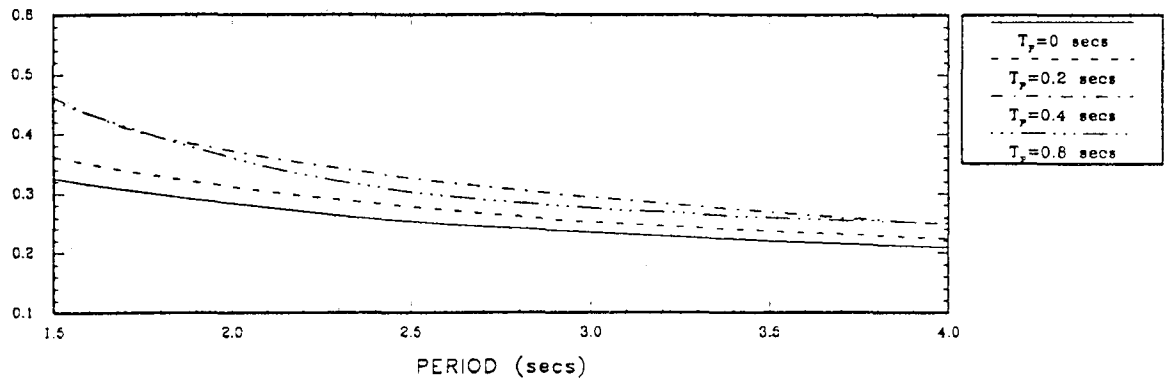
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 2

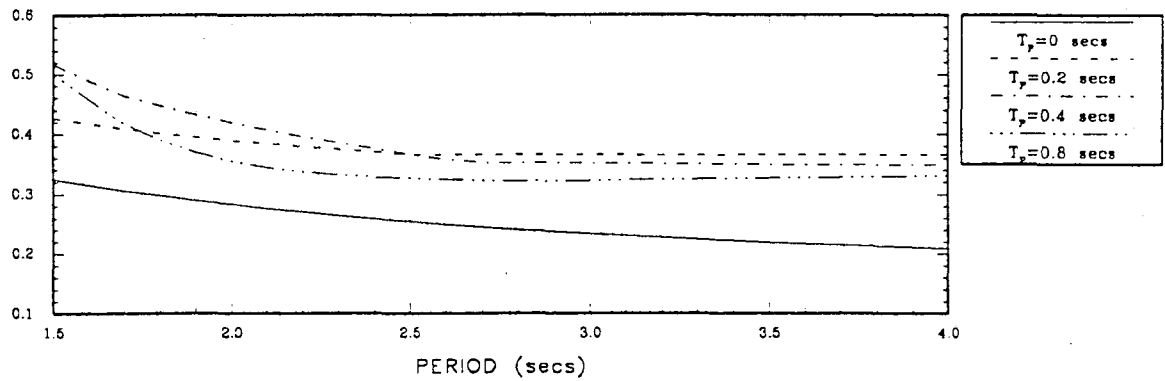
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

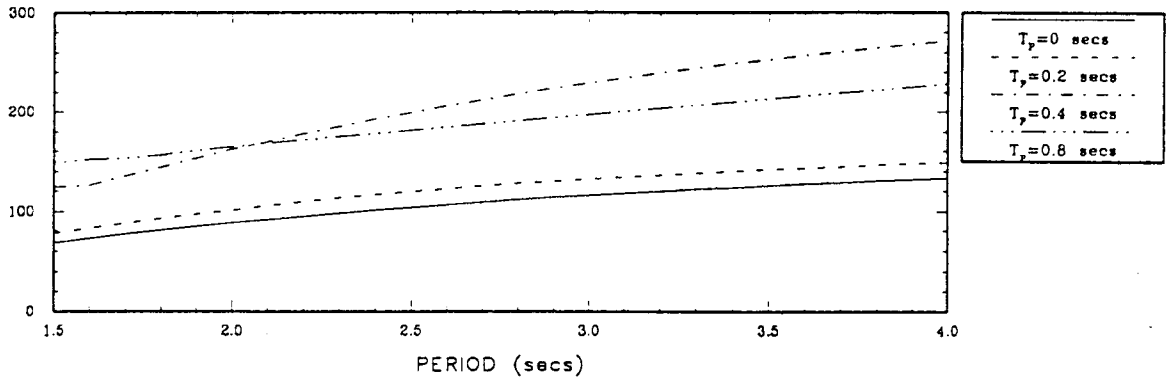


$$\xi = 0.20, \quad \mu = 0.15$$

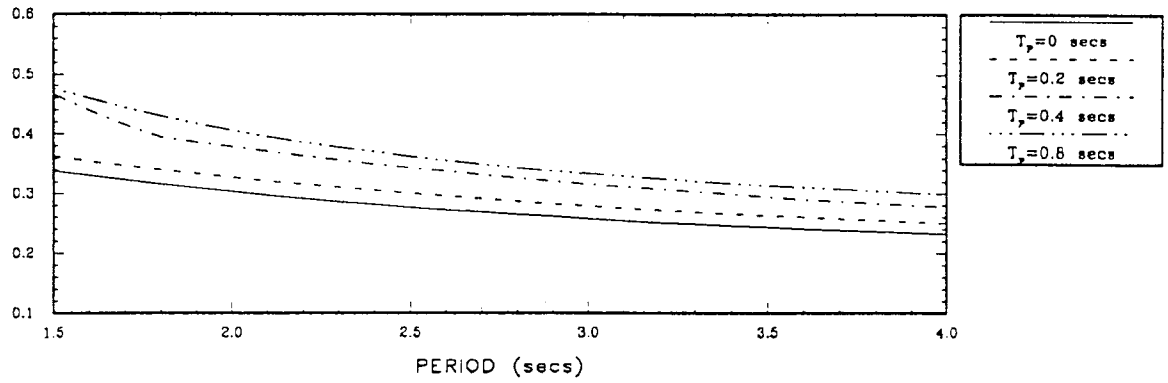
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 2

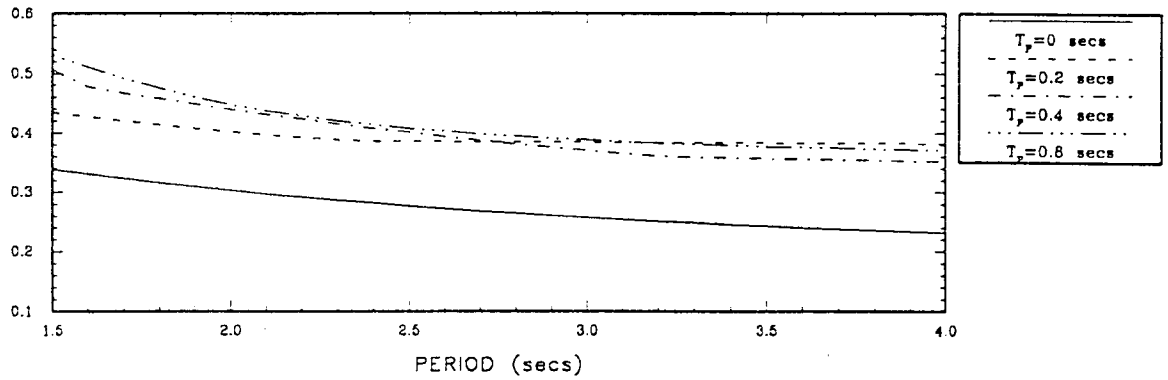
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

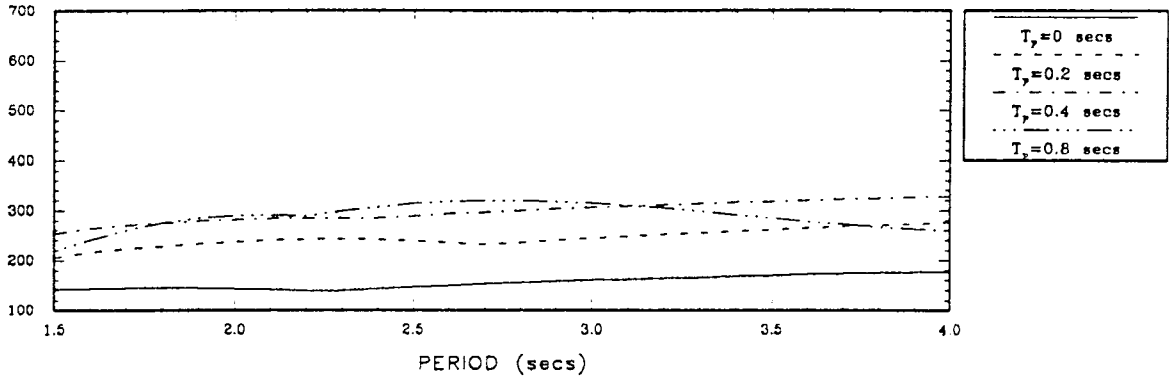


$$\xi = 0.40, \quad \mu = 0.15$$

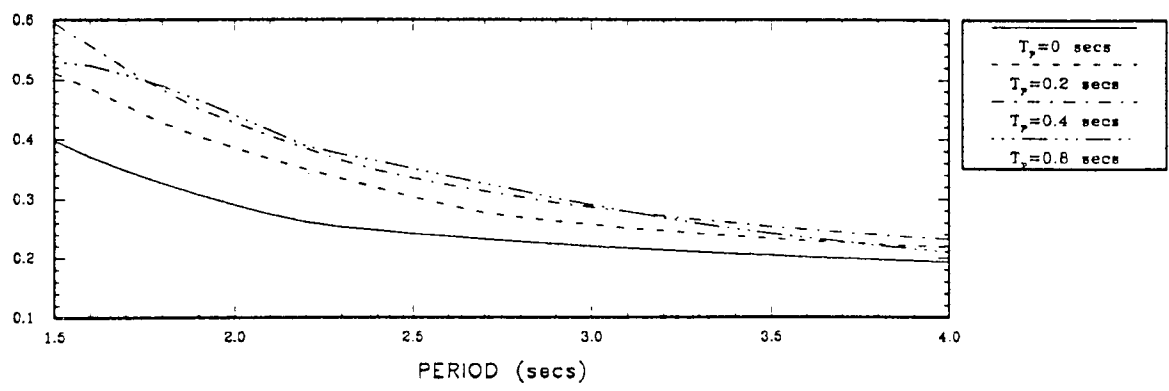
$$W_p/W_d = 1/5$$

LEVEL 2 G.C. 2

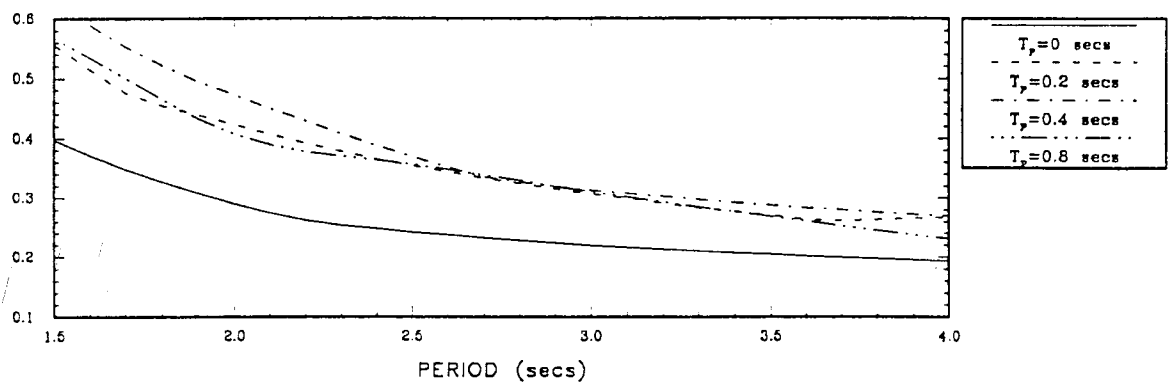
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

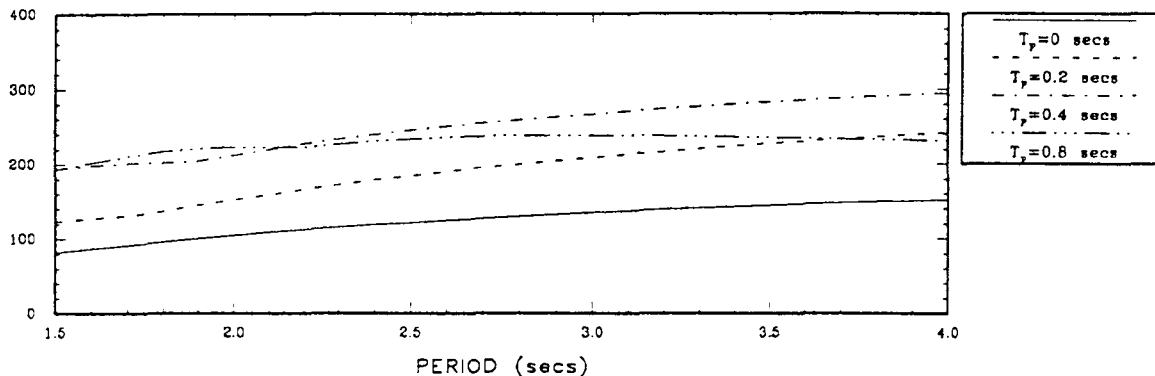


$$\xi = 0, \quad \mu = 0.15$$

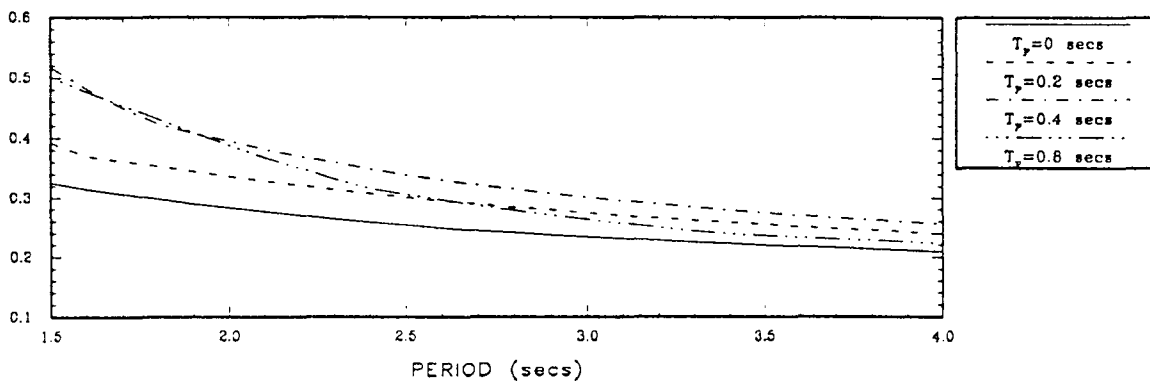
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 2

