

SCHOOL OF
CIVIL ENGINEERING

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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



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

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Joint Highway Research Project
HPR 2031

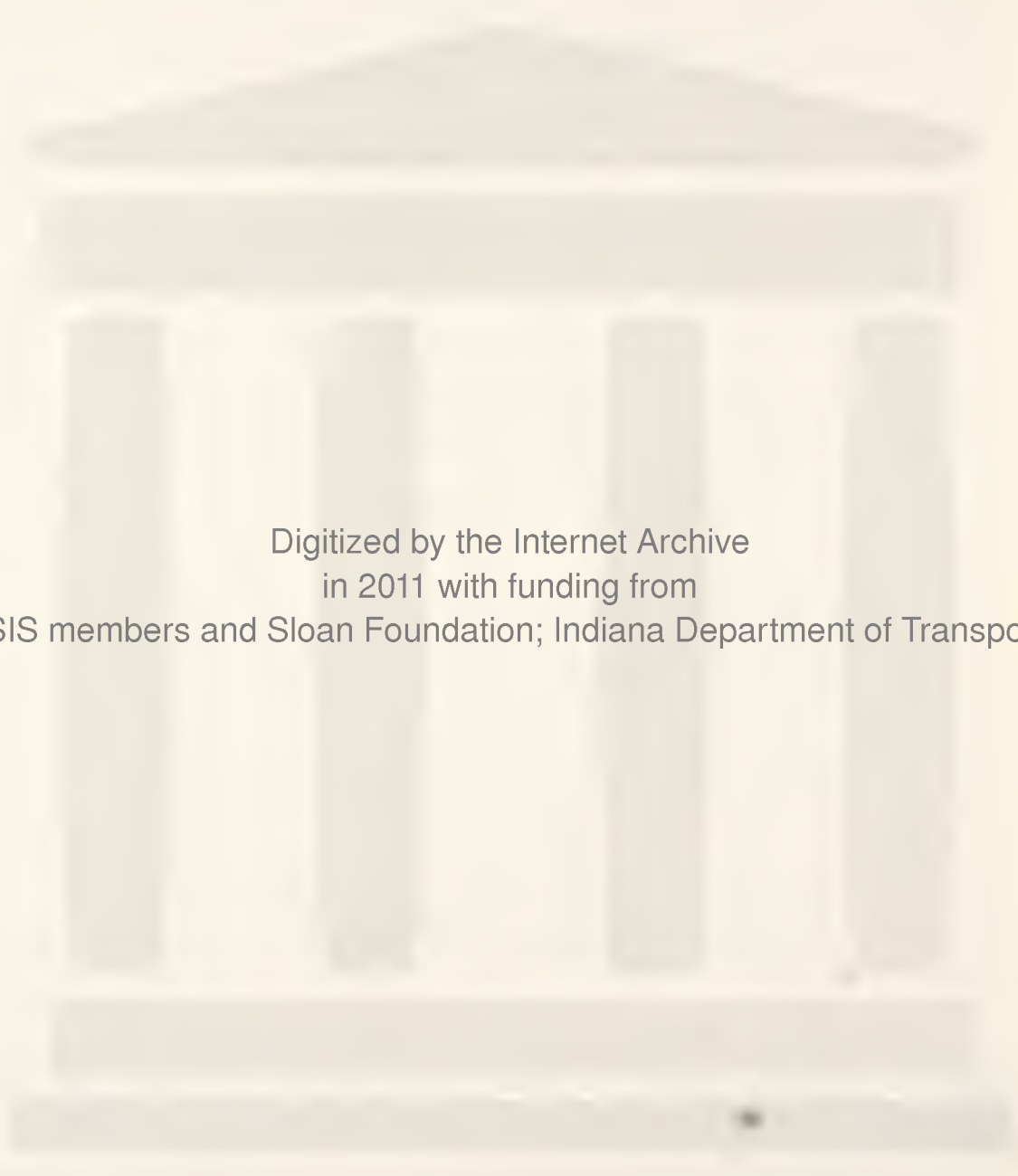
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This study is proposed to be conducted by
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in Cooperation with
the Indiana Department of Highways
and the
U.S. Department of Transportation
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The 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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APPENDIX A

