SCHOOL OF

CIVIL ENGINEERING

INDIANA

DEPARTMENT OF TRANSPORTATION

Joint Highway Research Project

Interim Report FHWA/JHRP/IN 92/1

A Sensitivity Analysis of the Parameters for a Cap Plasticity Model

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Wai-Fai Chen
C. William Lovell
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PURDUE UNIVERSITY

Joint Highway Research Project

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Interim Report: "A Sensitivity Analysis of the Parameters for a Cap Plasticity Model"

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the Joint Highway Research Project

in Cooperation with

the Indiana Department of Highways

and the

U.S. Department of Transportation
Federal Highway Administration

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein.

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West Lafayette, Indiana 47907

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TABLE 1. SUMMARY OF SENSITIVITY ANALYSIS OF THE CAP PLASTICITY MODEL PARAMETERS

PARAMETER / CASE	ν	C_c	C_r	β	ϕ	*USR*	*OCR*
1A 1B 1C	0.15 0.30 0.45	0.162	0.044	10	24	0.22	1.49
2A 2B 2C	0.45	0.107 0.162 0.240	0.044	10	24	0.22	1.49
3A 3B 3C	0.45	0.162	0.029 0.044 0.066	10	24	0.22	1.49
4A 4B 4C	0.45	0.162	0.044	1 5 10	24	0.22	1.49
5A 5B 5C	0.45	0.162	0.044	10	19 24 30	0.22	1.49
6A 6B 6C	0.45	0.162	0.044	10	24	0.22 0.31 0.43	1.49
7A 7B 7C	0.45	0.162	0.044	10	24	0.22	1.0 1.49 2.25

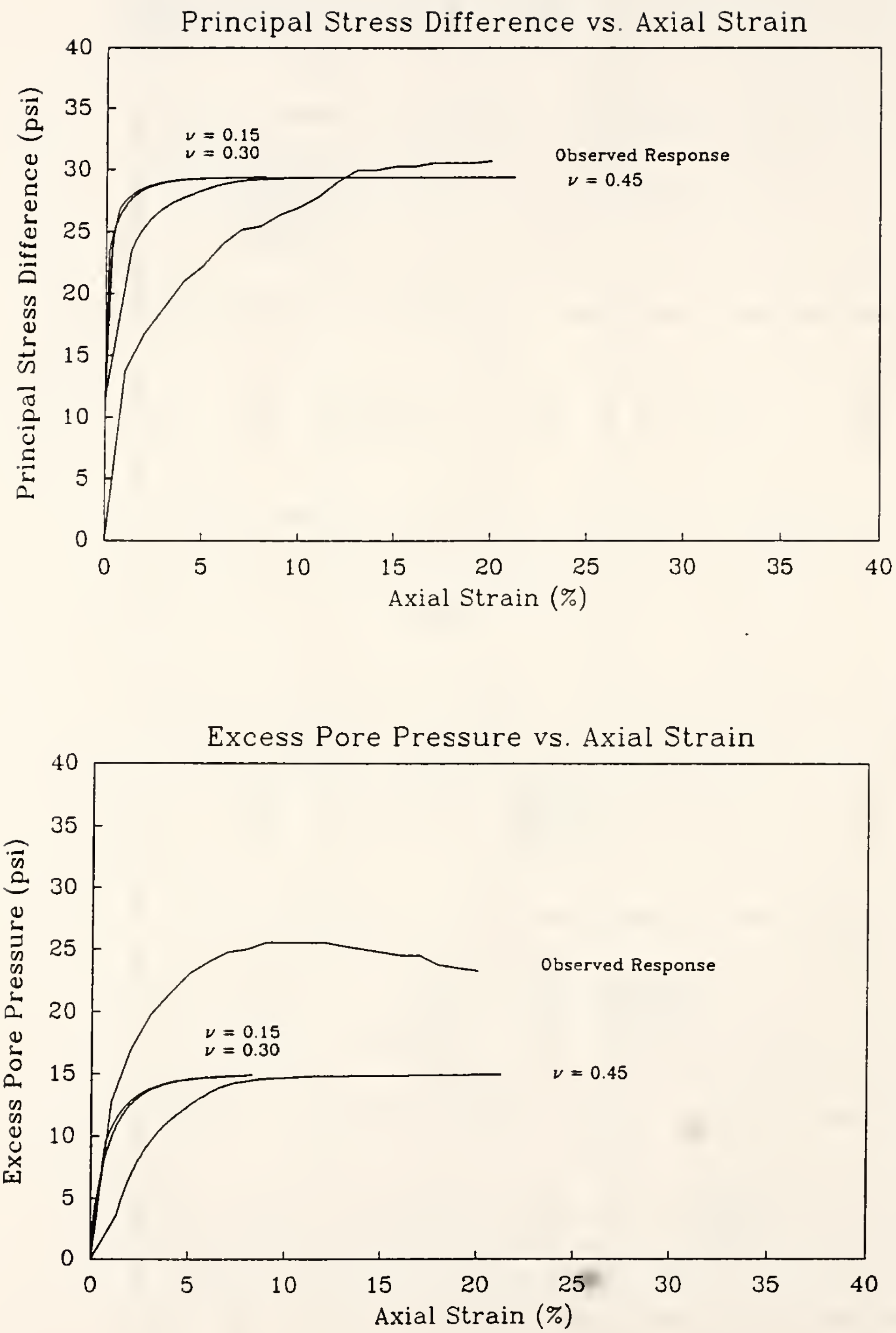


Figure A.1.1 - Effect of Poisson's Ratio on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

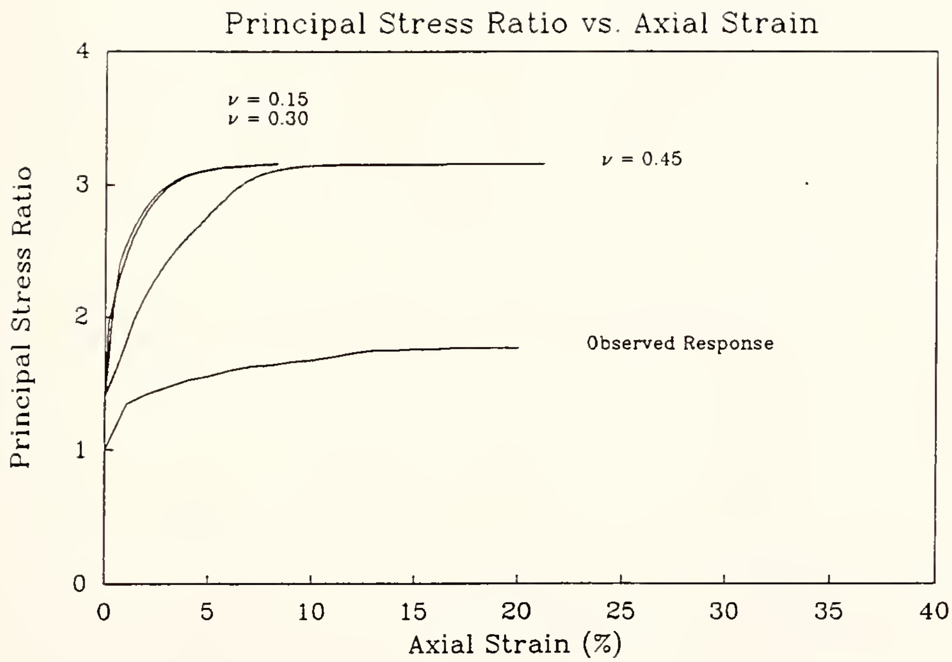
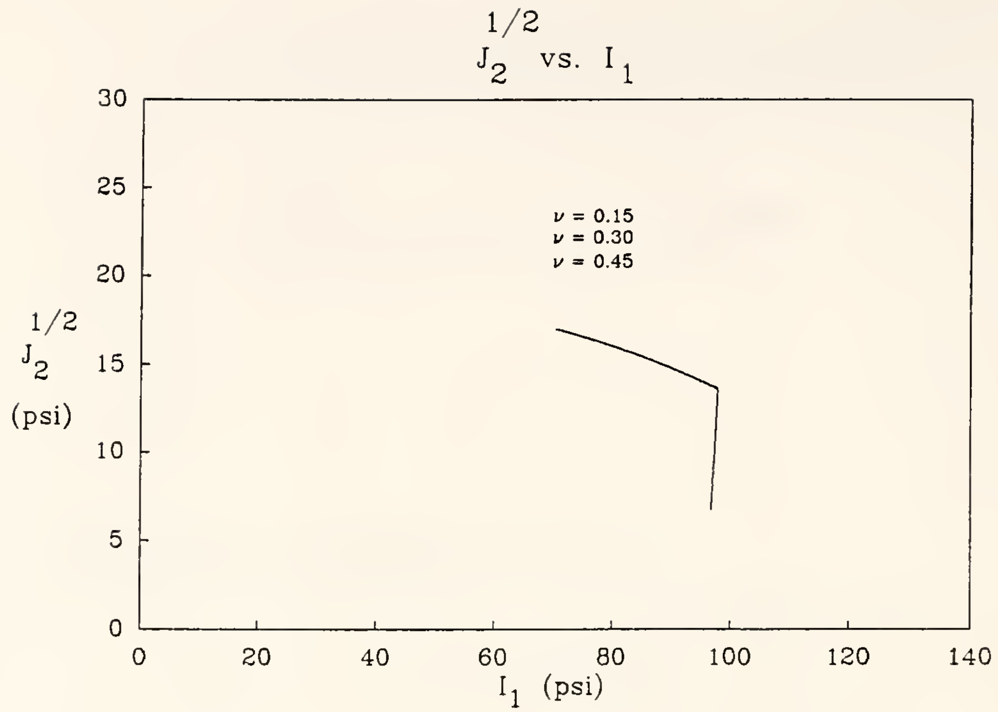
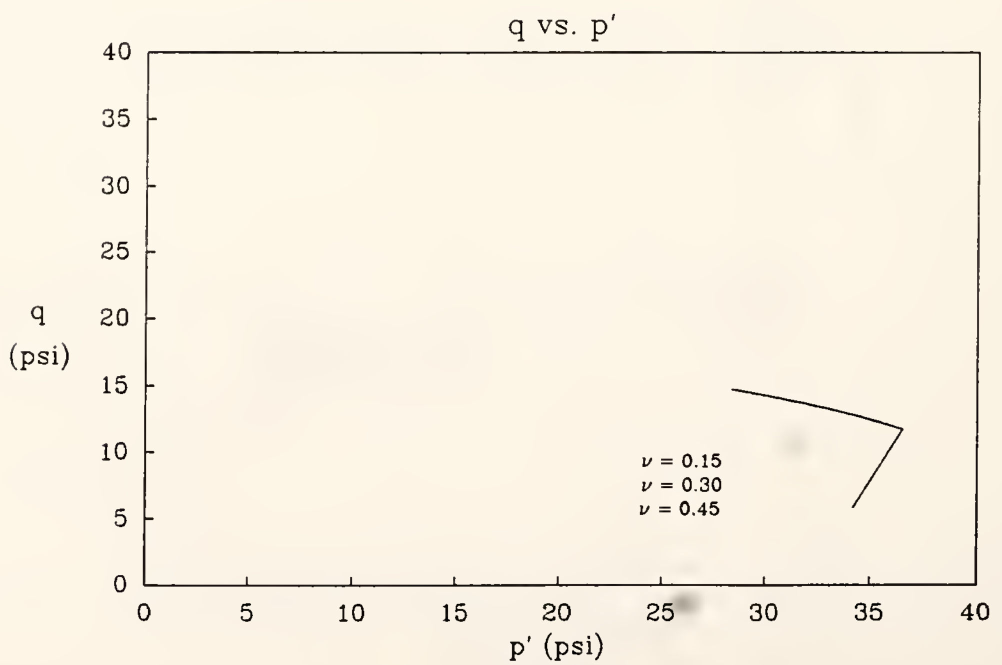