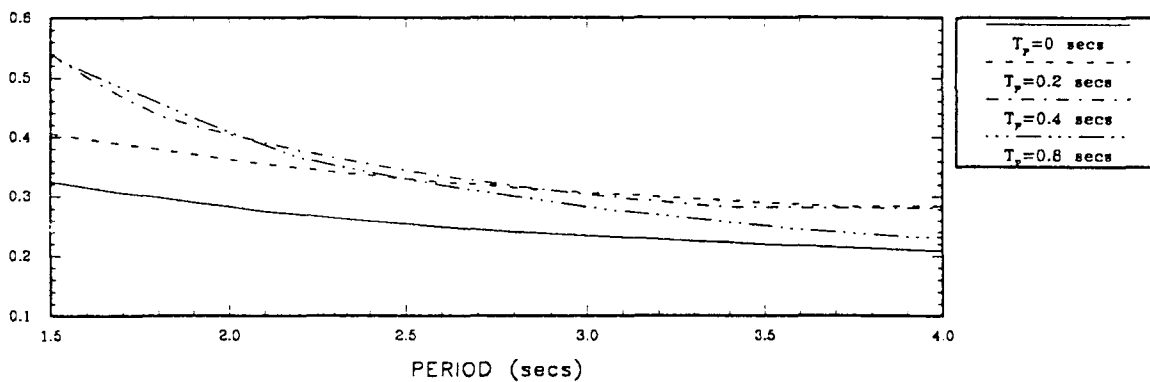
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

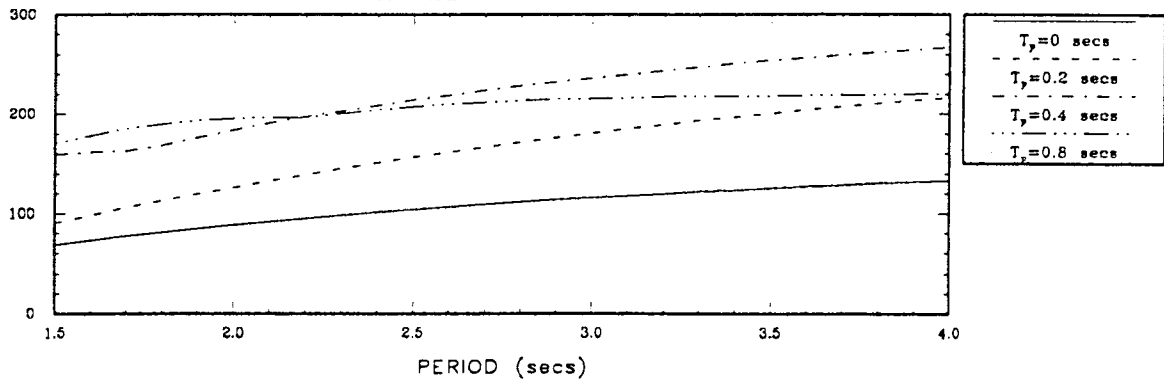


$$\xi = 0.20, \quad \mu = 0.15$$

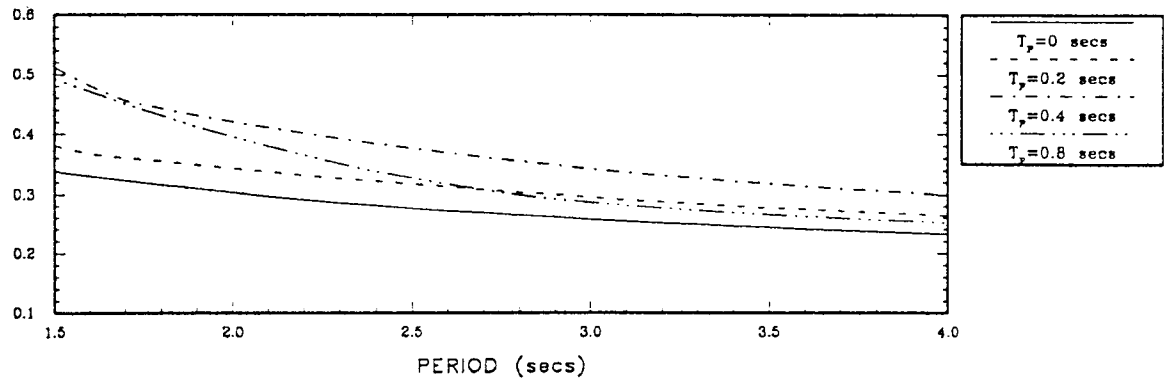
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 2

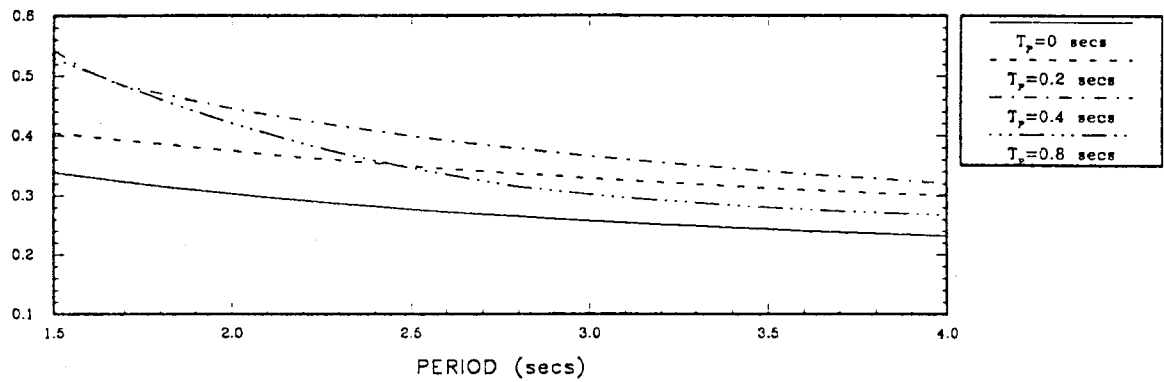
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



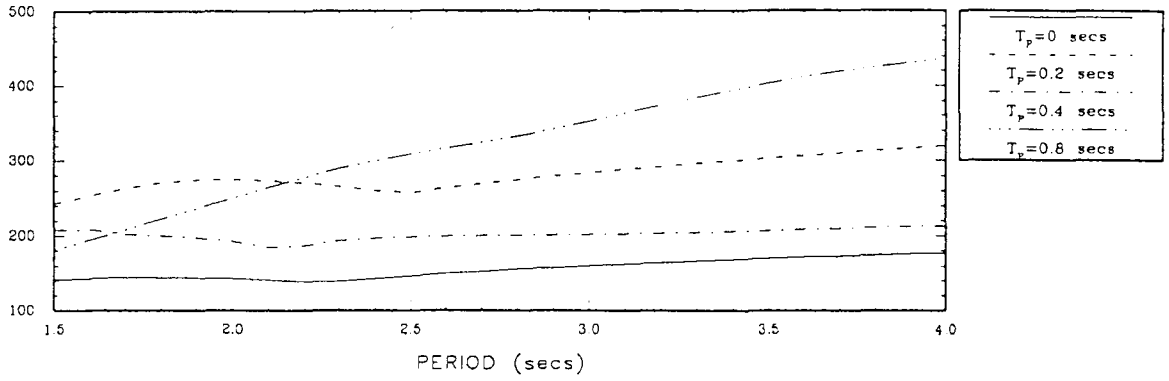
$$\xi = 0.40, \quad \mu = 0.15$$

$$W_p / W_d = 1/10$$

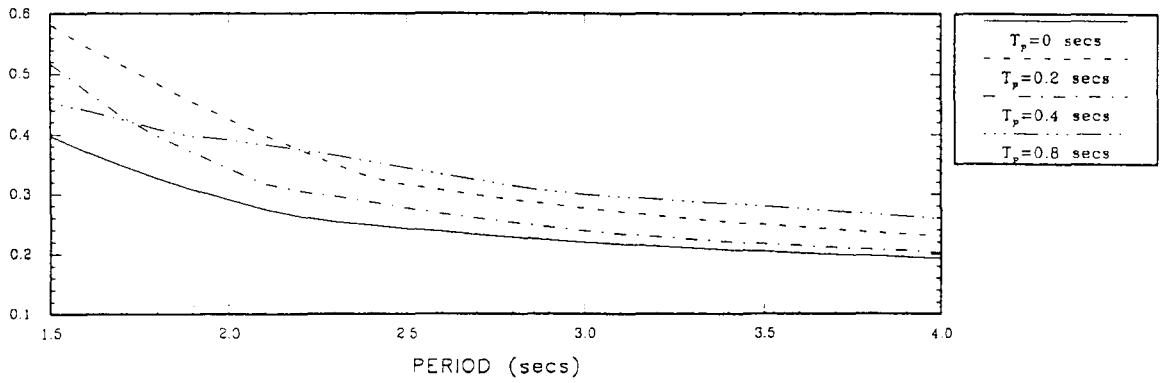


LEVEL 2 G.C. 2

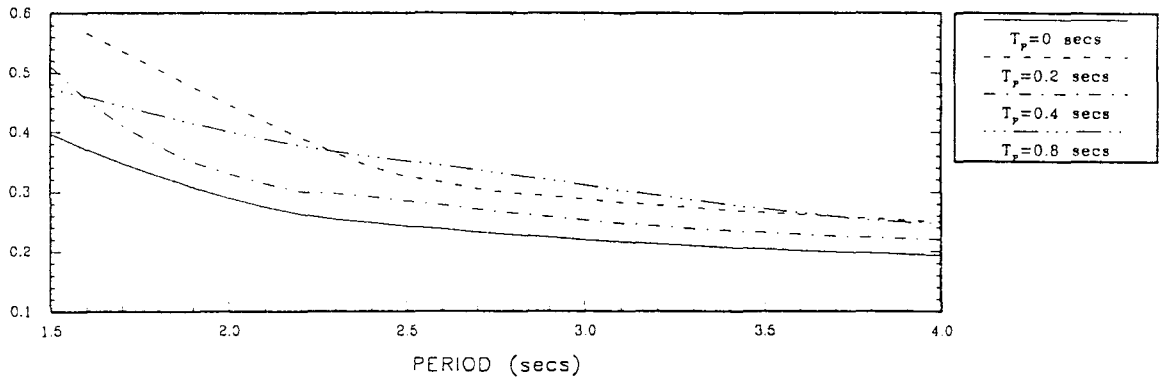
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

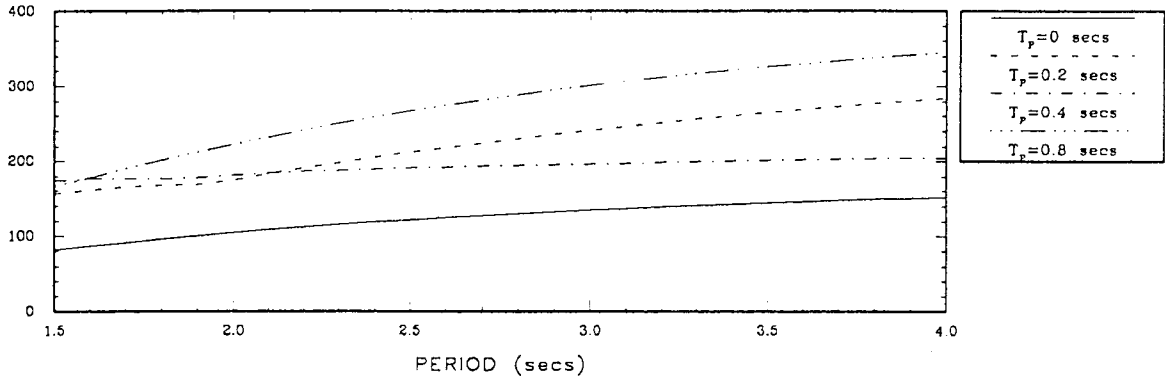


$$\xi = 0, \quad \mu = 0.15$$

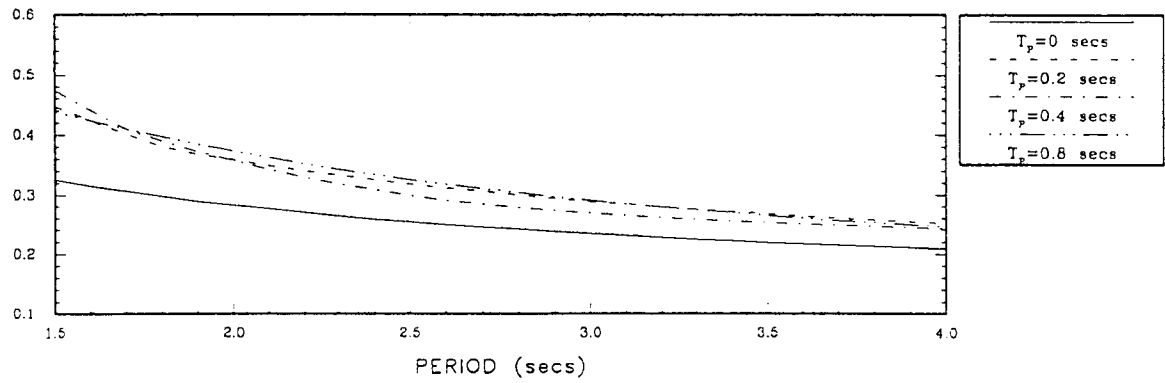
$$W_p / W_d = 1/20$$

LEVEL 2 G.C. 2

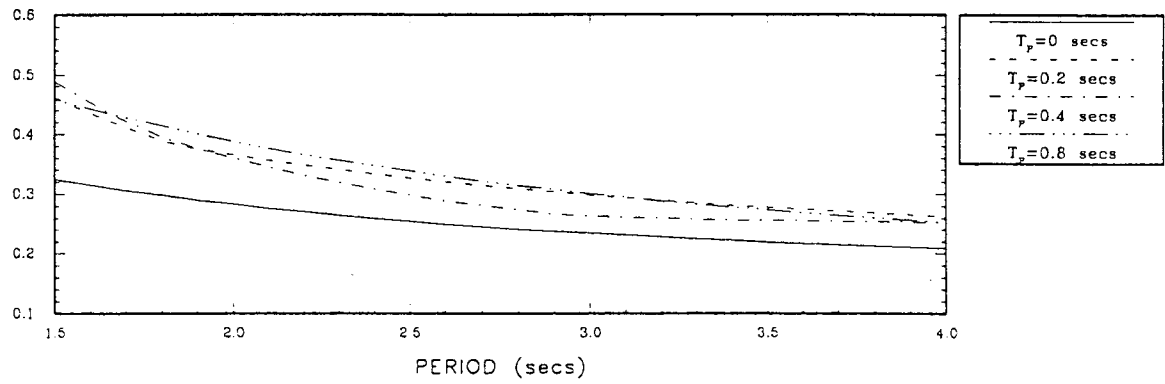
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