A.1 - Case 1

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

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

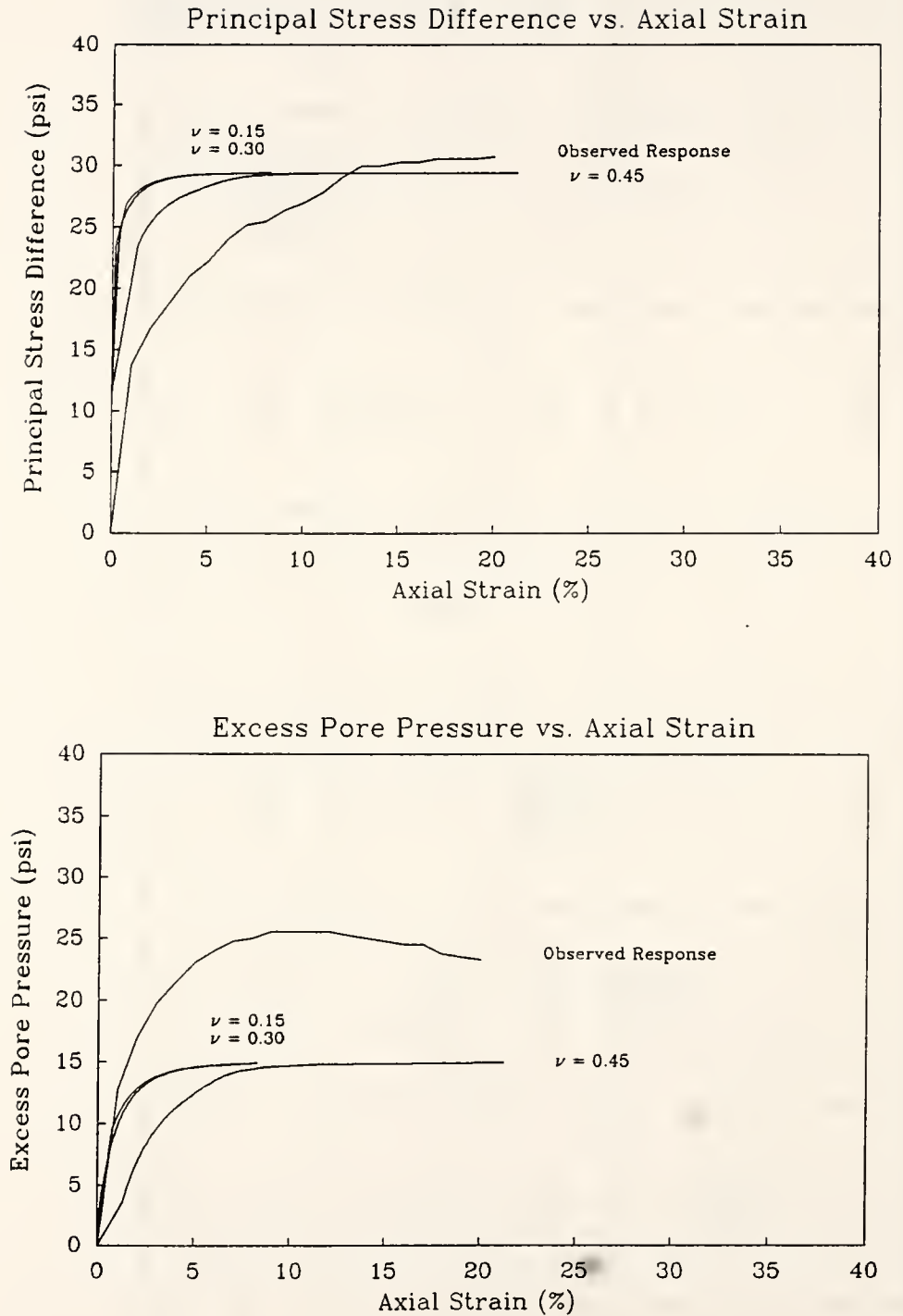


Figure A.1.1 - Effect of Poisson's Ratio on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