Figure A.1.2 - Effect of Poisson's Ratio on the Principal Stress Ratio vs. Axial Strain





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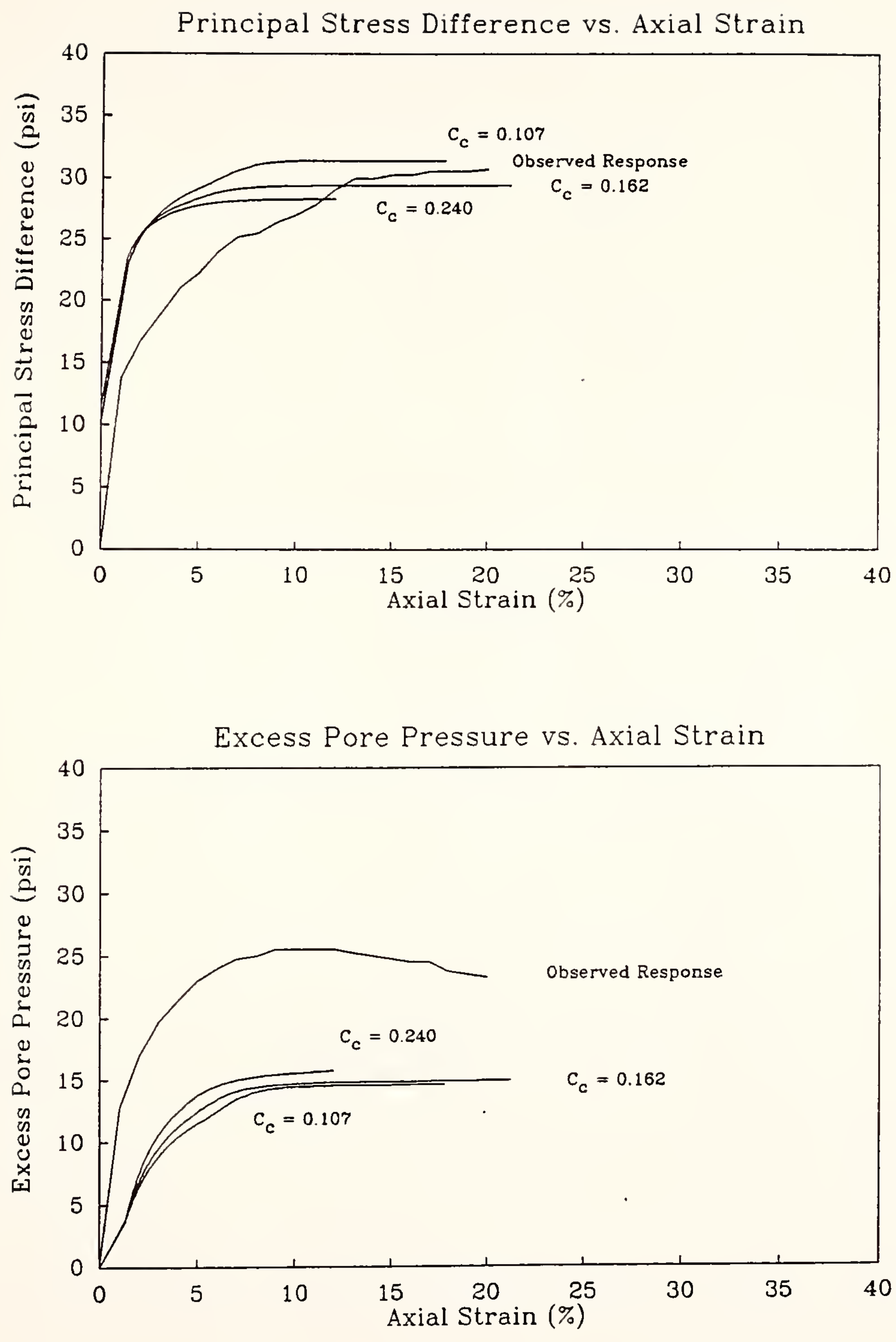
A.2 - Case 2