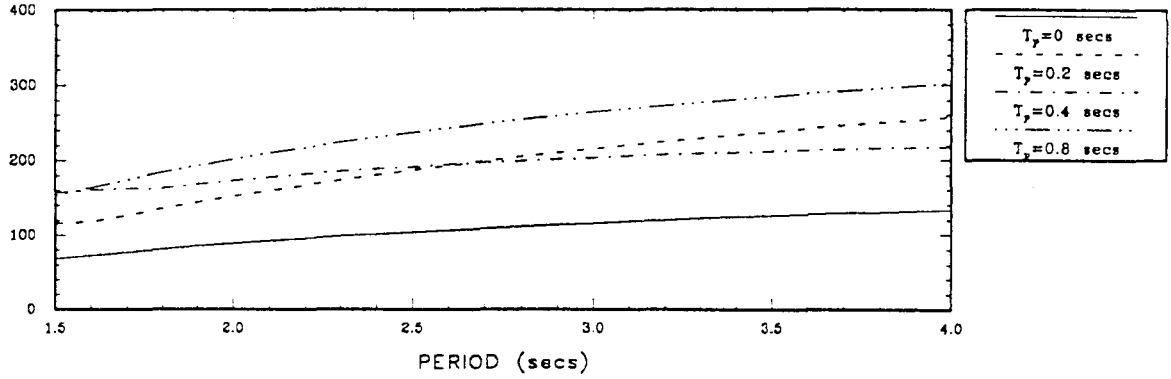


$$\xi = 0.20, \quad \mu = 0.15$$

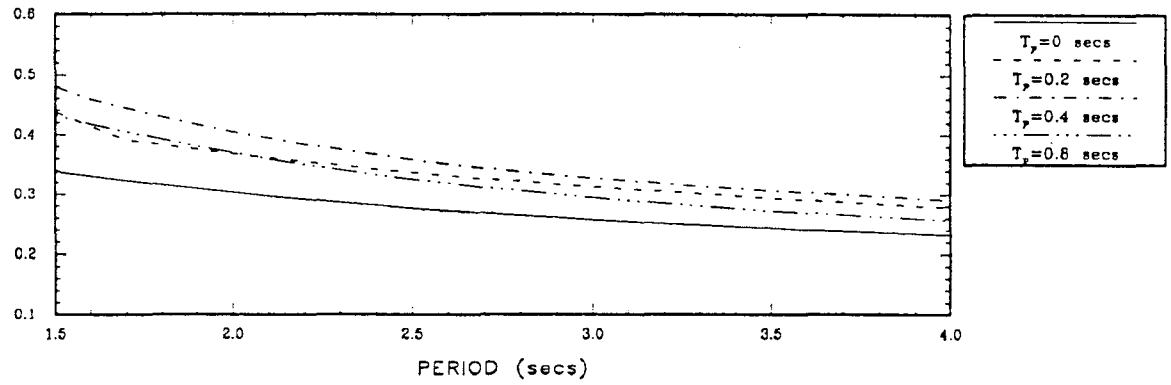
$$W_p / W_d = 1/20$$

LEVEL 2 G.C. 2

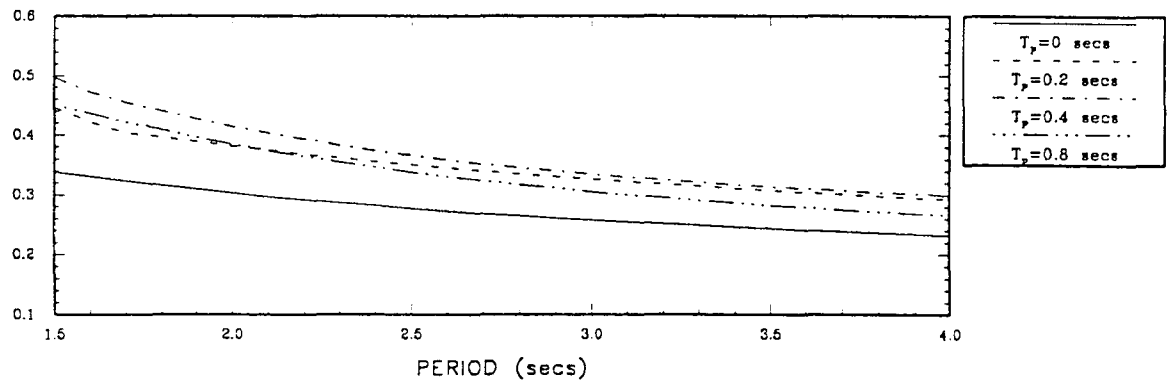
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

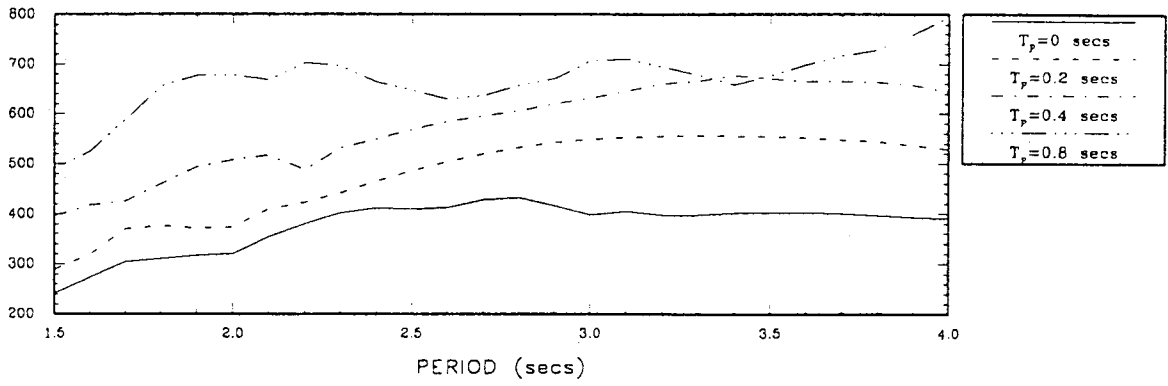


$$\xi = 0.40, \quad \mu = 0.15$$

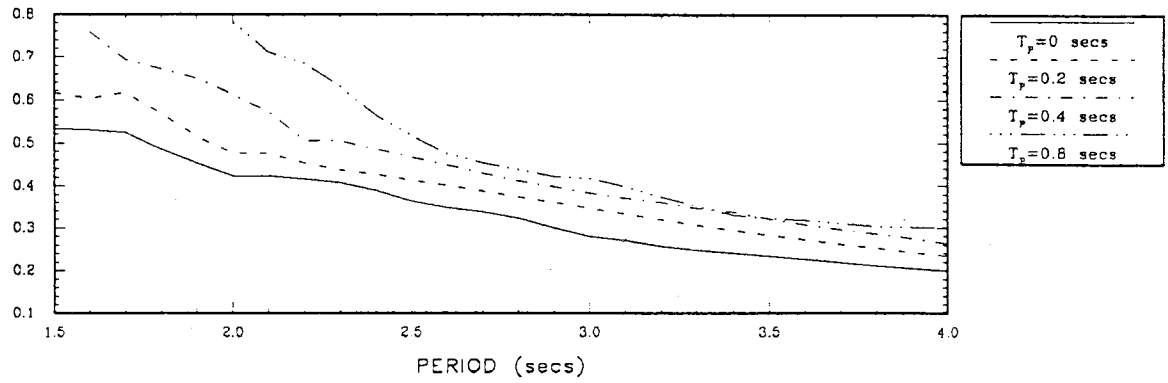
$$W_p / W_d = 1/20$$

LEVEL 2 G.C. 3

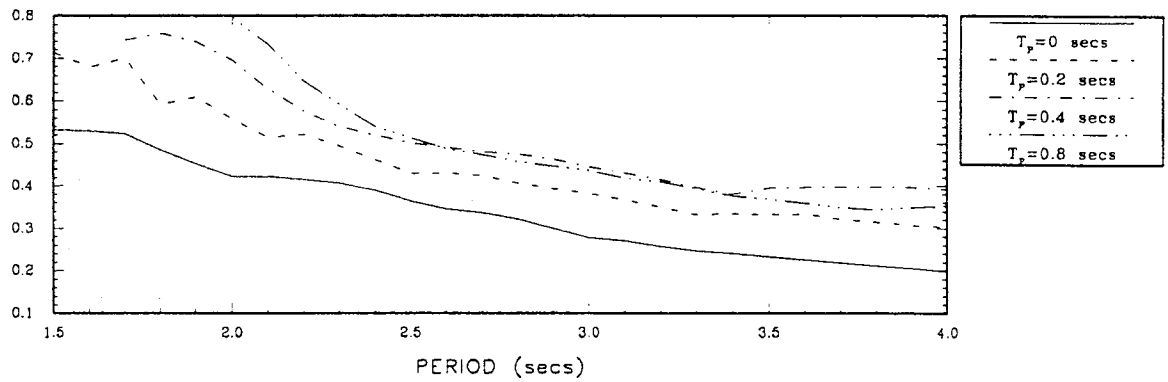
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT

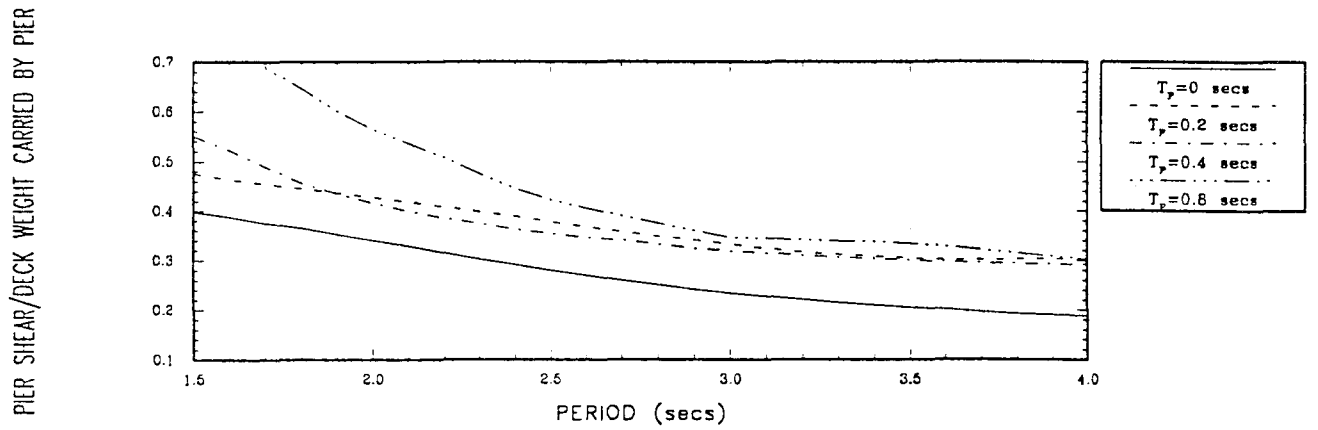
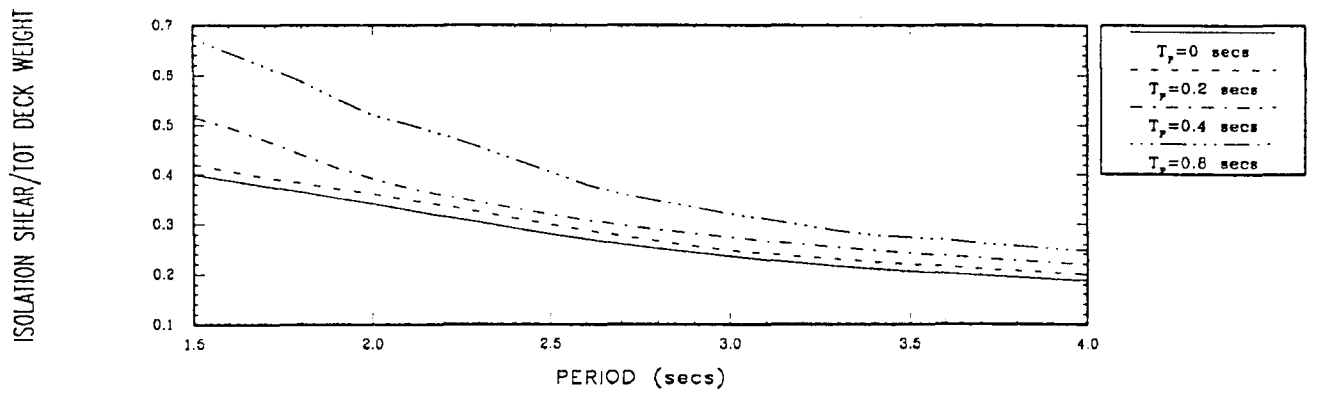
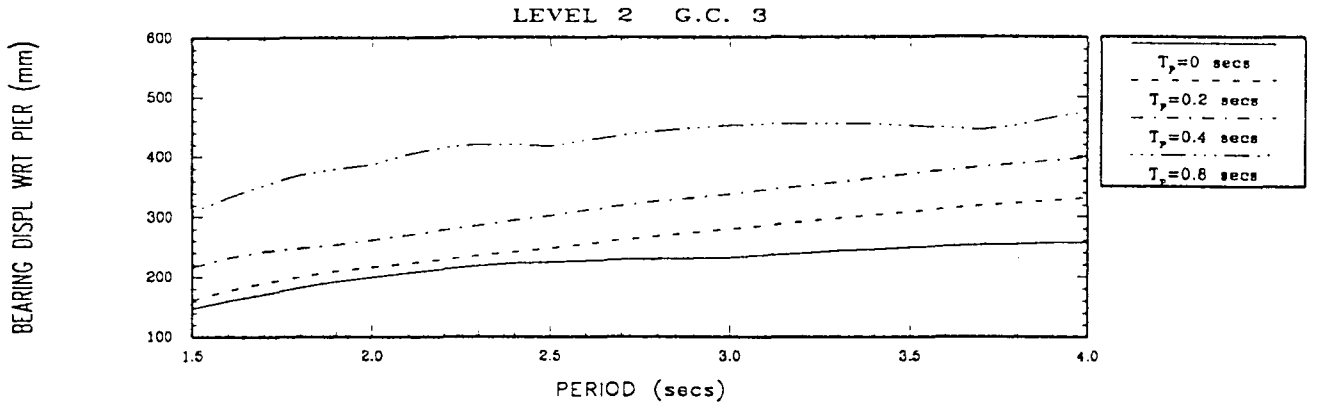


PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi = 0, \quad \mu = 0.10$$

$$W_p / W_d = 1/5$$

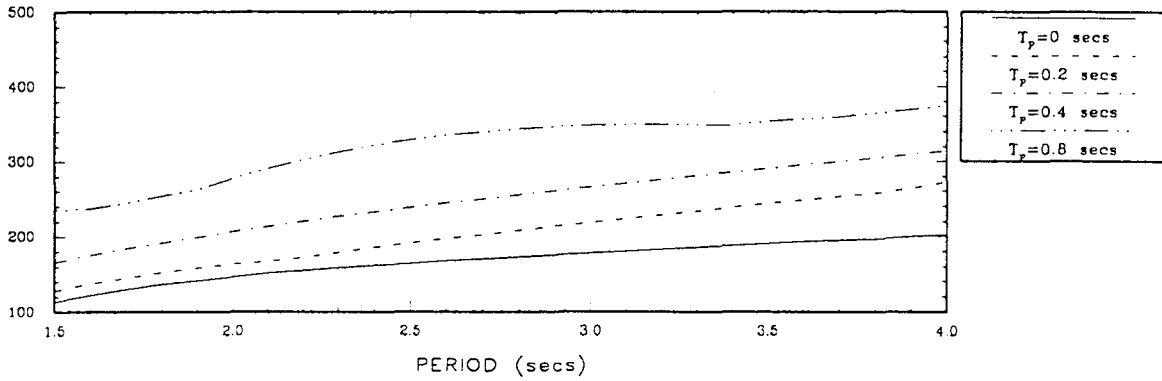


$$\xi = 0.20, \quad \mu = 0.10$$

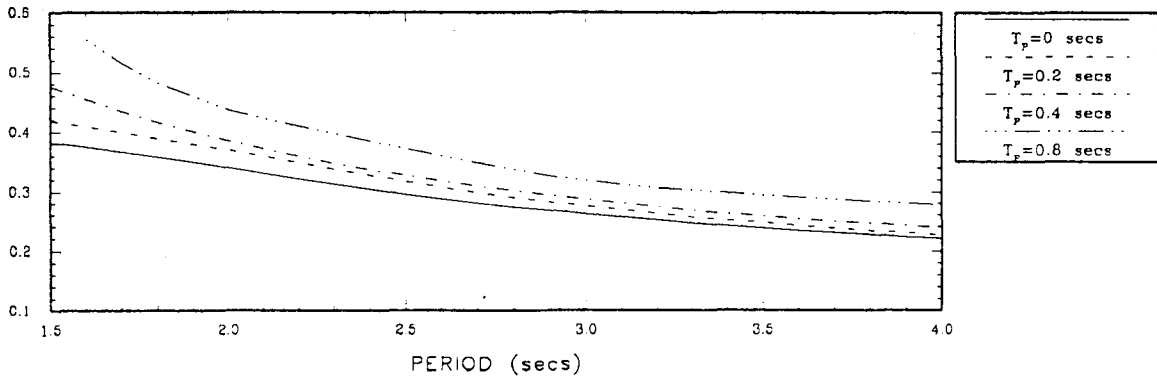
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 3

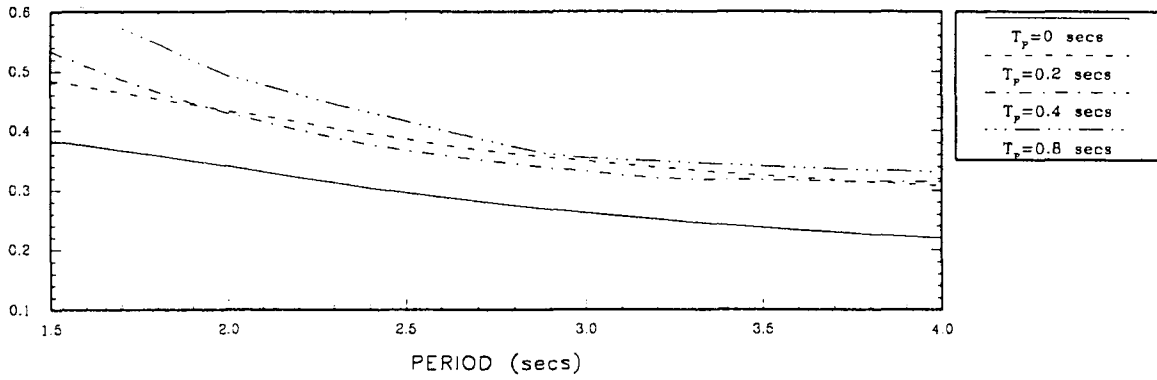
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT

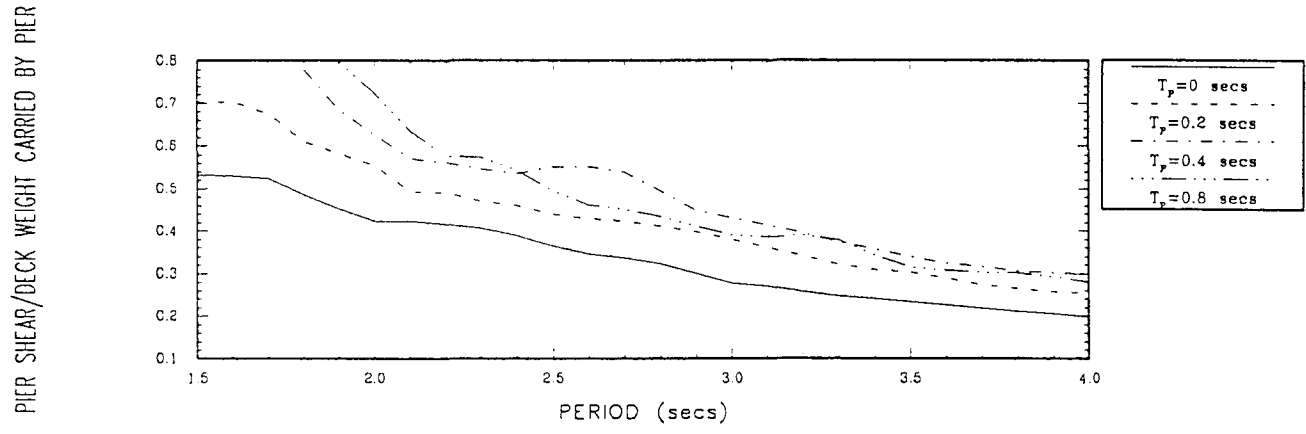
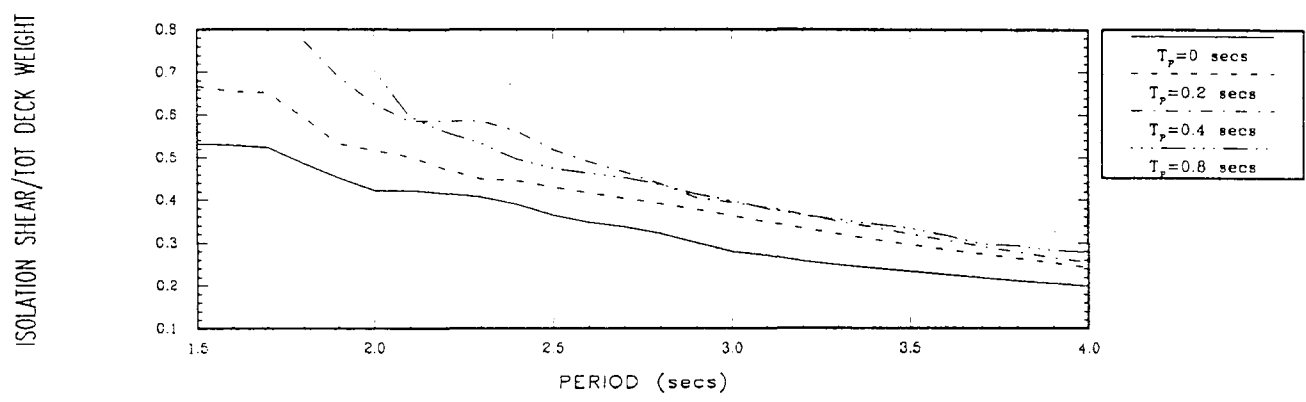
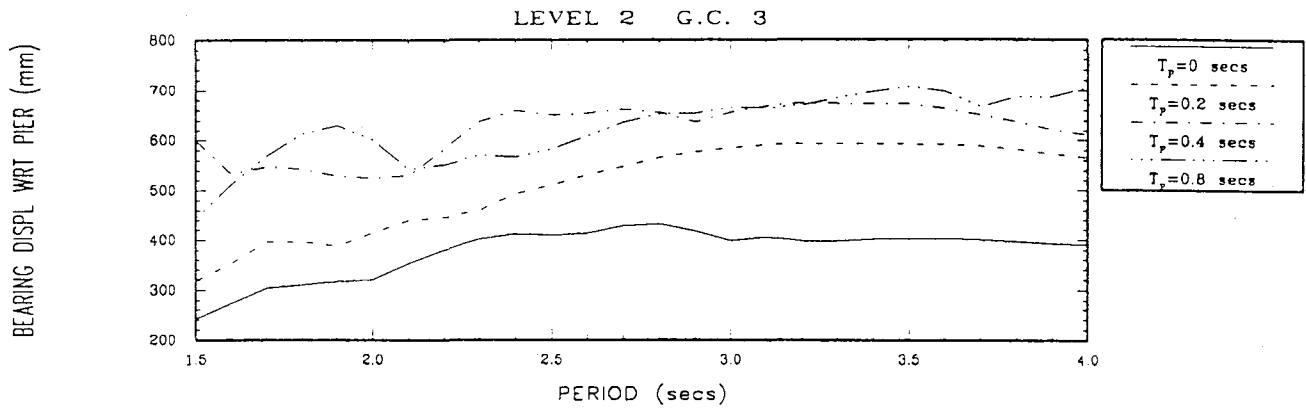


PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi = 0.40, \quad \mu = 0.10$$

$$W_p / W_d = 1/5$$

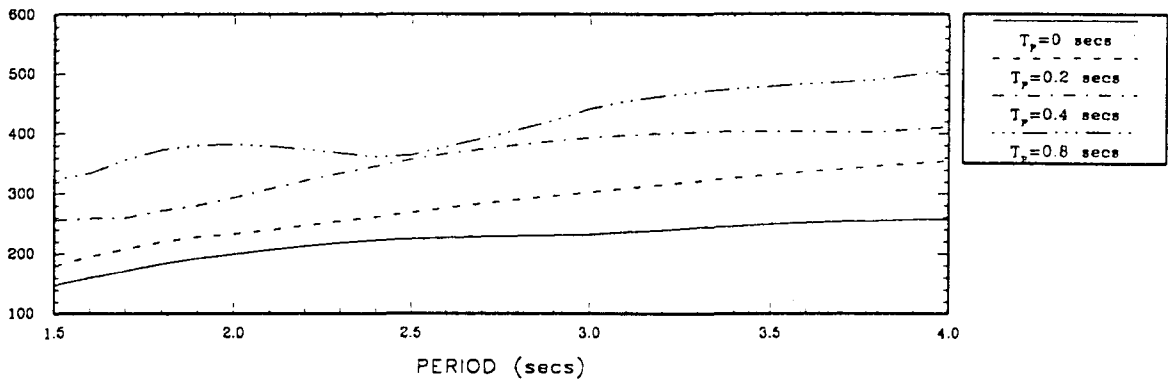


$$\xi = 0, \quad \mu = 0.10$$

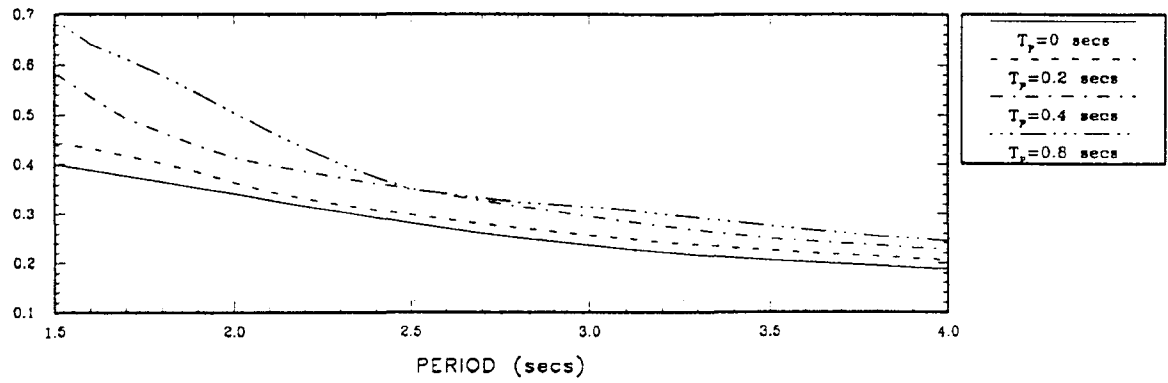
$$W_p / W_d = 1/10$$

LEVEL 2 G.C. 3

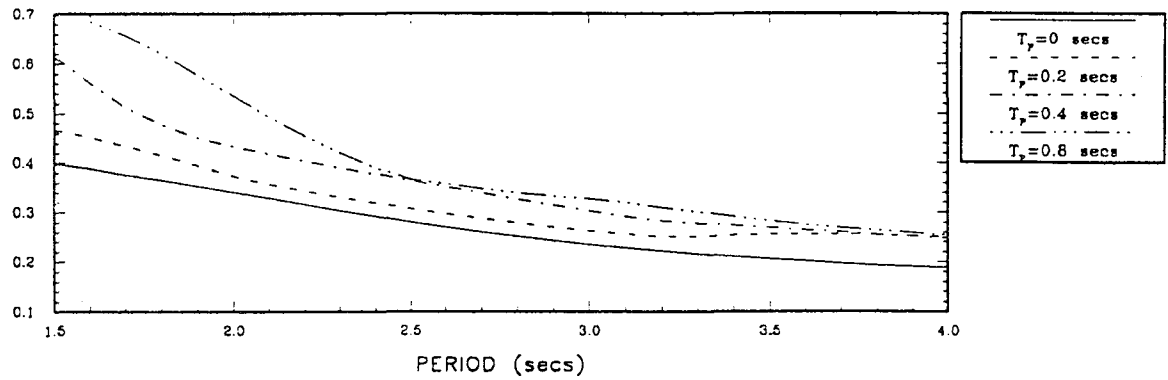
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