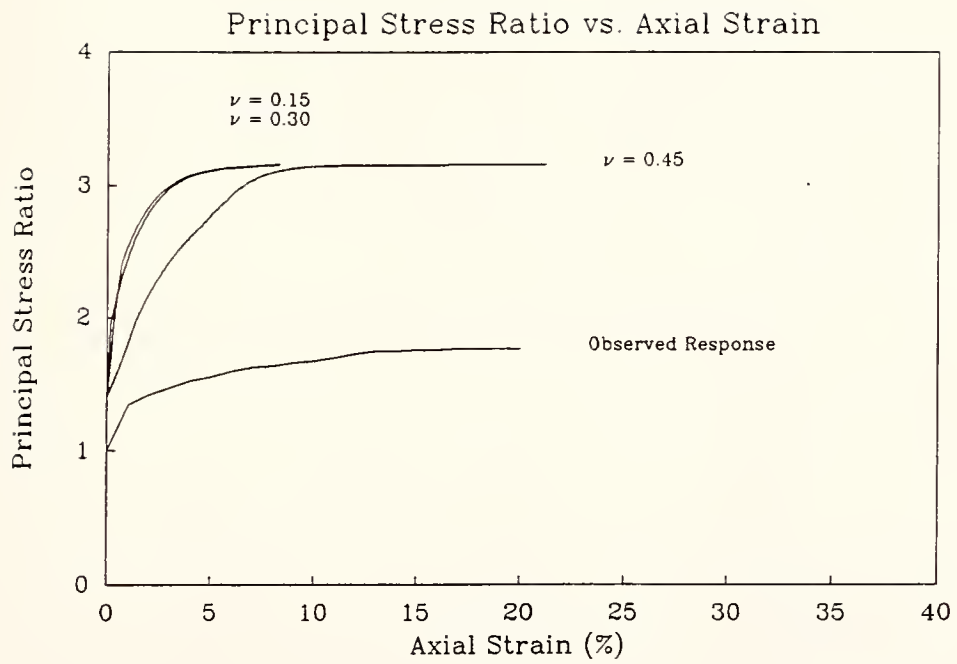


Figure A.1.2 - Effect of Poisson's Ratio on the Principal Stress Ratio vs. Axial Strain