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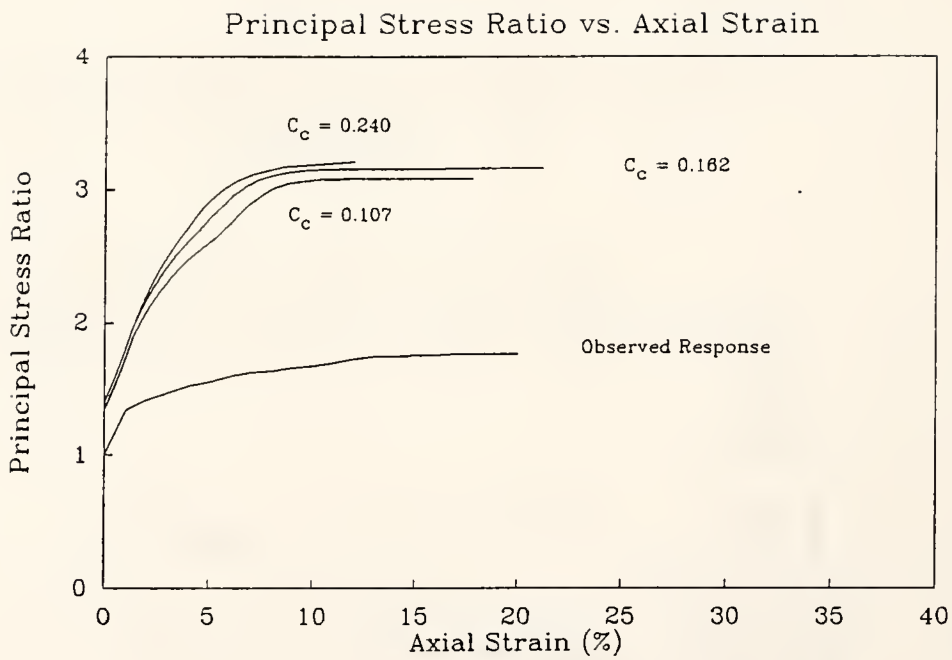
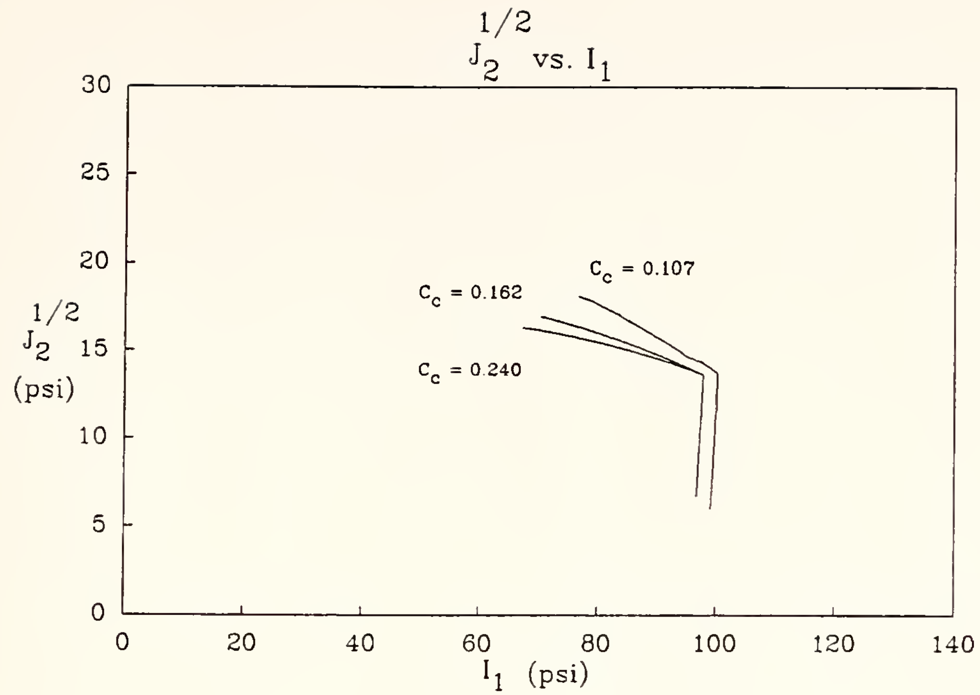
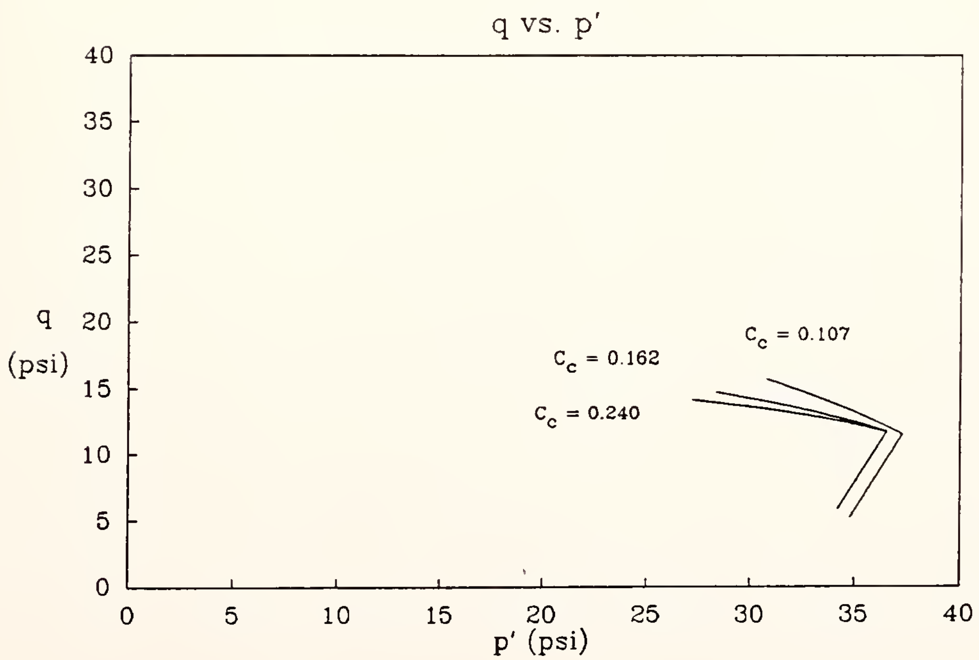


Figure A.2.2 - Effect of the Compression Index on the Principal Stress Ratio vs. Axial Strain





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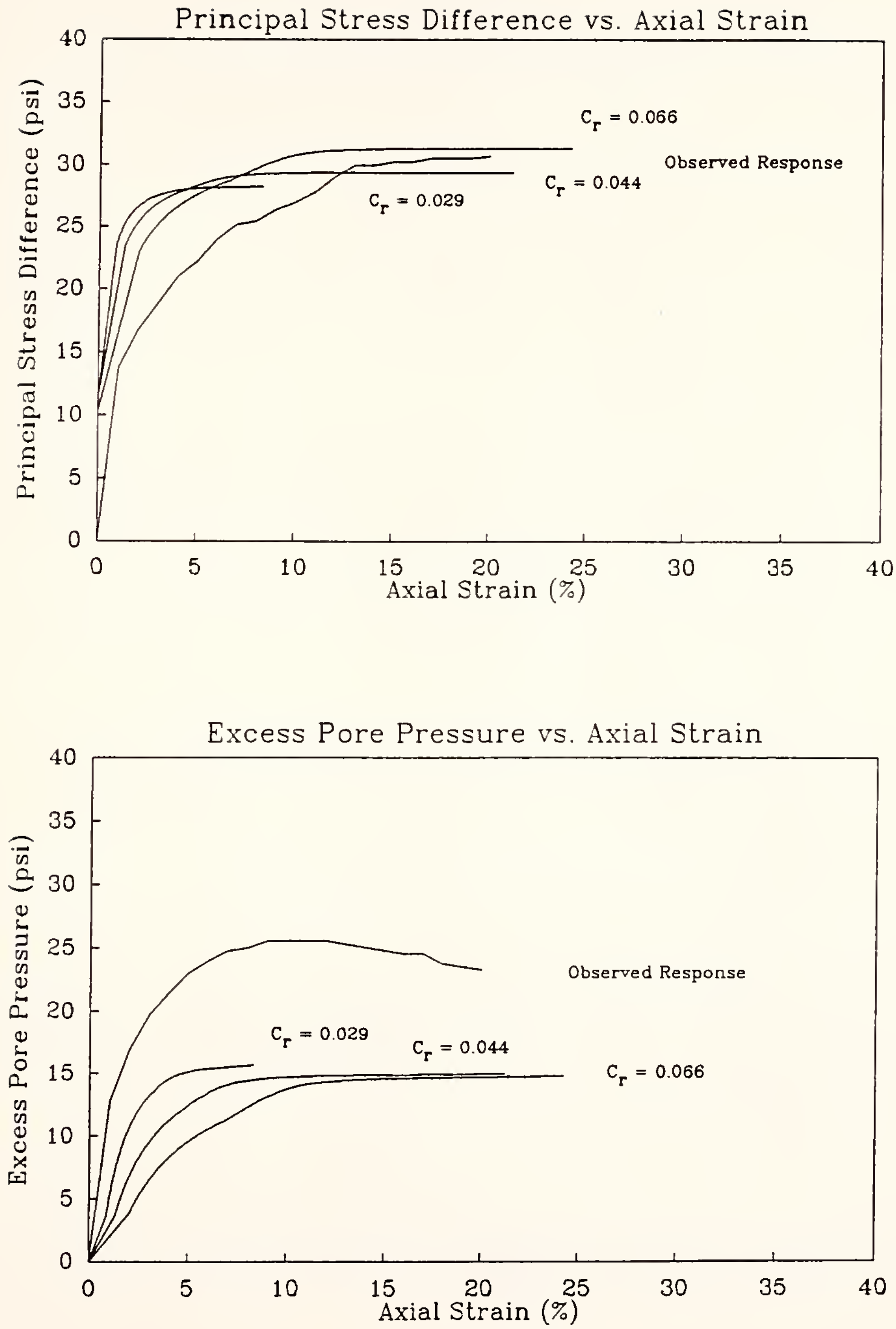

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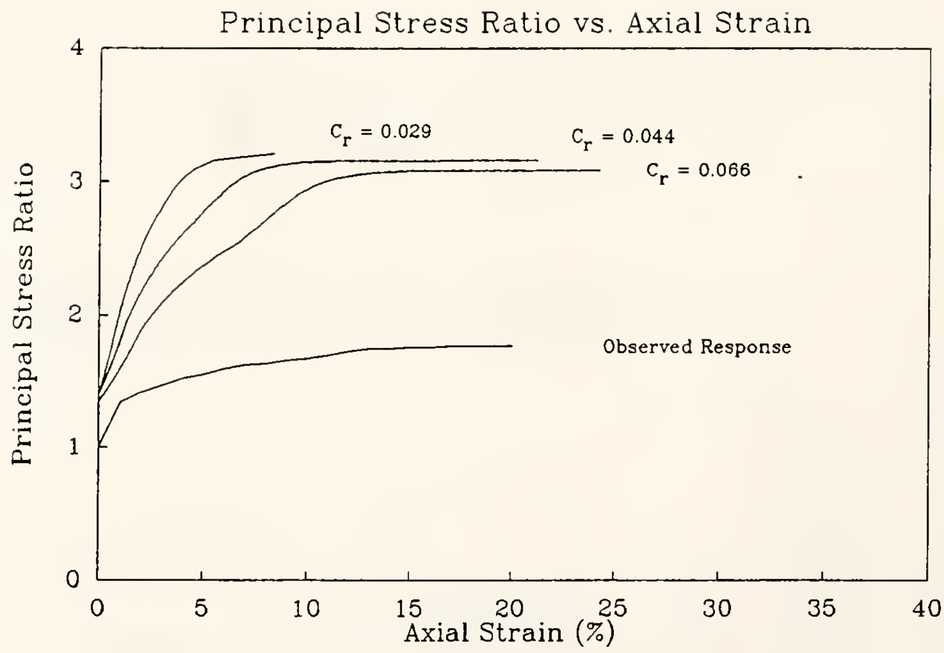