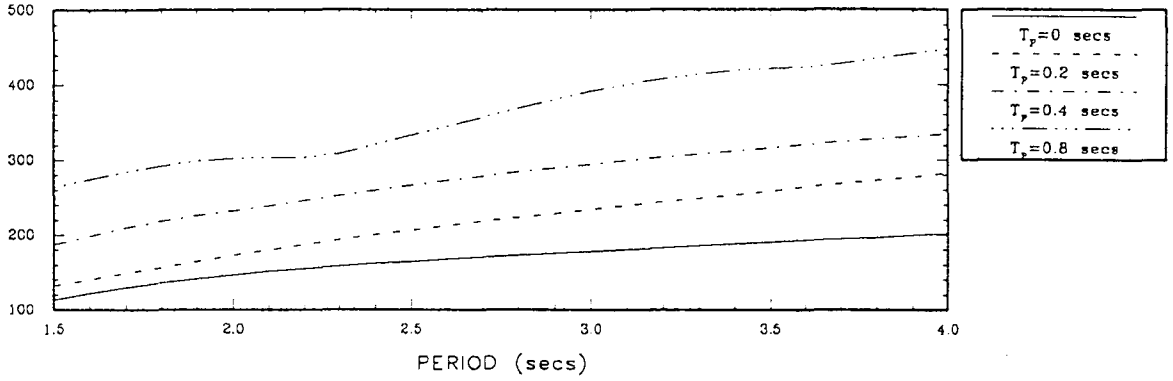
$$\xi=0.20, \quad \mu=0.10$$

$$W_p/W_d=1/10$$

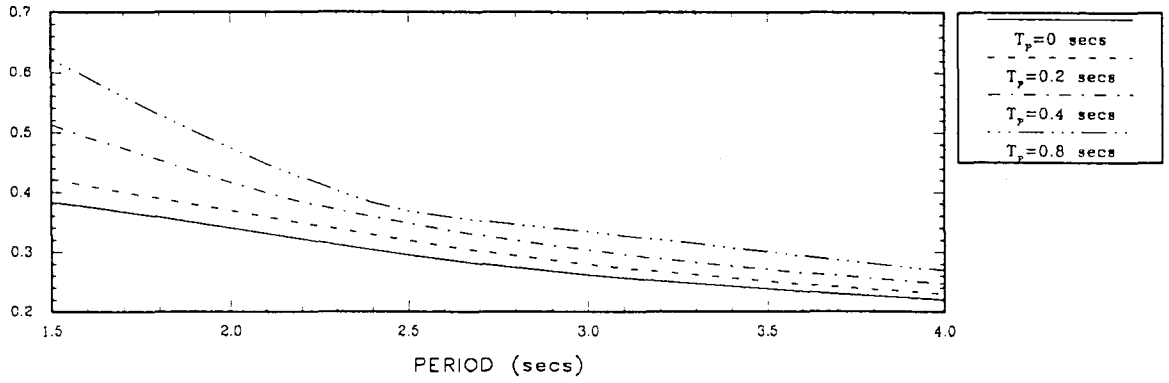


LEVEL 2 G.C. 3

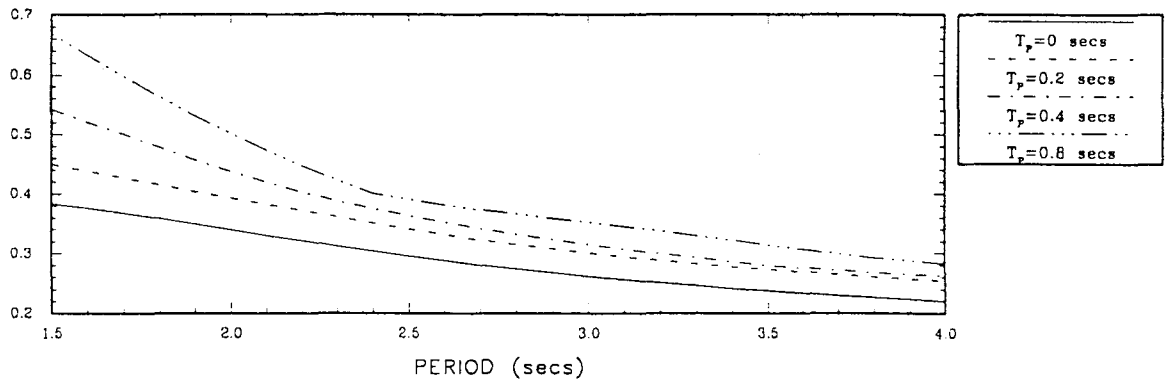
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

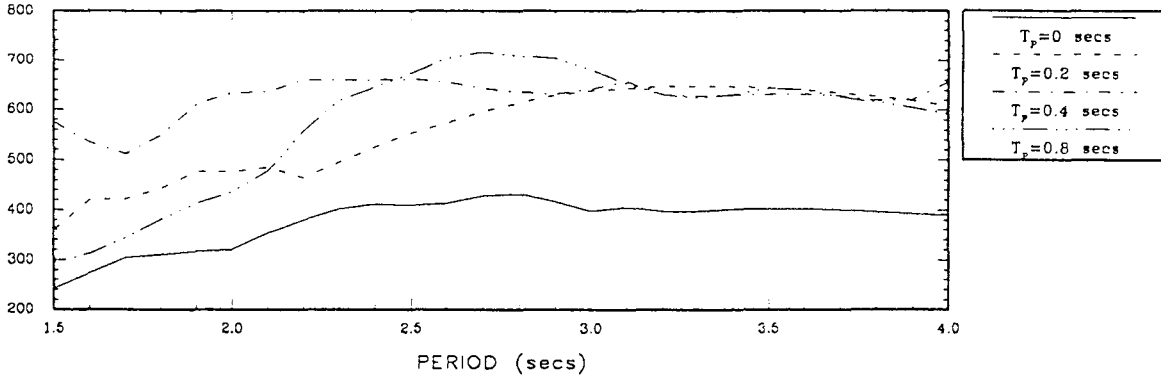


$$\xi=0.40, \quad \mu=0.10$$

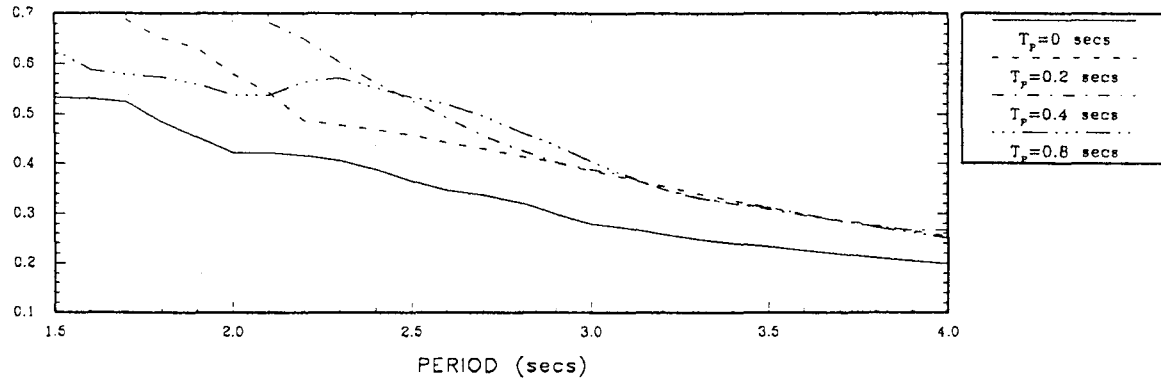
$$W_p/W_d=1/10$$

LEVEL 2 G.C. 3

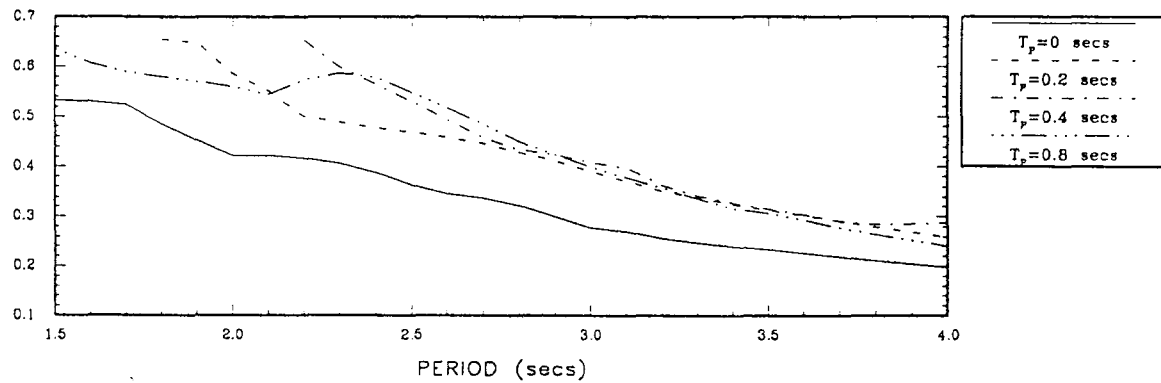
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

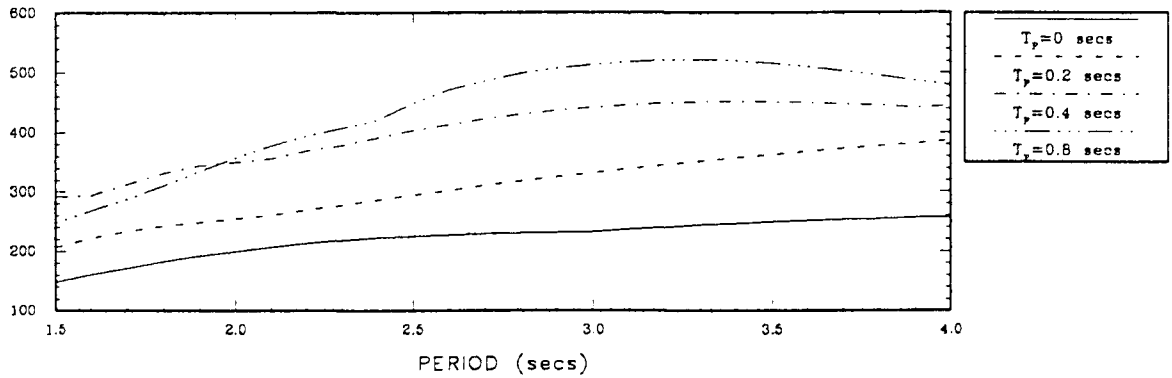


$$\xi = 0, \quad \mu = 0.10$$

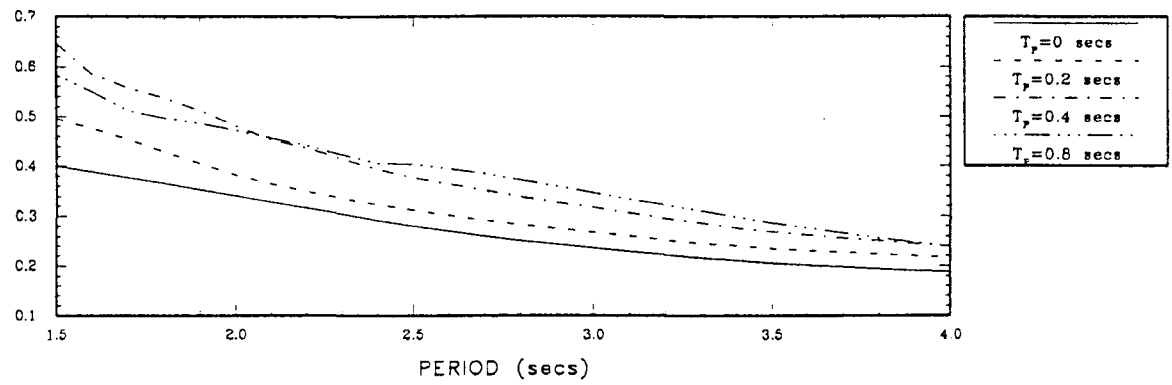
$$W_p / W_d = 1/20$$

LEVEL 2 G.C. 3

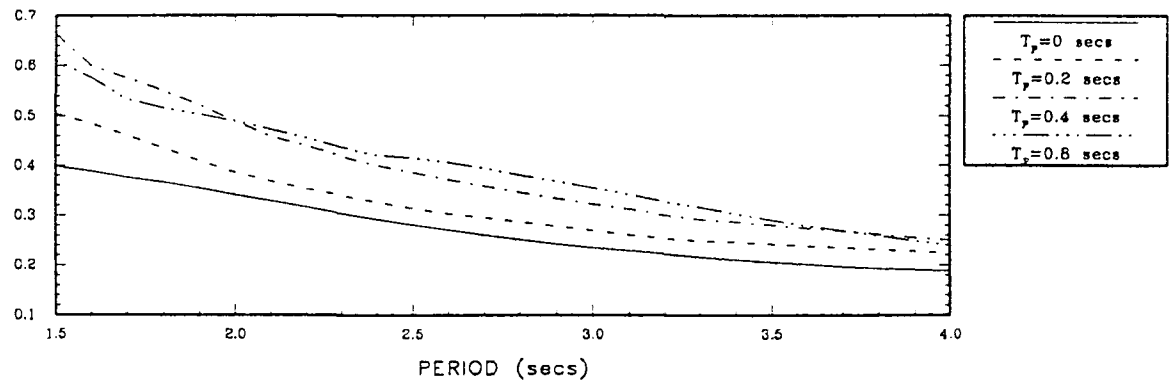
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



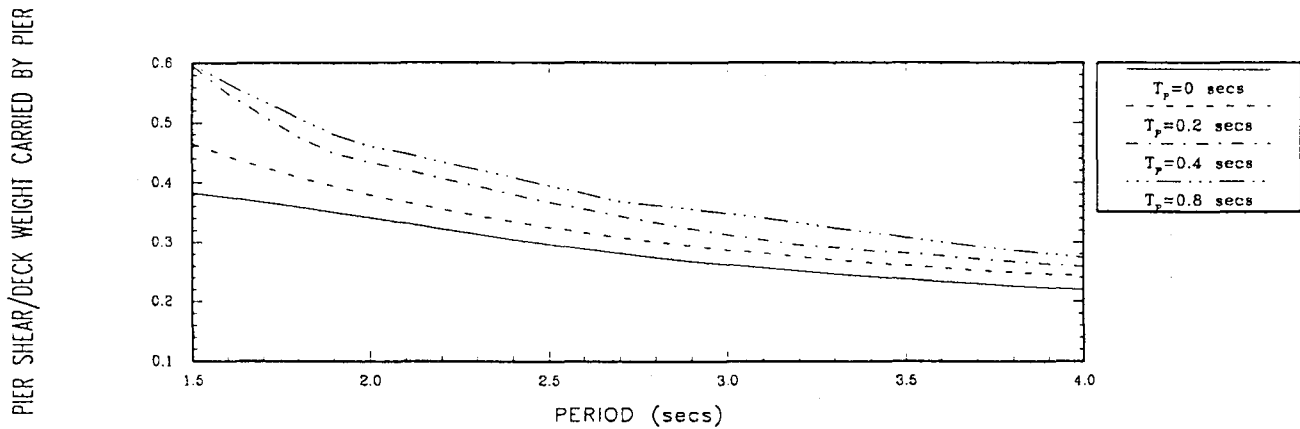
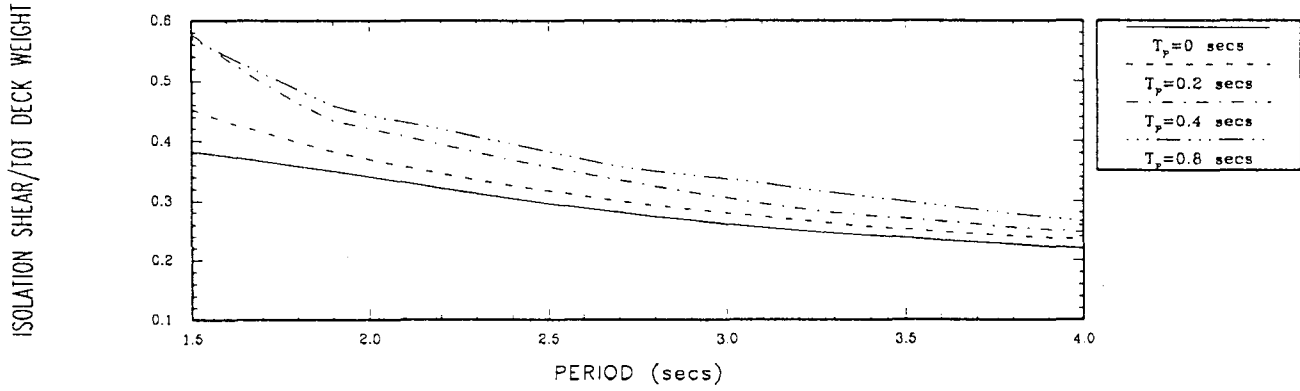
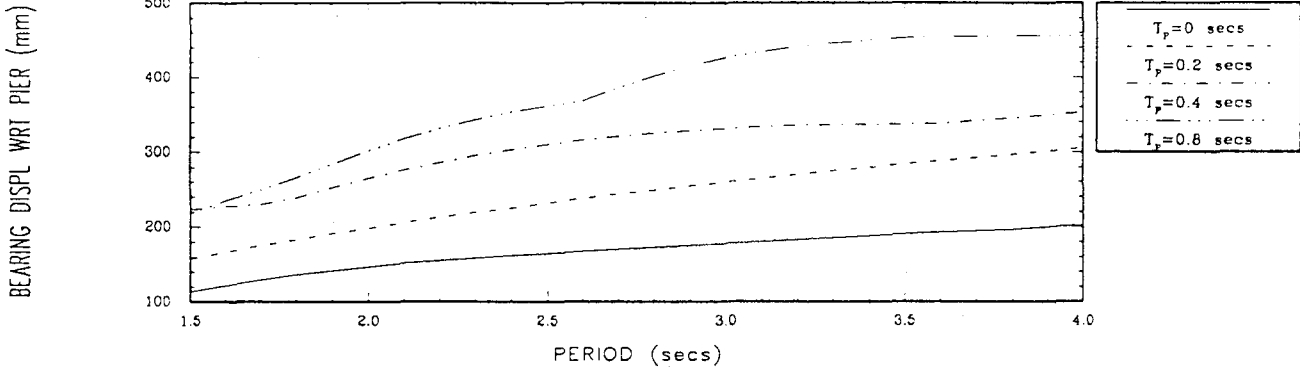
PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi=0.20, \quad \mu=0.10$$