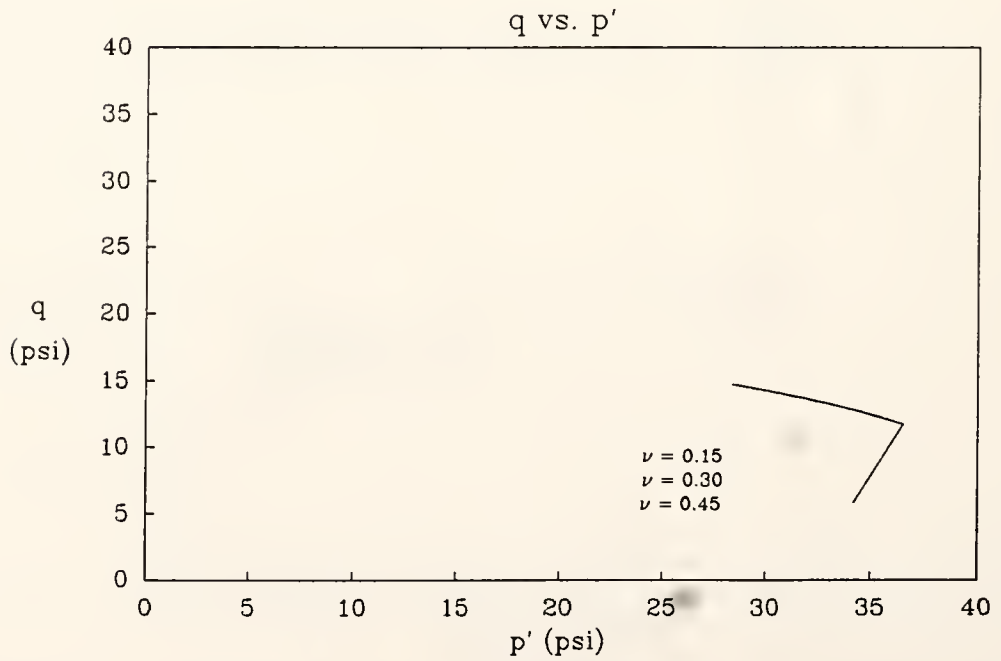
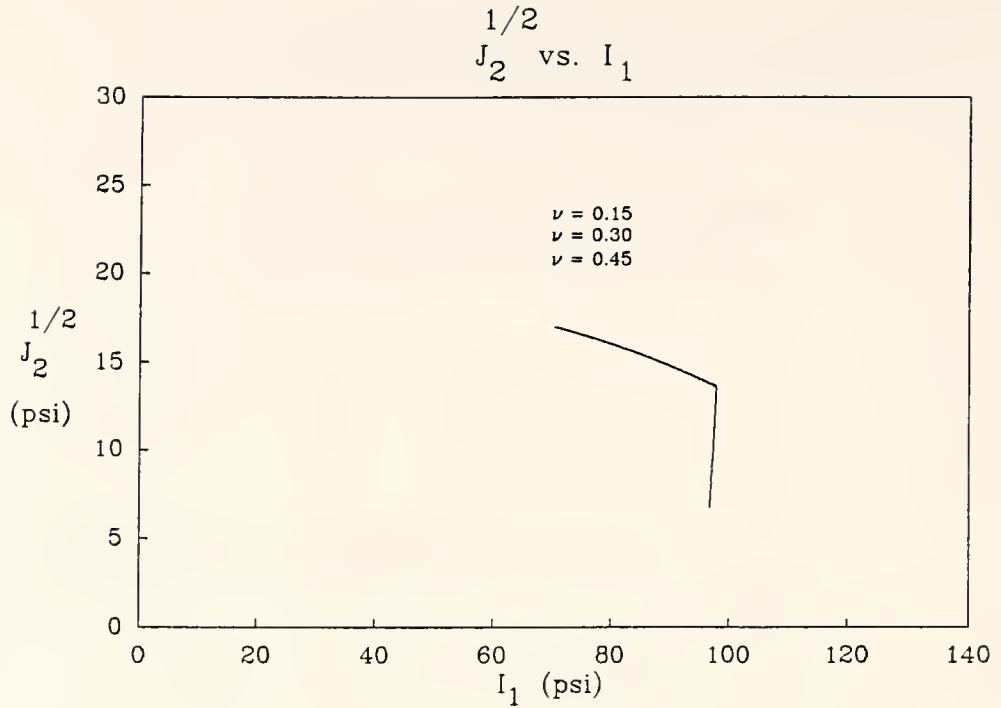


Figure A.1.3 - Effect of Poisson's Ratio on the location of the Cap in the $J_2^{1/2}$ - I_1 Space and on the q- p' Diagram