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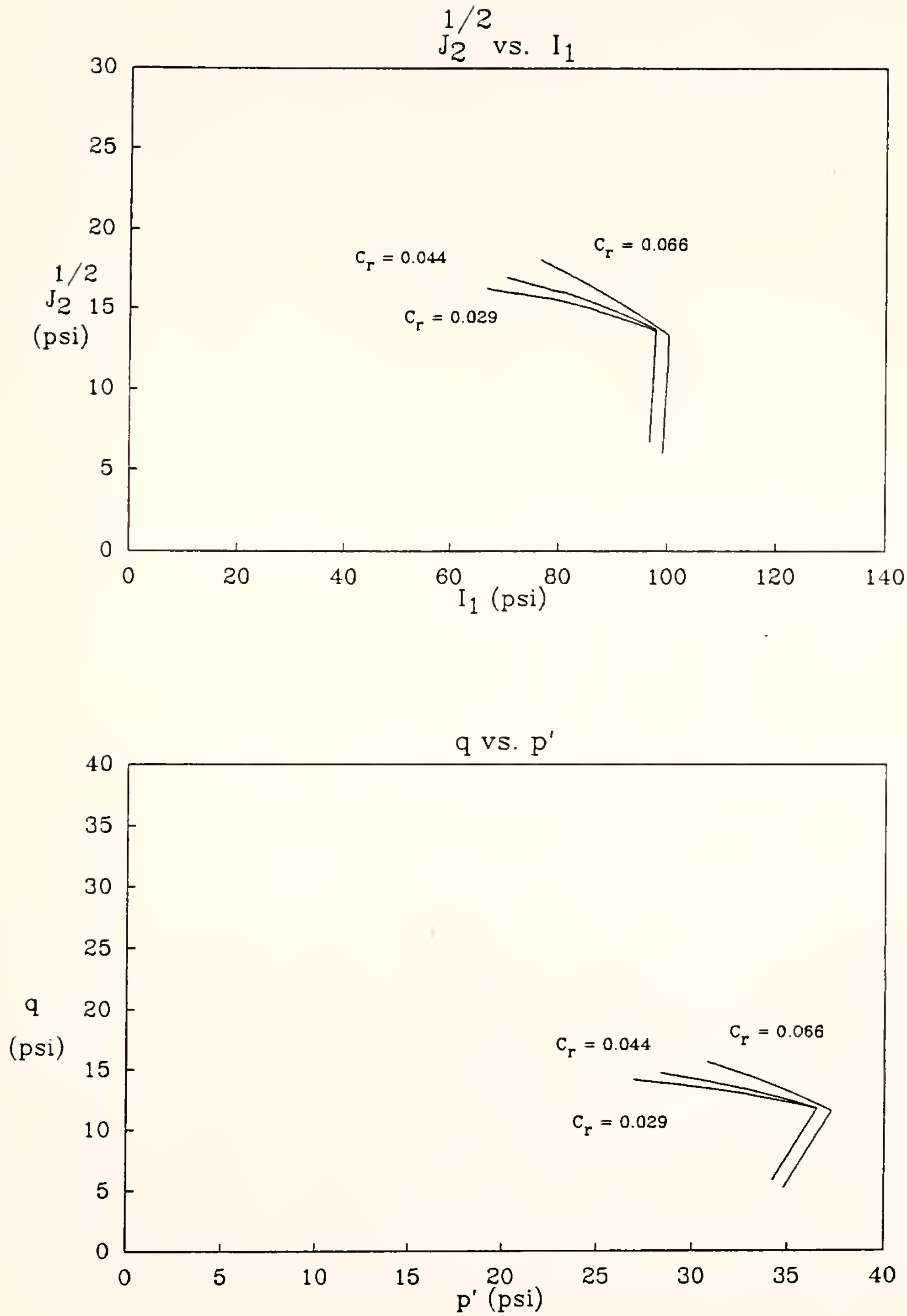

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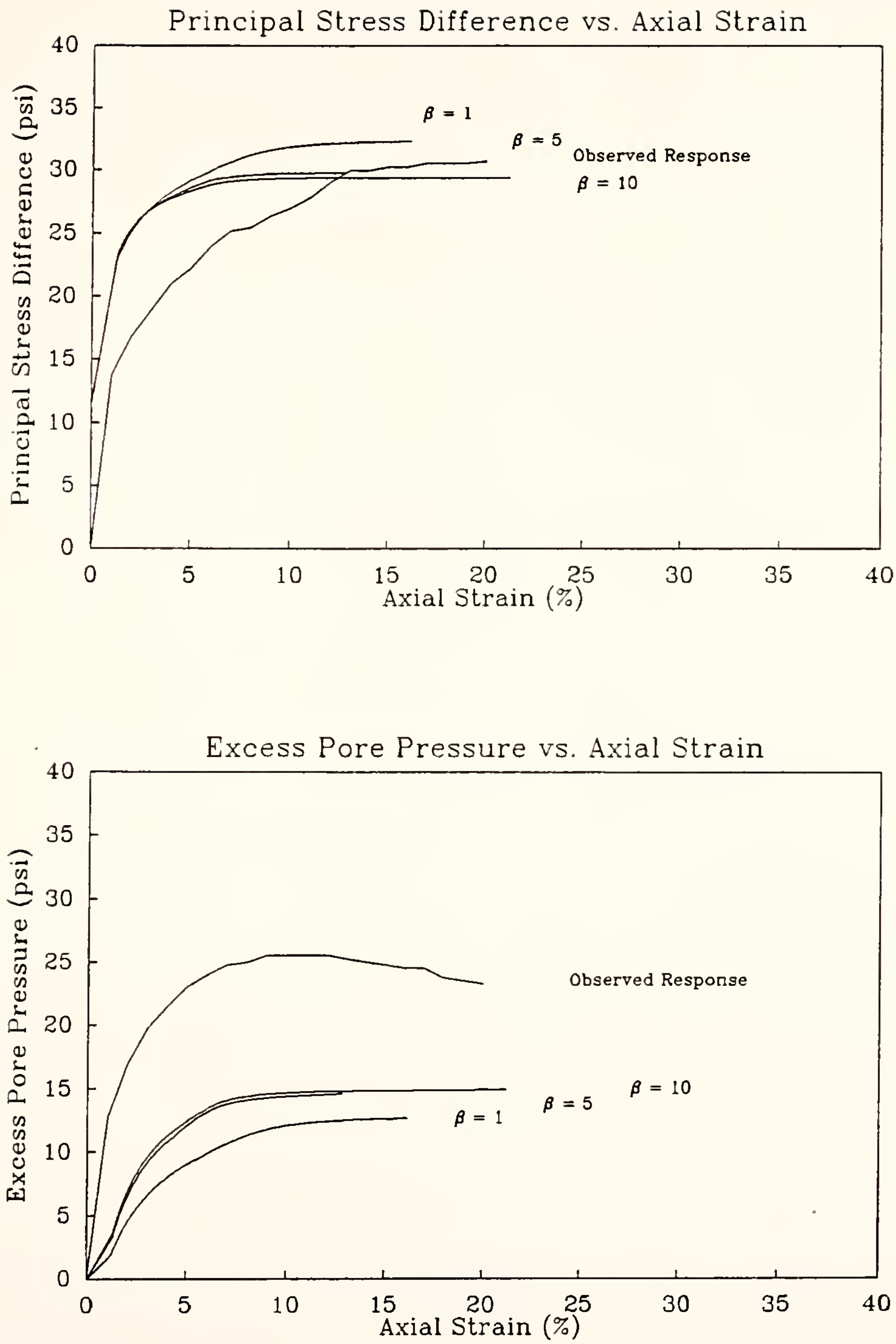