$$W_p/W_d=1/20$$

LEVEL 2 G.C. 3

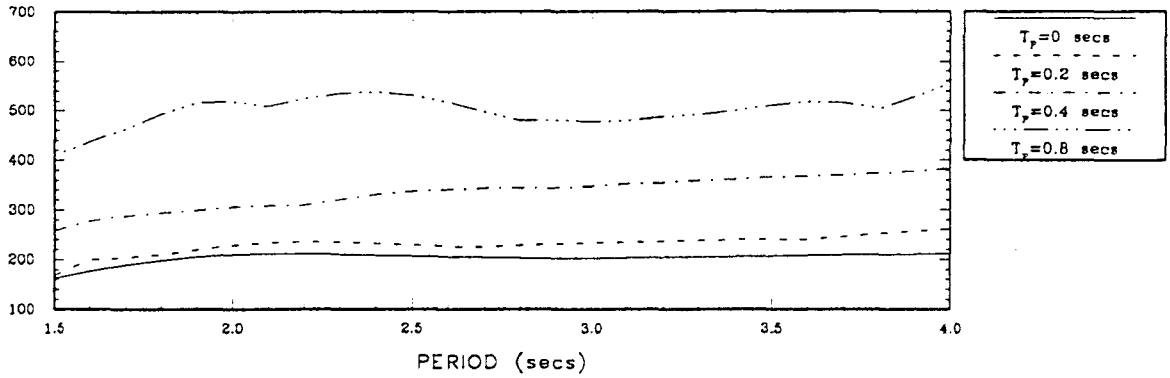


$$\xi = 0.40, \quad \mu = 0.10$$

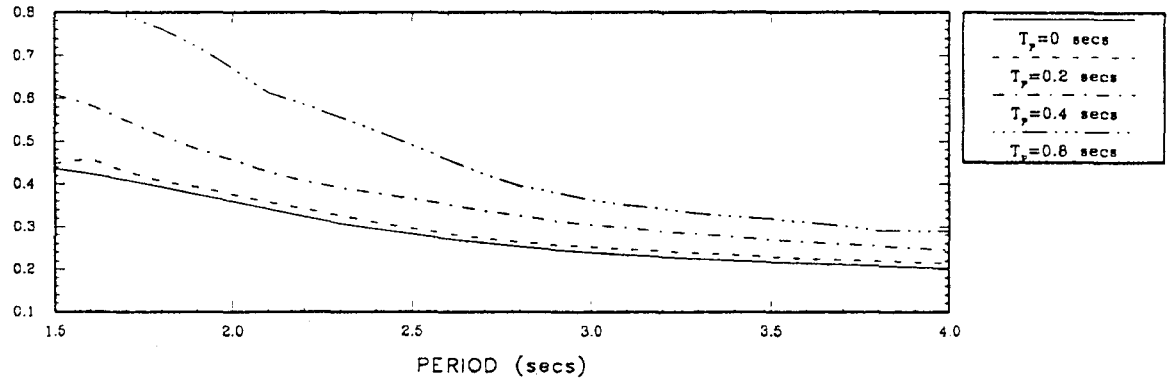
$$W_p / W_d = 1/20$$

LEVEL 2 G.C. 3

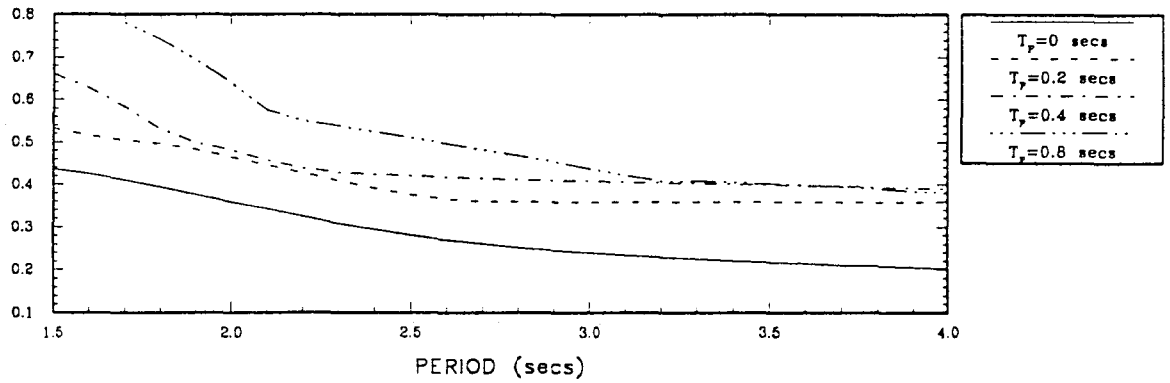
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



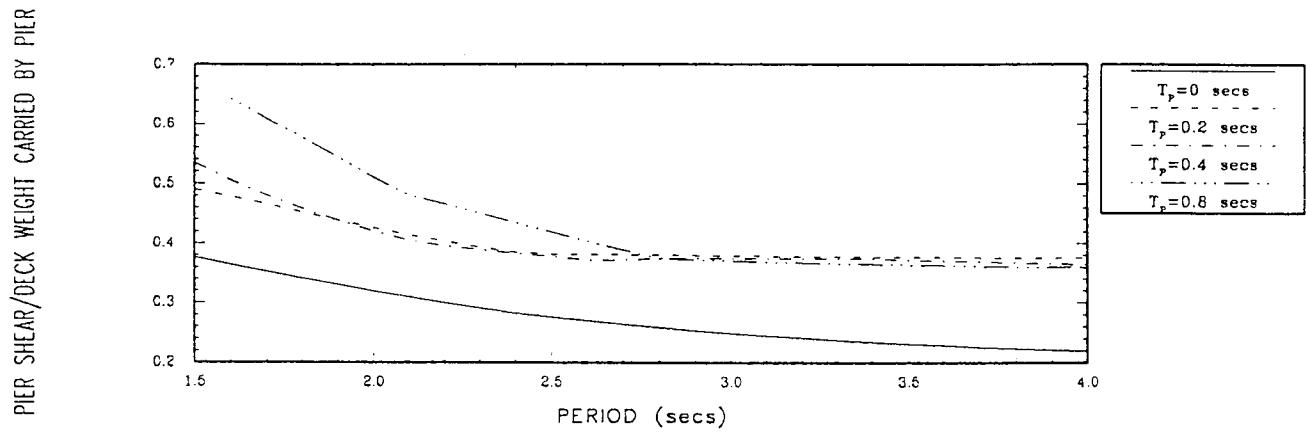
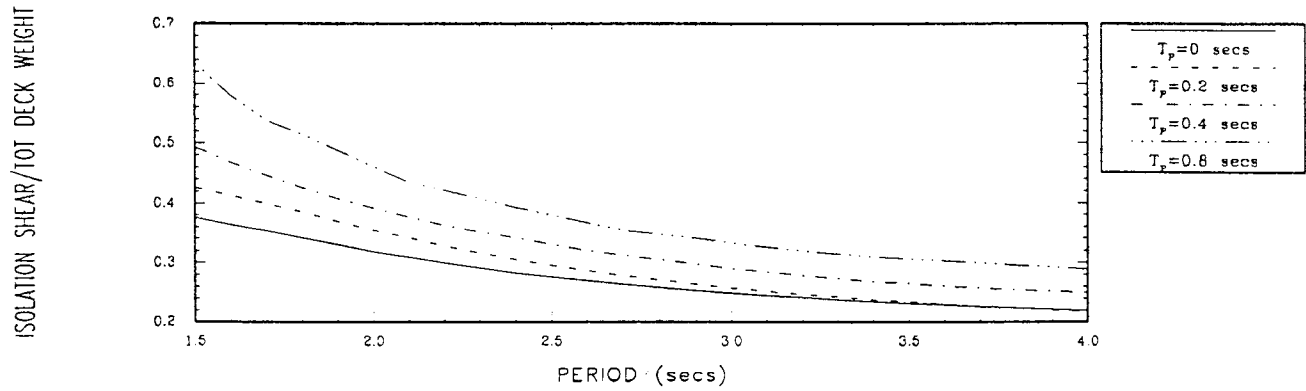
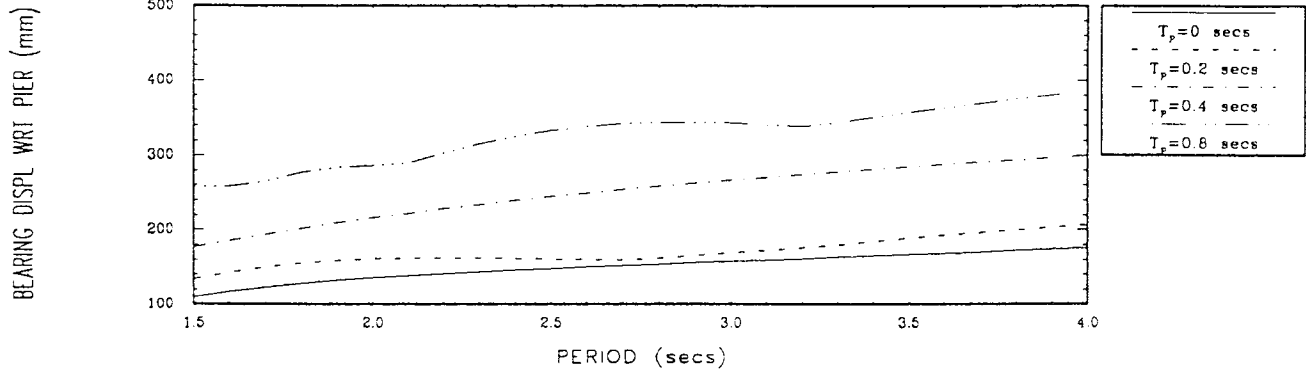
PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi = 0, \quad \mu = 0.15$$

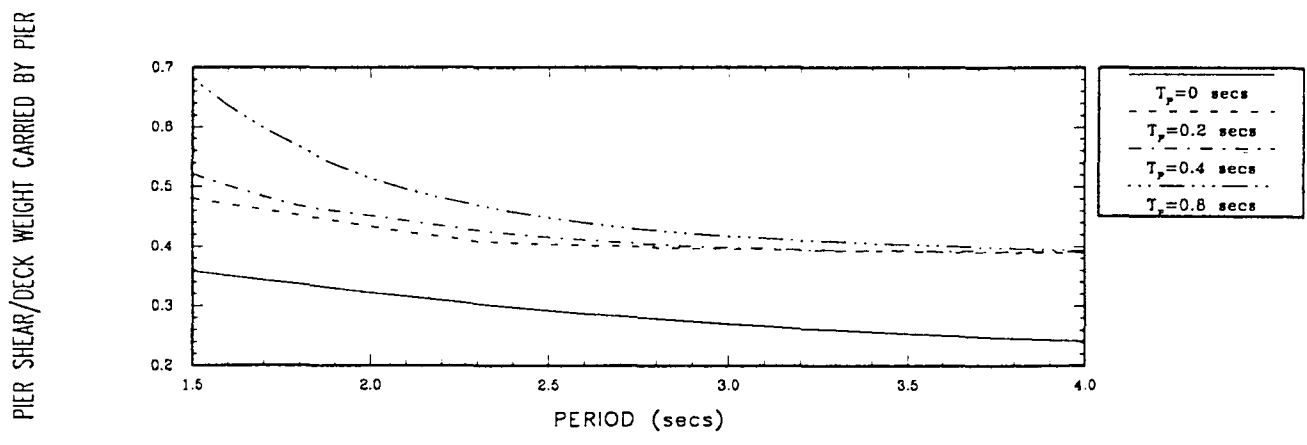
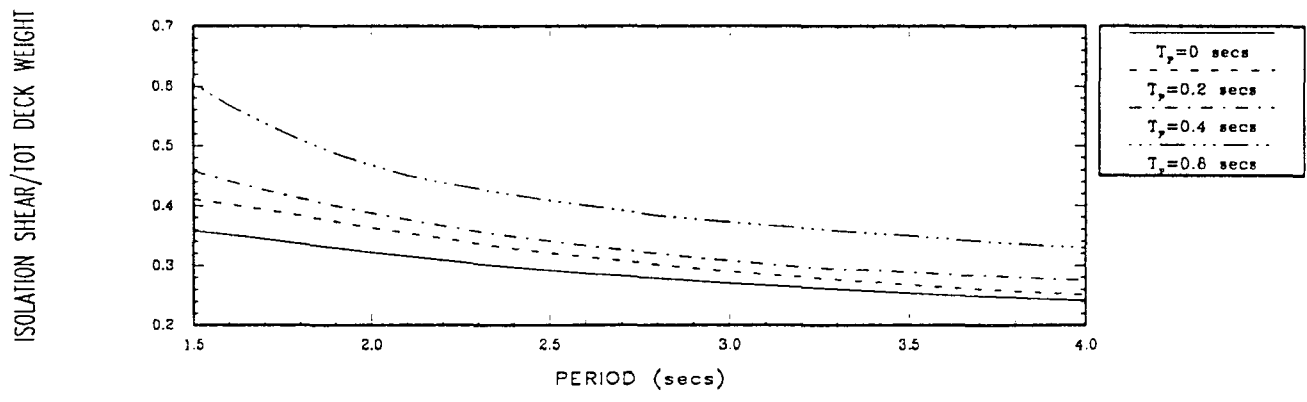
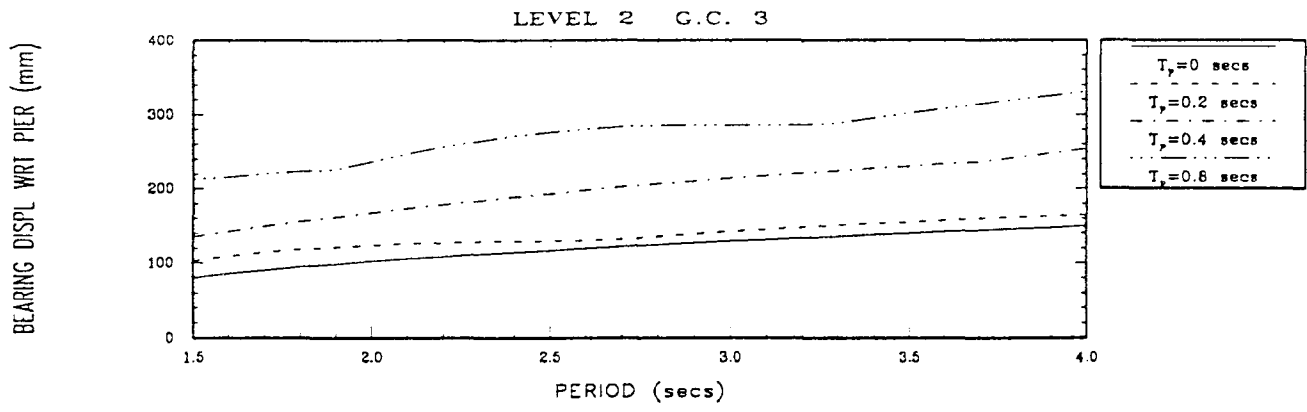
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 3