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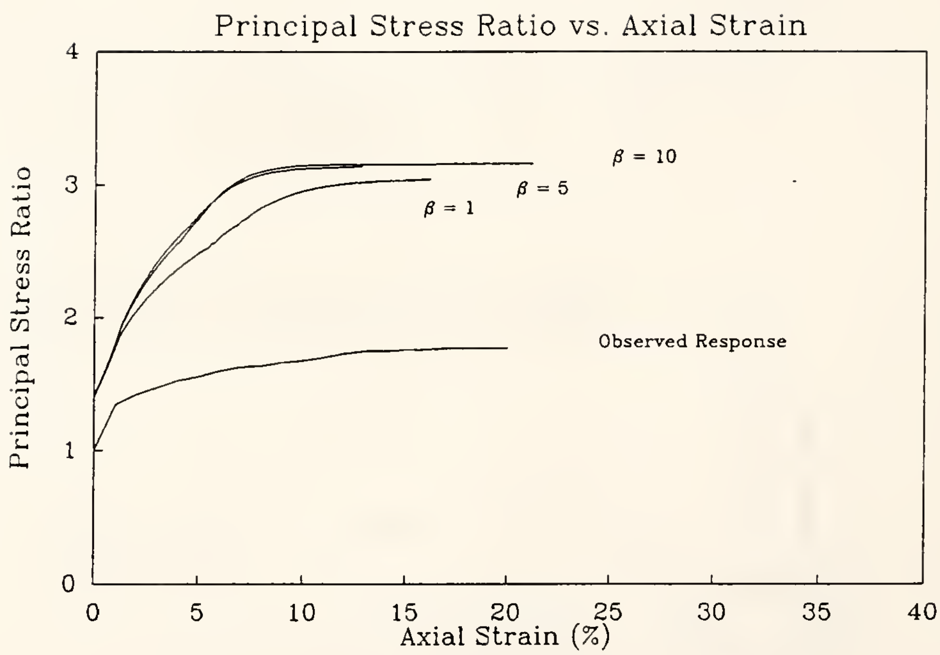
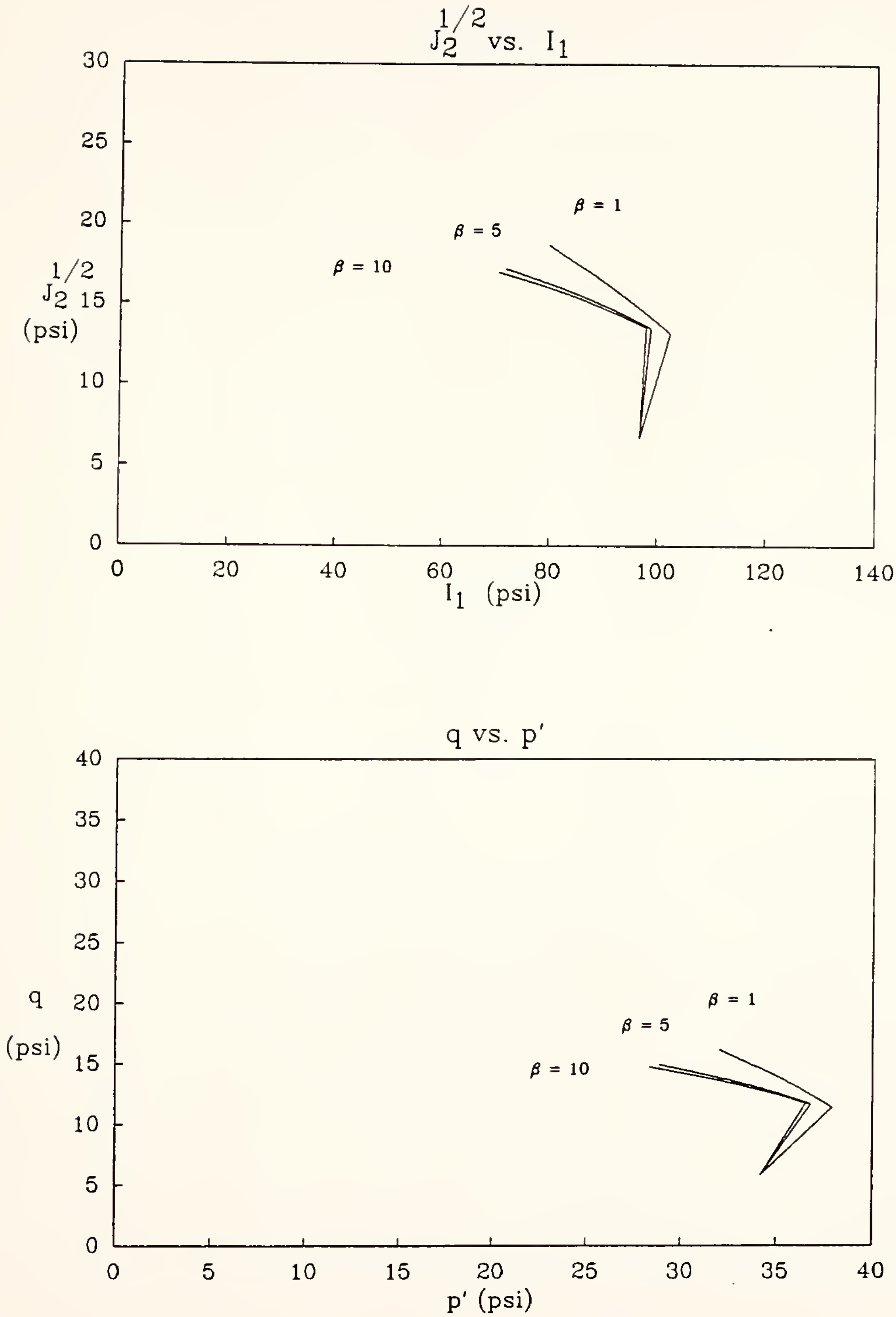


Figure A.4.2 - Effect of the Pore Pressure Response Factor on the Principal Stress Ratio vs. Axial Strain



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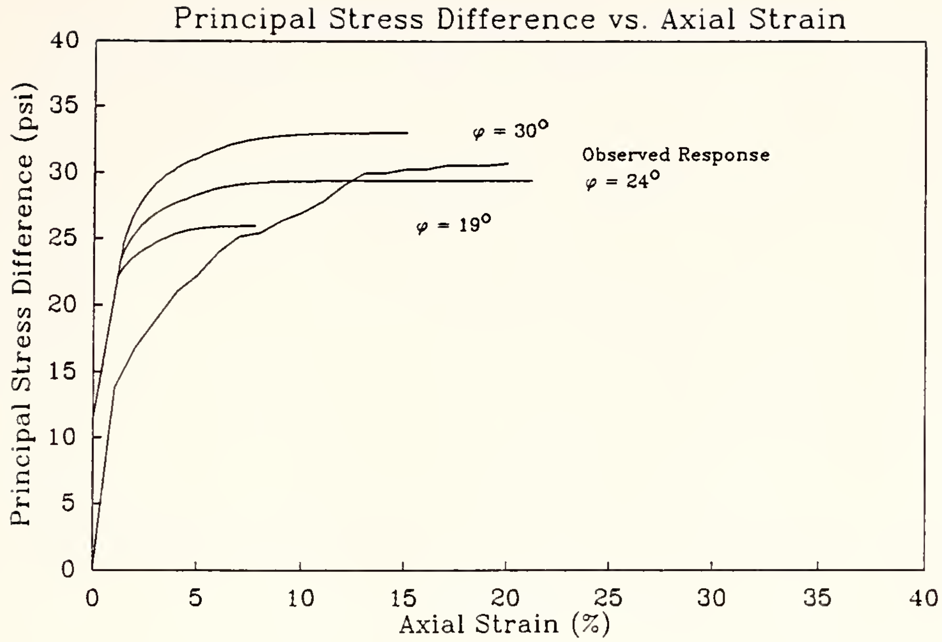
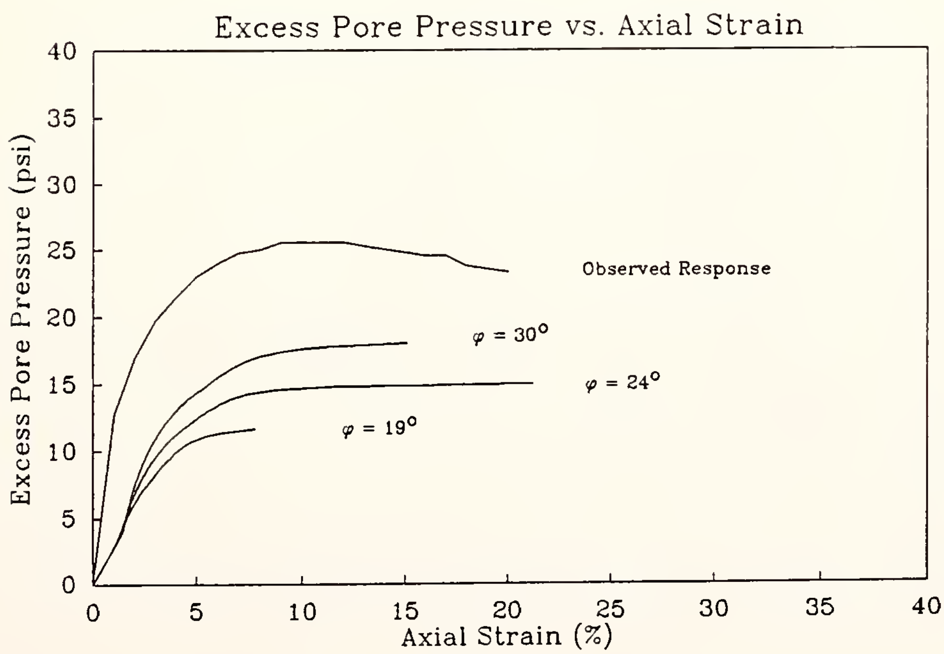
A.5 - Case 5





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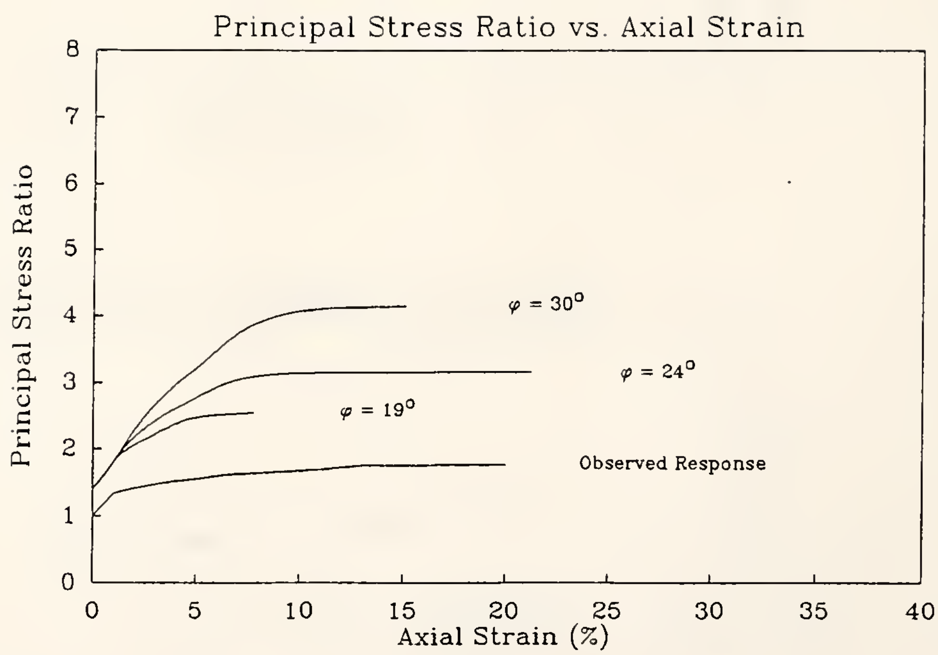

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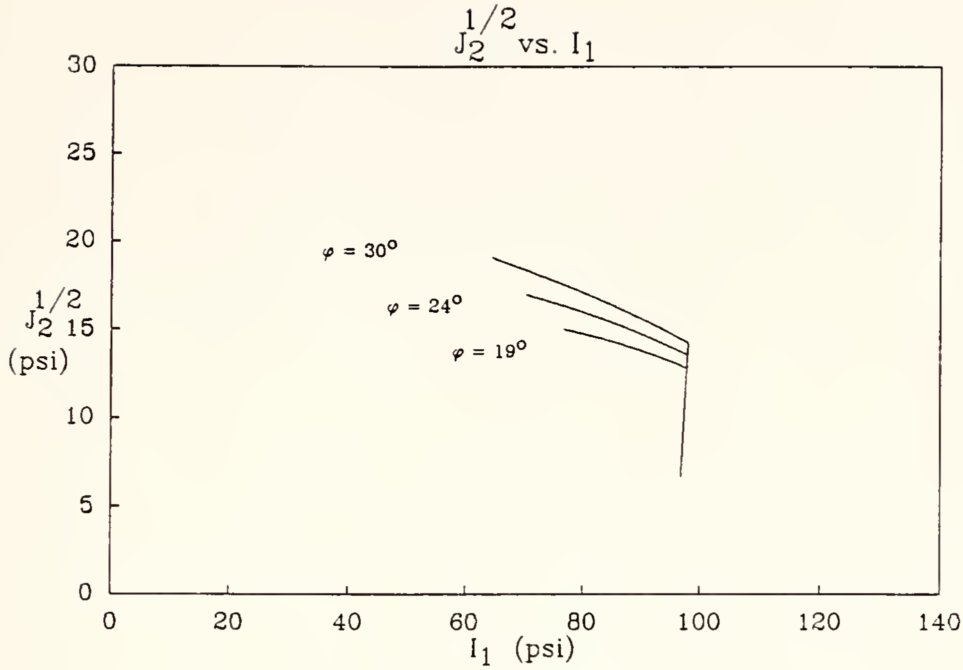

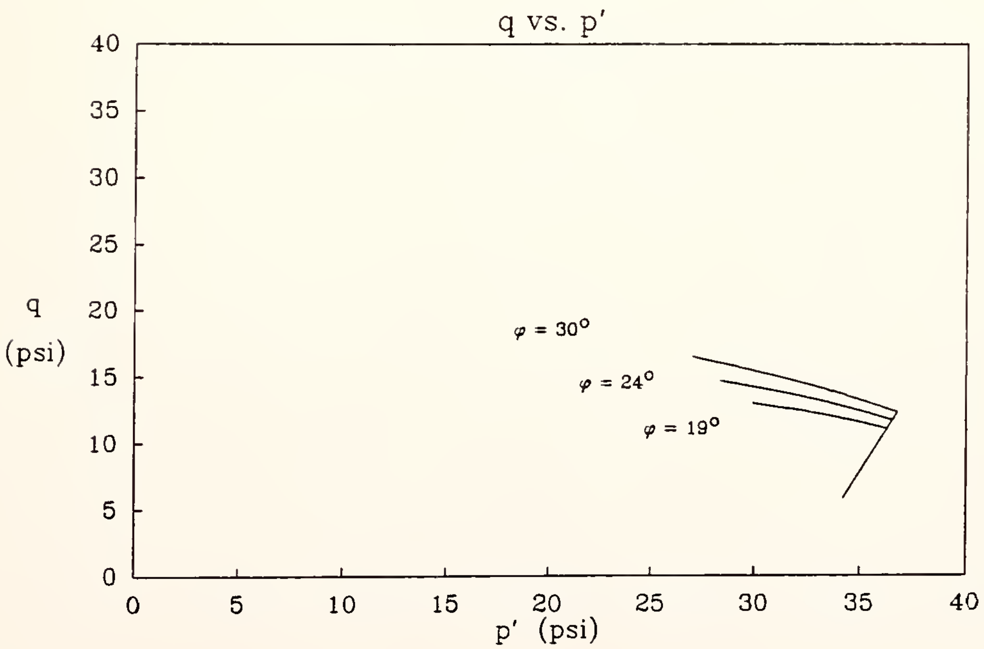

Figure A.5.3 - Effect of the Angle of Internal Friction on location of the Cap in the $J_2^{1/2}$-I_1 Space and on the q-p' Diagram

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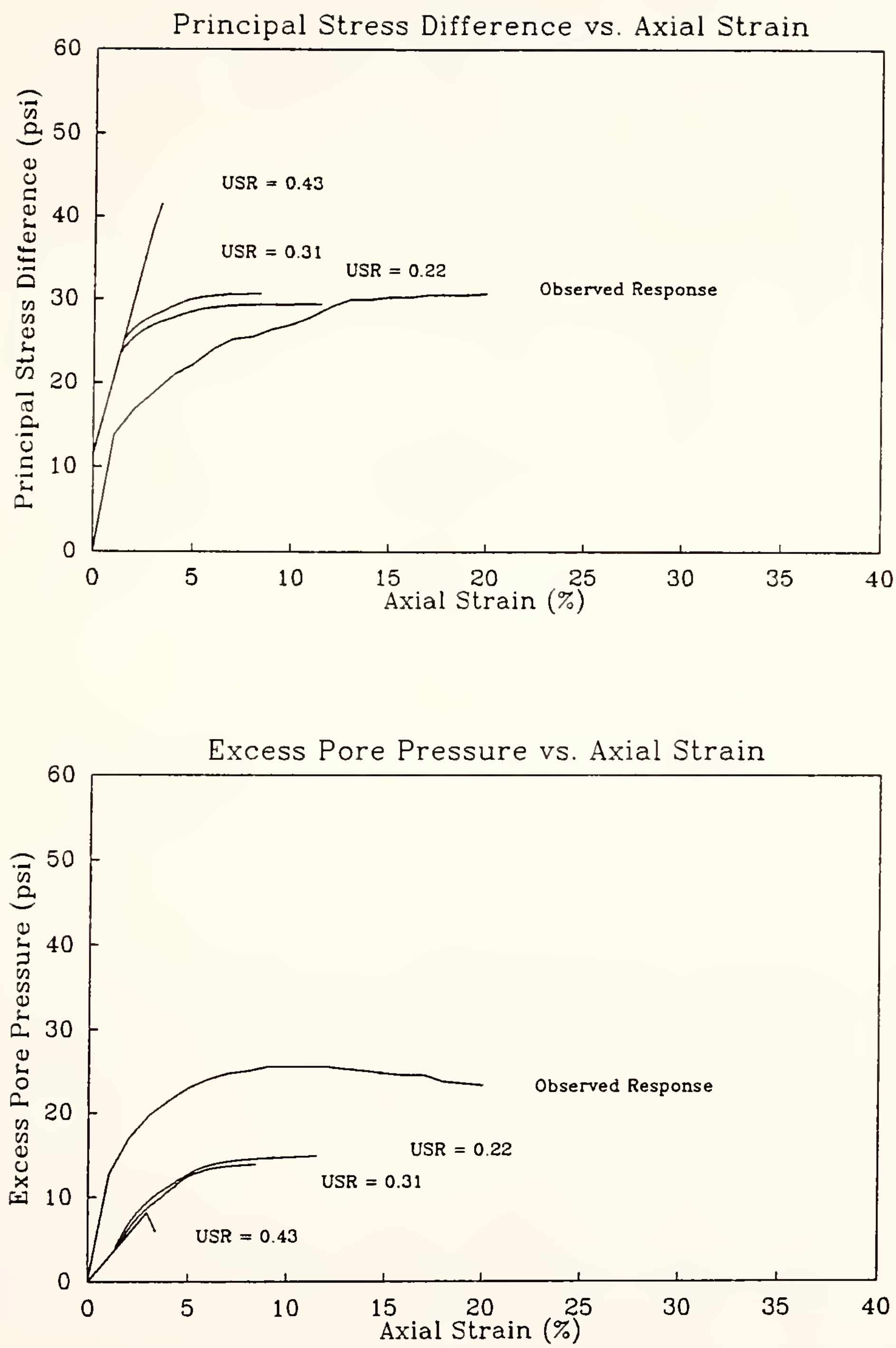