$$\xi=0.20, \quad \mu=0.15$$

$$W_p/W_d=1/5$$

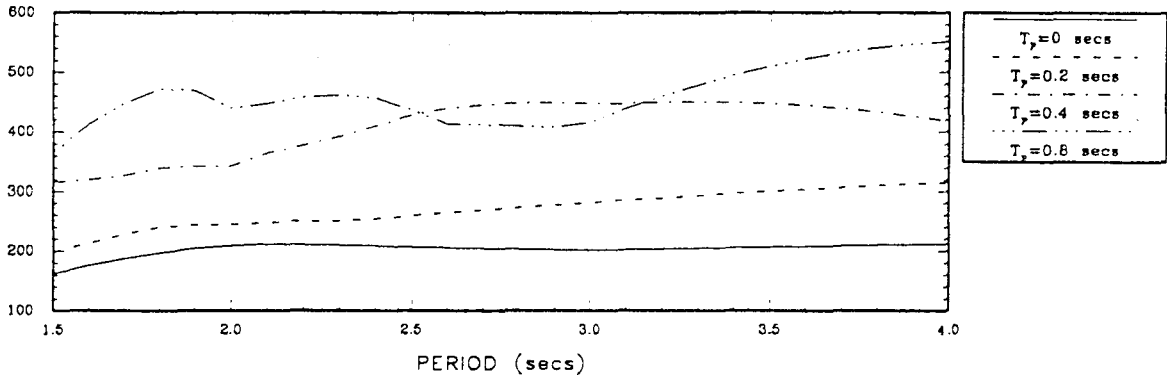


$$\xi = 0.40, \quad \mu = 0.15$$

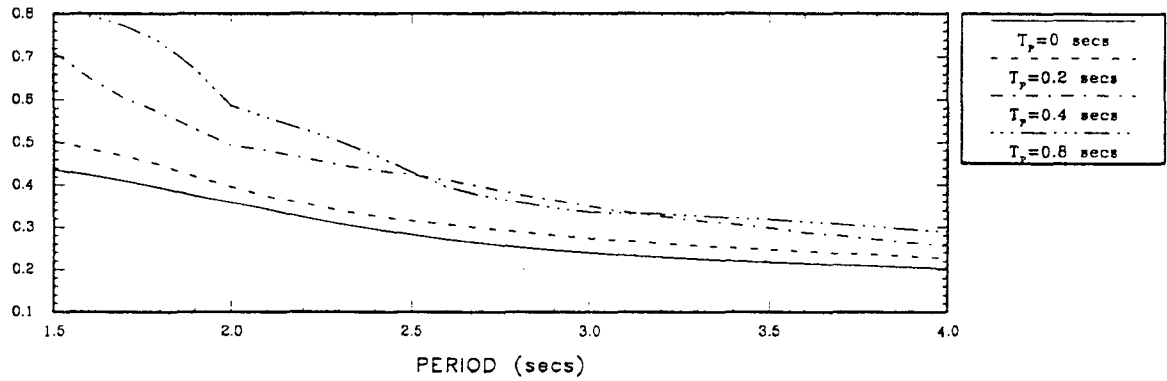
$$W_p / W_d = 1/5$$

LEVEL 2 G.C. 3

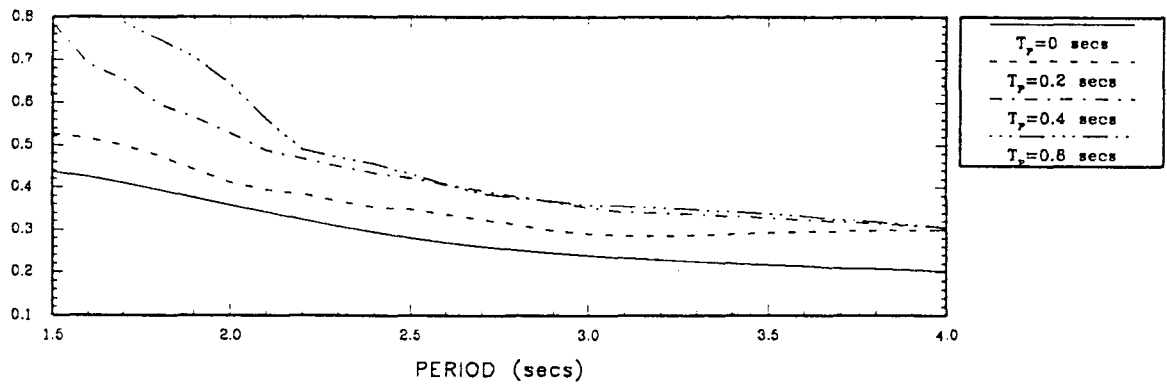
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



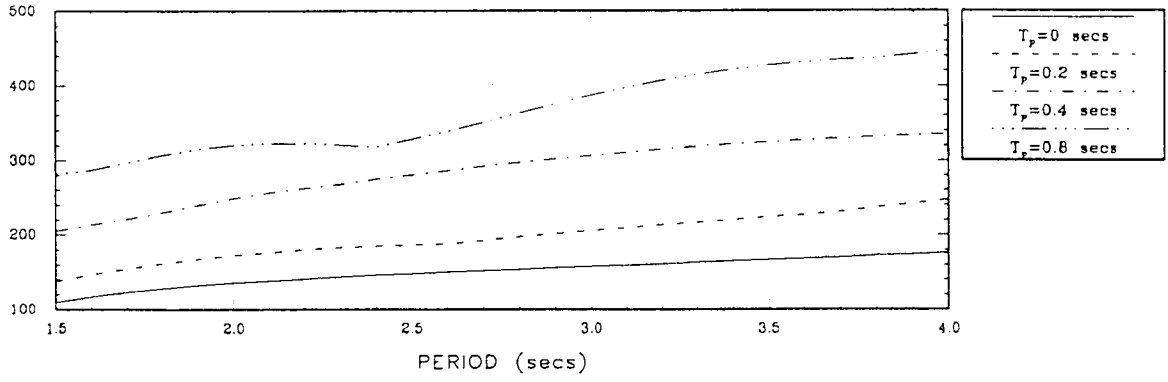
$$\xi = 0, \quad \mu = 0.15$$

$$W_p / W_d = 1/10$$

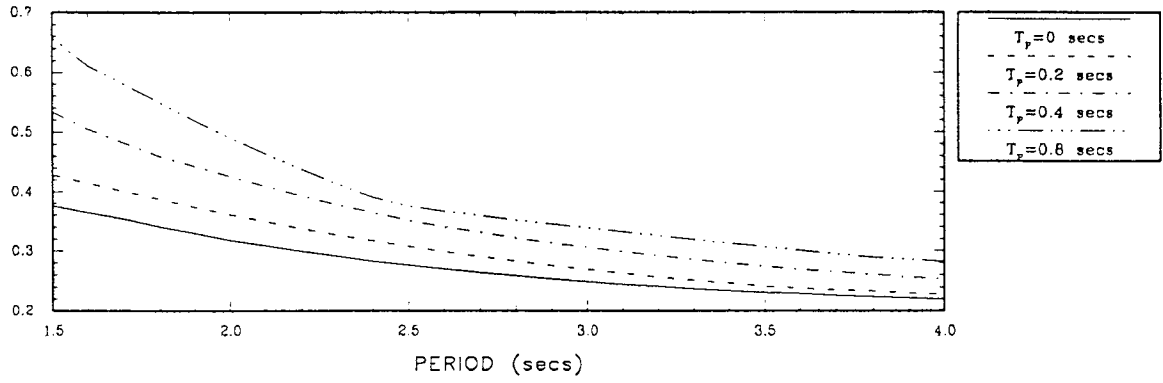


LEVEL 2 G.C. 3

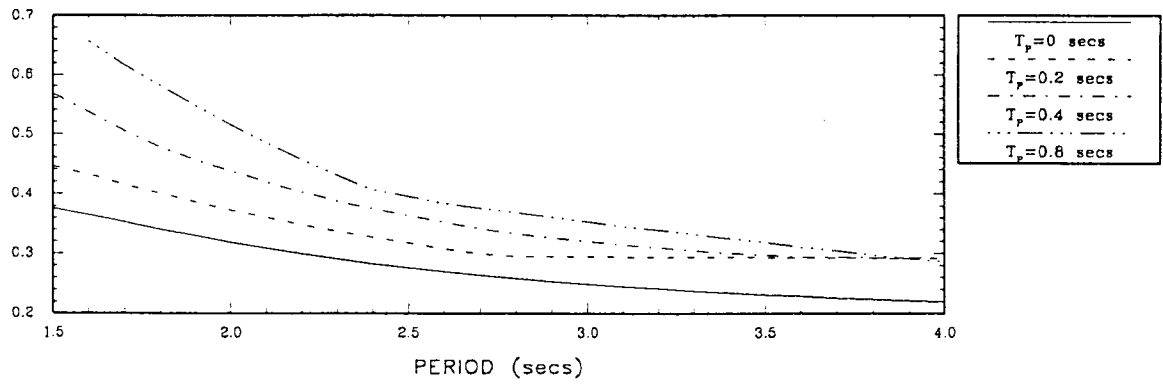
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



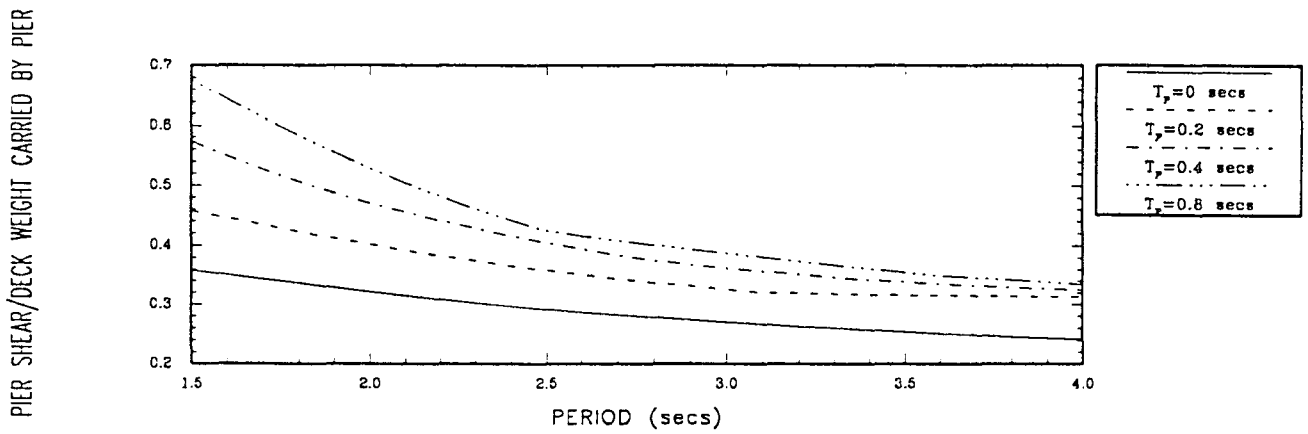
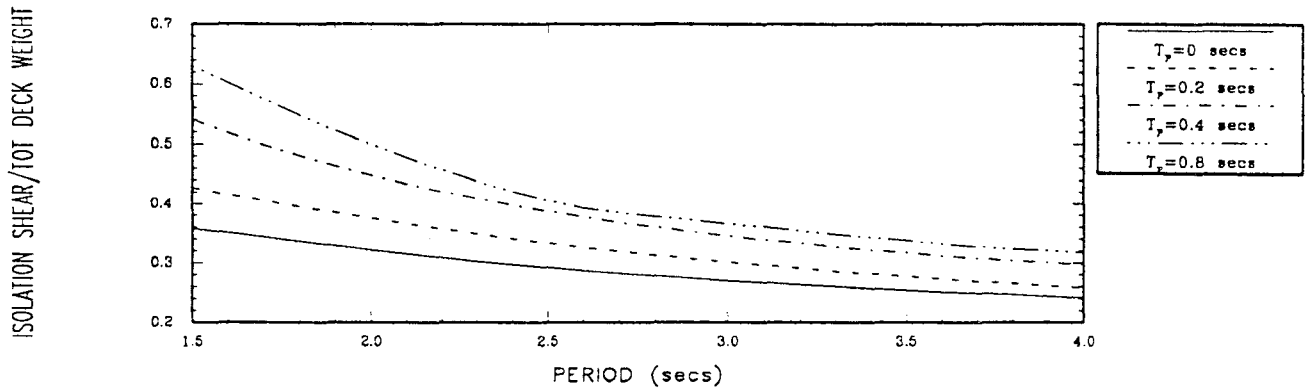
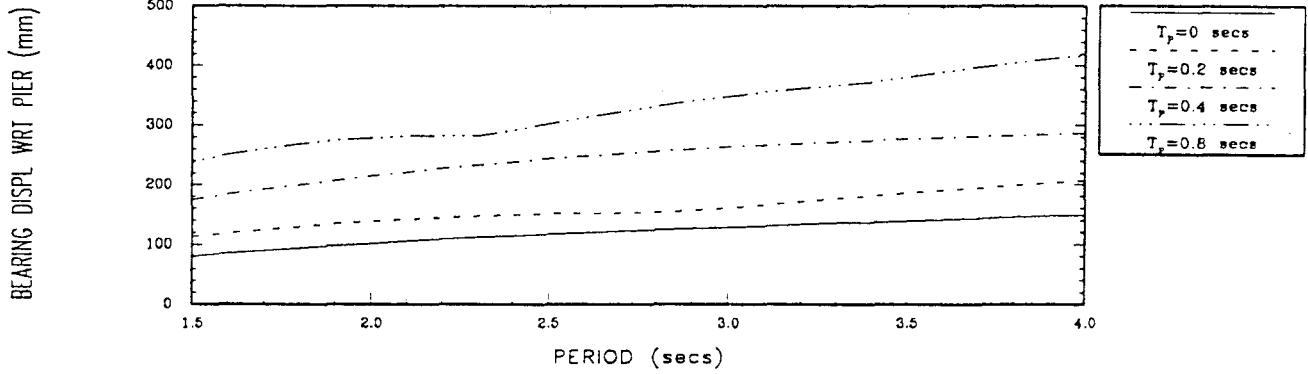
PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi = 0.20, \quad \mu = 0.15$$