Figure A.6.1 - Effect of the Undrained Shear Strength Ratio on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

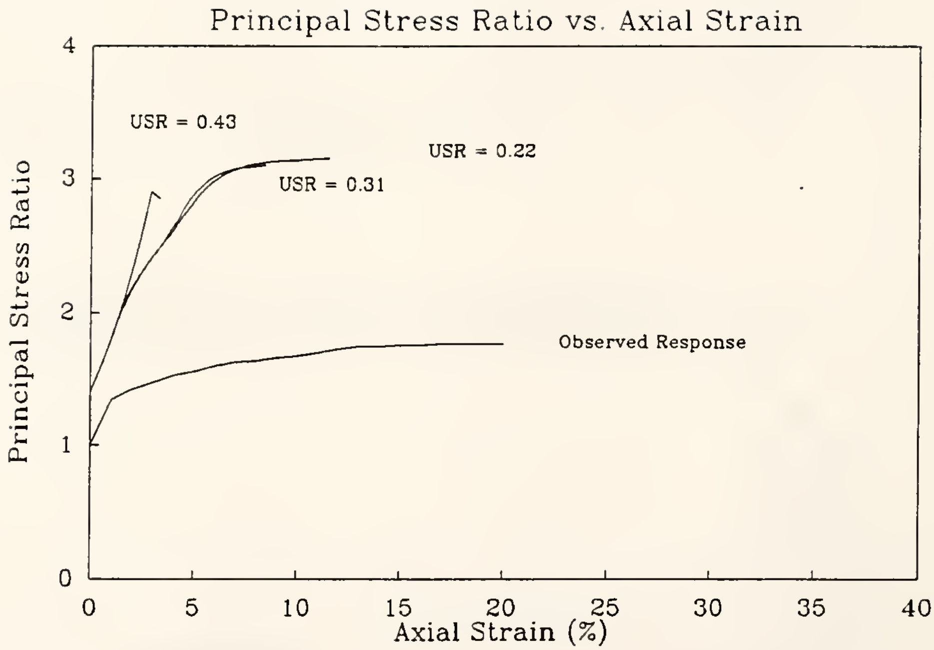


Figure A.6.2 - Effect of the Undrained Shear Strength Ratio on the Principal Stress Ratio vs. Axial Strain

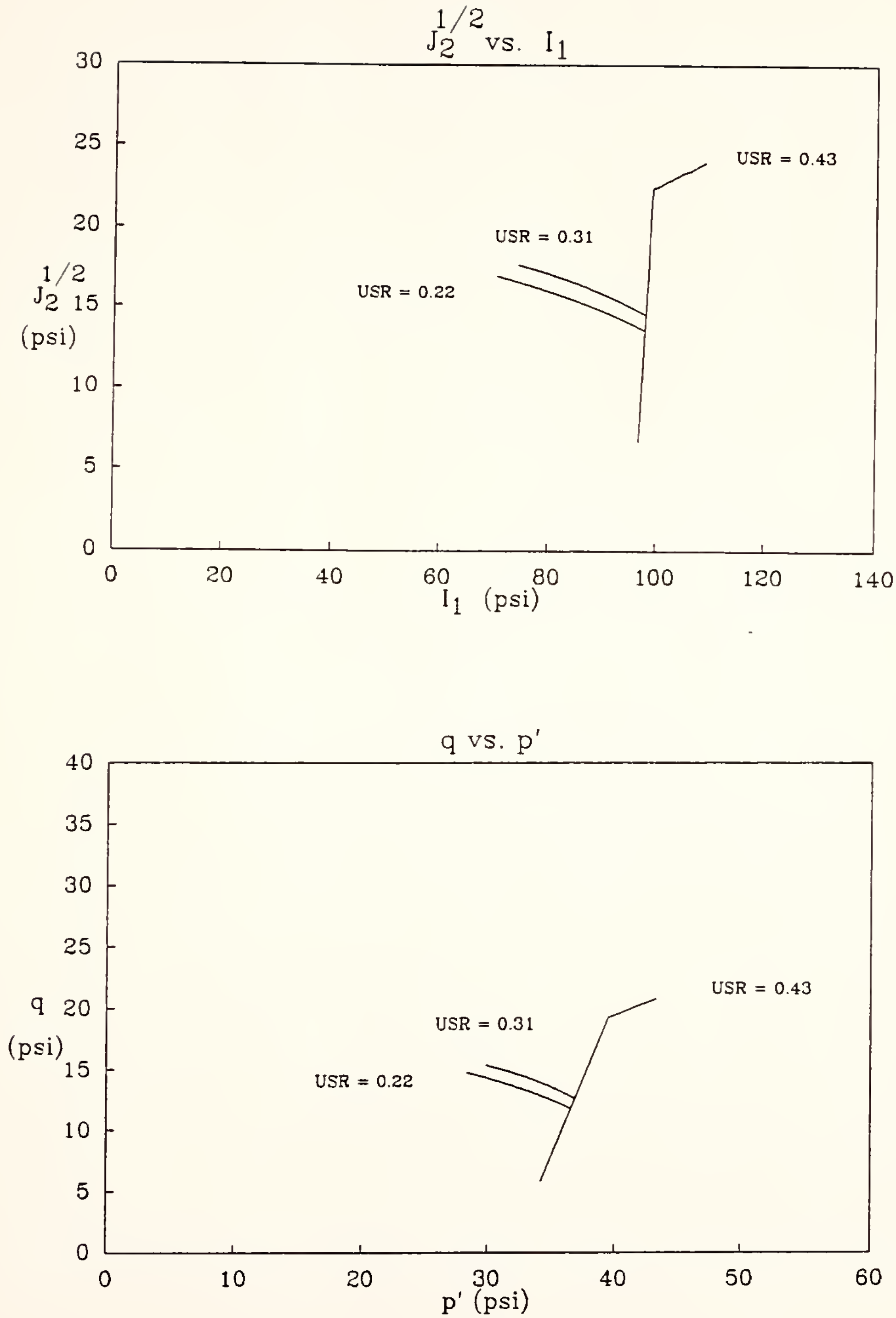
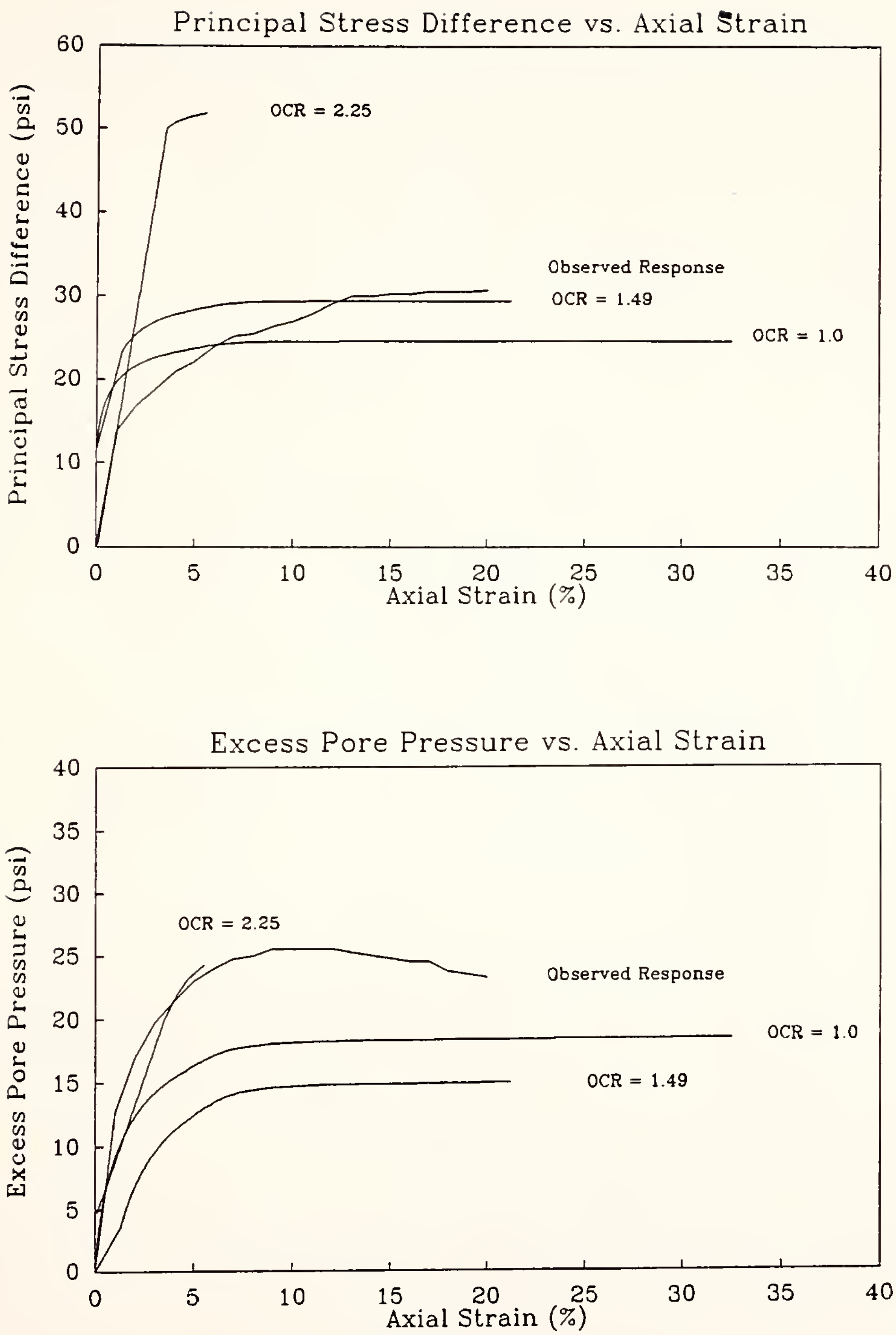


Figure A.6.3 - Effect of the Undrained Shear Strength Ratio on location of the Cap in the $J_2^{1/2}-I_1$ Space and on the q-p' Diagram

A.7 - Case 7



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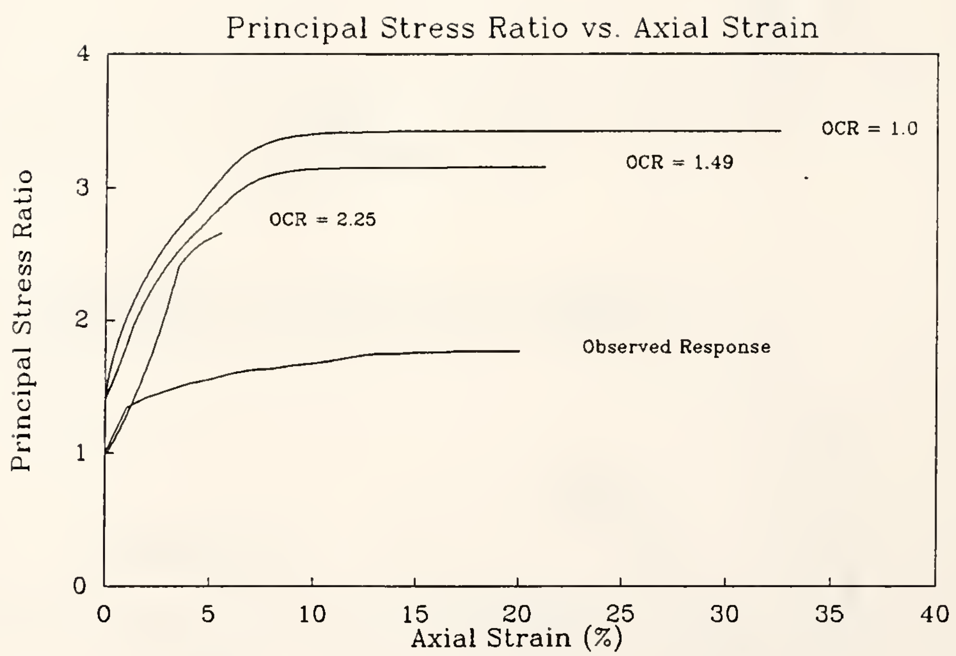

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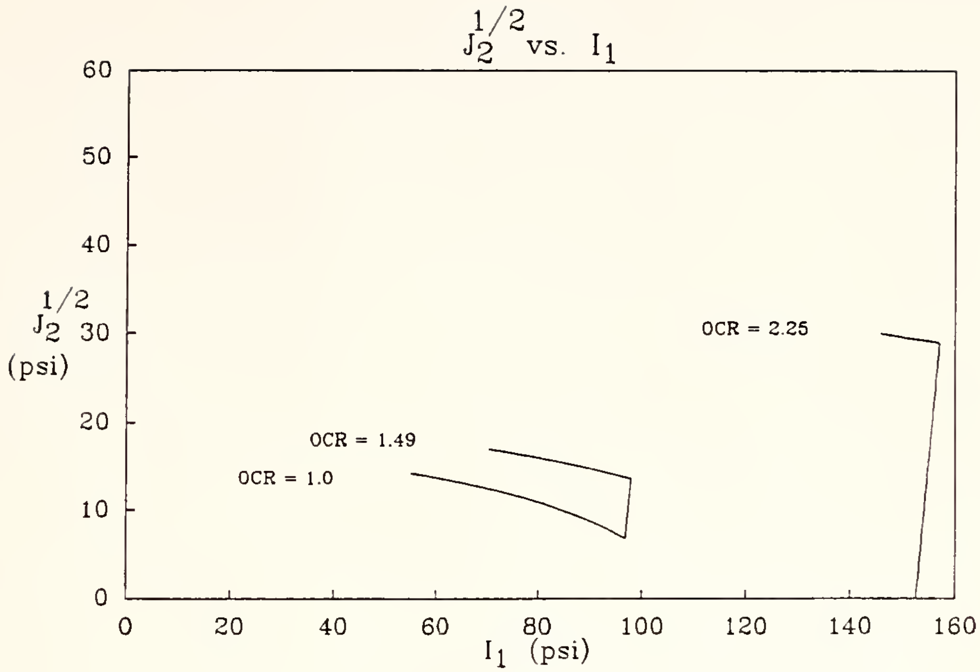

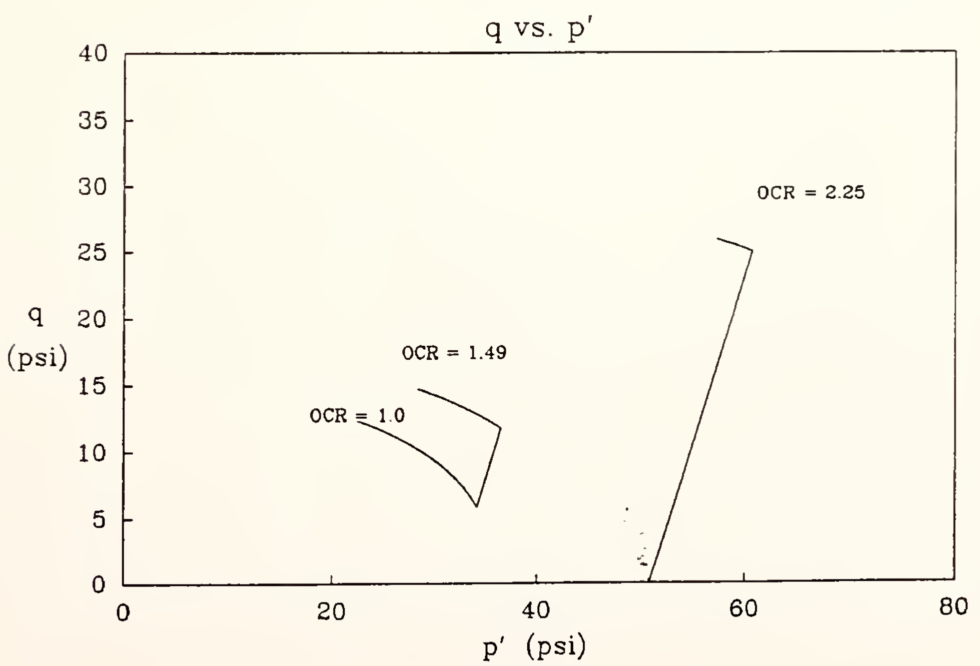

Figure A.7.3 - Effect of the Over-consolidation Ratio on location of the Cap in the $J_2^{1/2}$-I_1 Space and on the q-p' Diagram

APPENDIX B

Computer disk with input data files

APPENDIX C

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