$$W_p/W_d = 1/10$$

LEVEL 2 G.C. 3

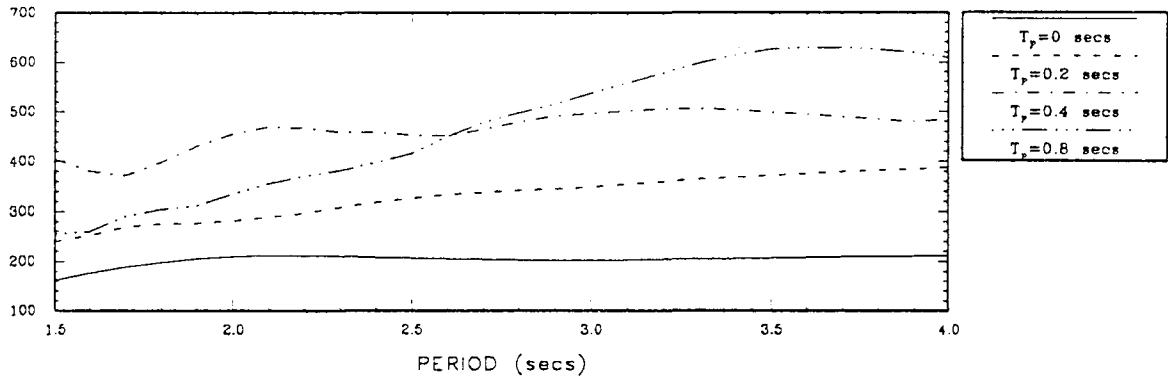


$$\xi = 0.40, \quad \mu = 0.15$$

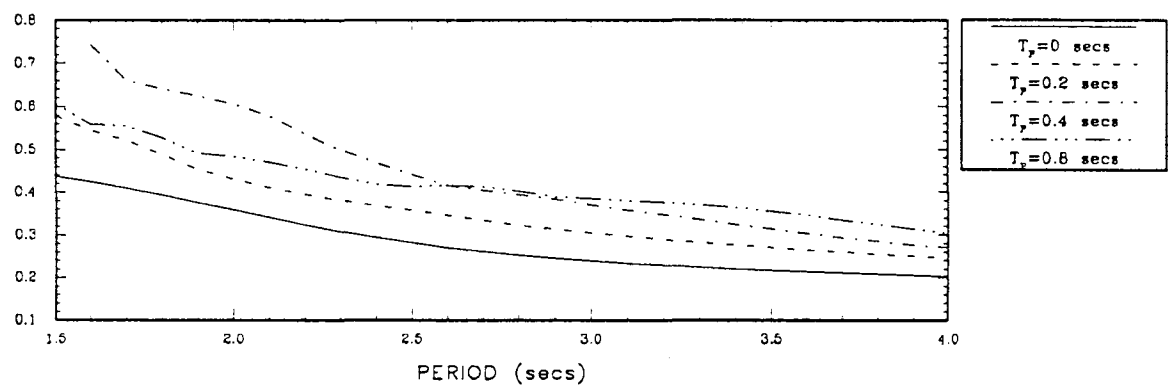
$$W_p/W_d = 1/10$$

LEVEL 2 G.C. 3

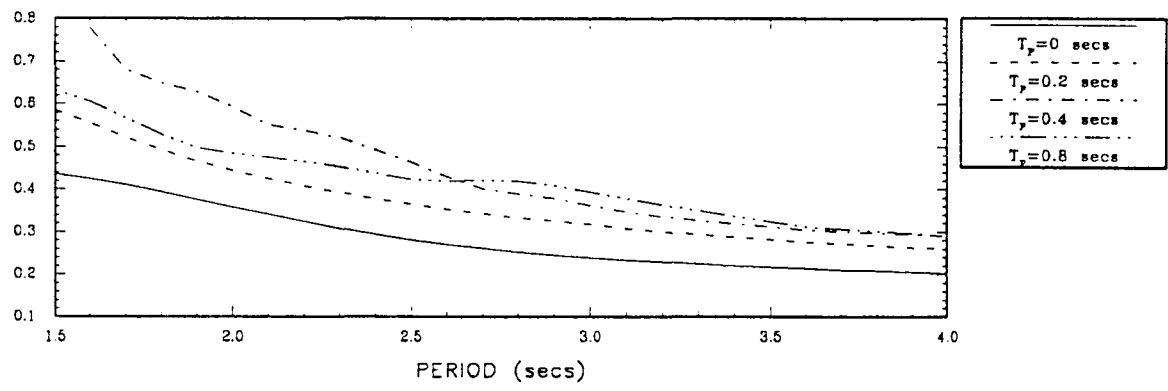
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

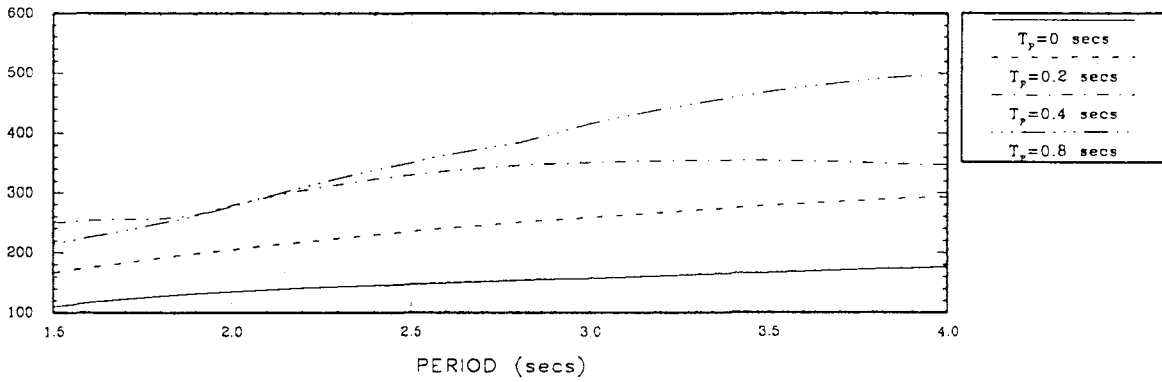


$$\xi=0, \quad \mu=0.15$$

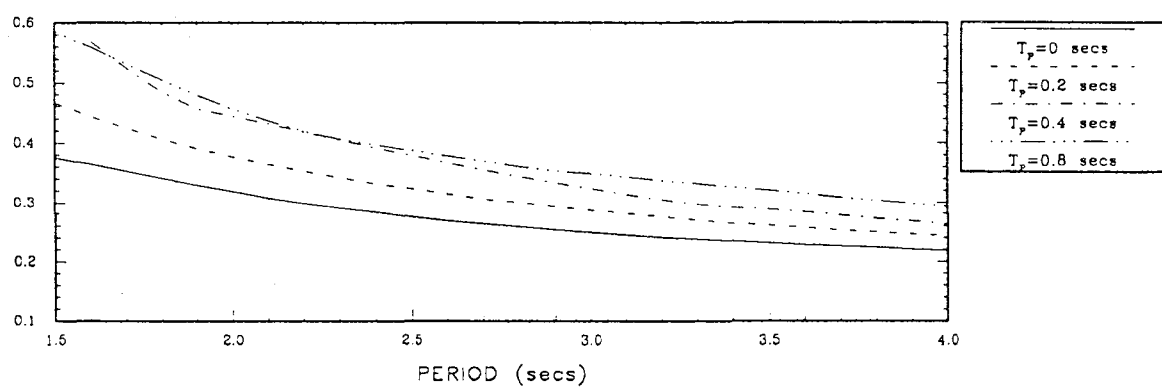
$$W_p/W_d=1/20$$

LEVEL 2 G.C. 3

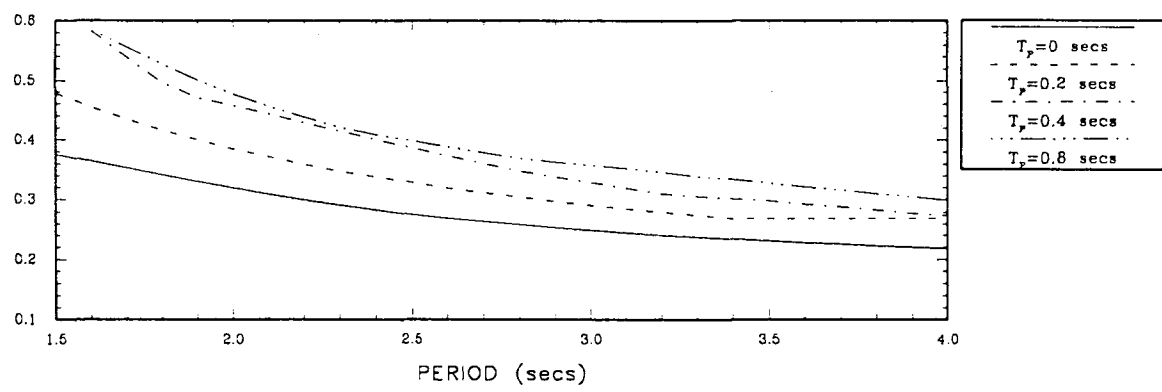
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER

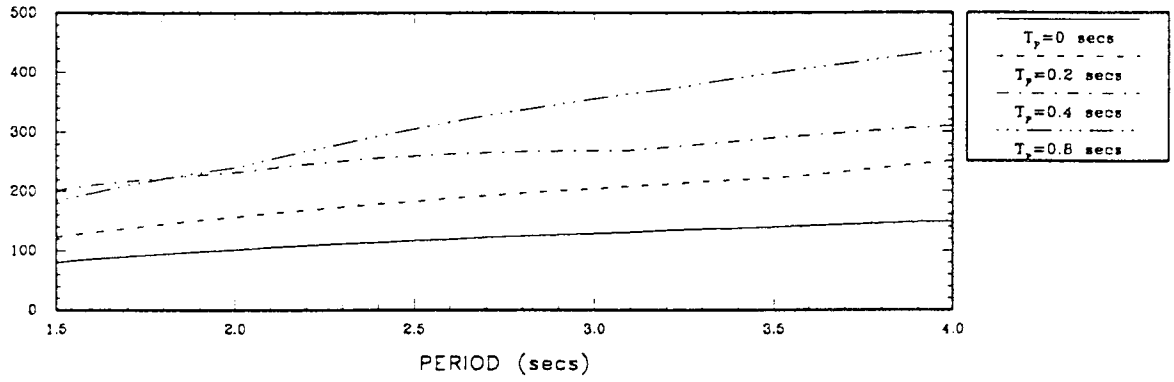


$$\xi=0.20, \quad \mu=0.15$$

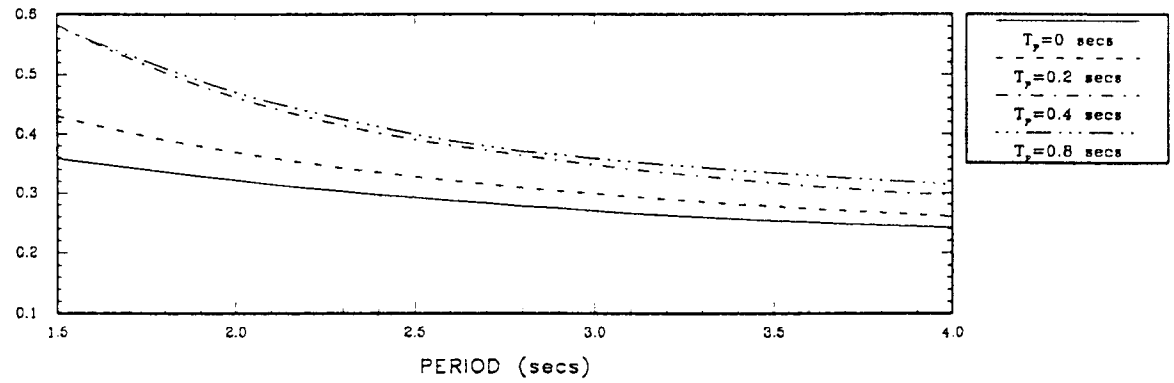
$$W_p/W_d=1/20$$

LEVEL 2 G.C. 3

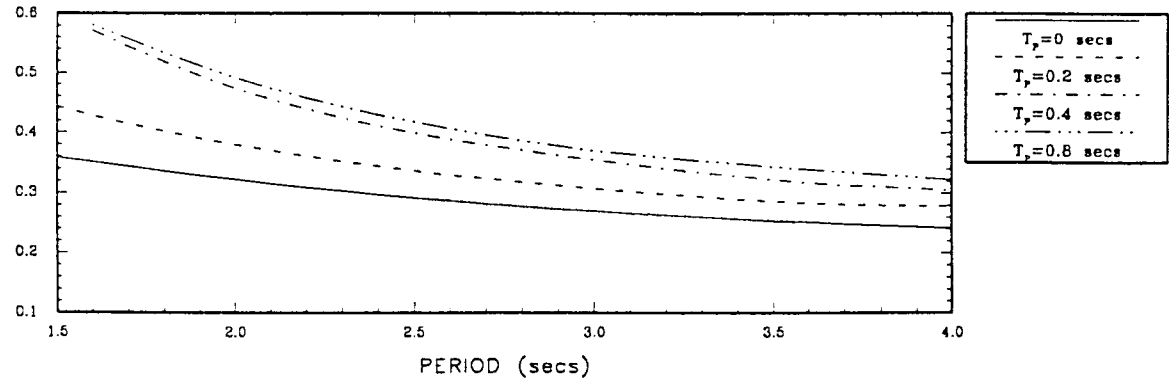
BEARING DISPL WRT PIER (mm)



ISOLATION SHEAR/TOT DECK WEIGHT



PIER SHEAR/DECK WEIGHT CARRIED BY PIER



$$\xi = 0.40, \quad \mu = 0.15$$

$$W_p / W_d = 1/20$$



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