A.2 - Case 2

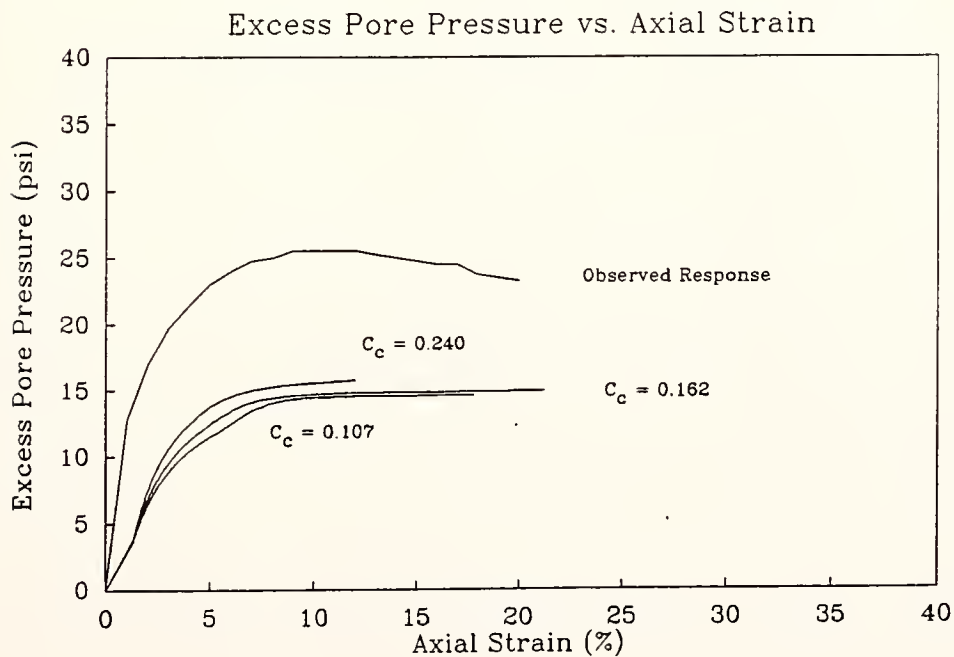
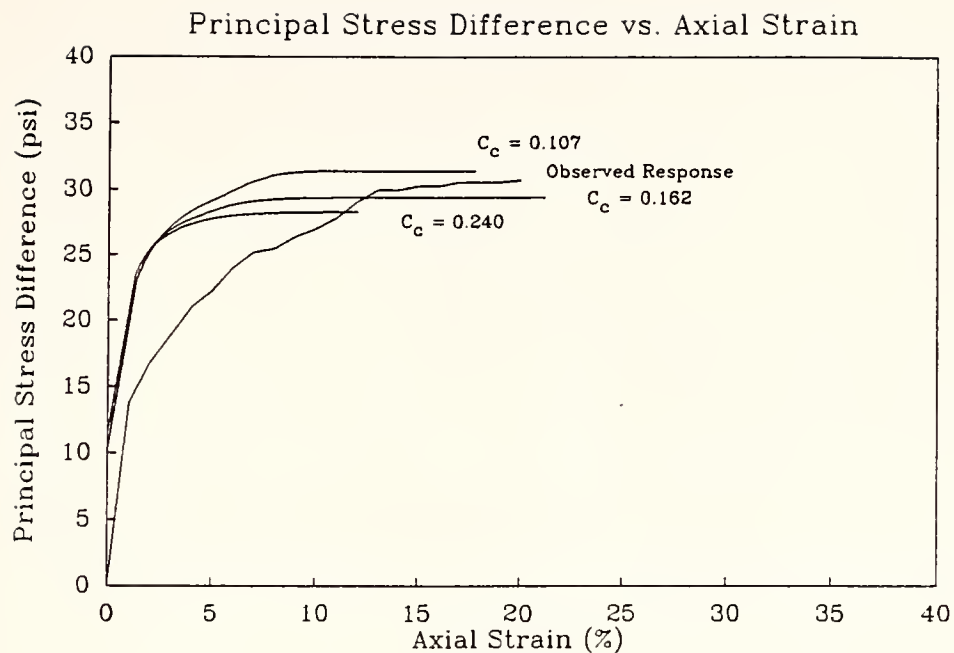


Figure A.2.1 - Effect of the Compression Index on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

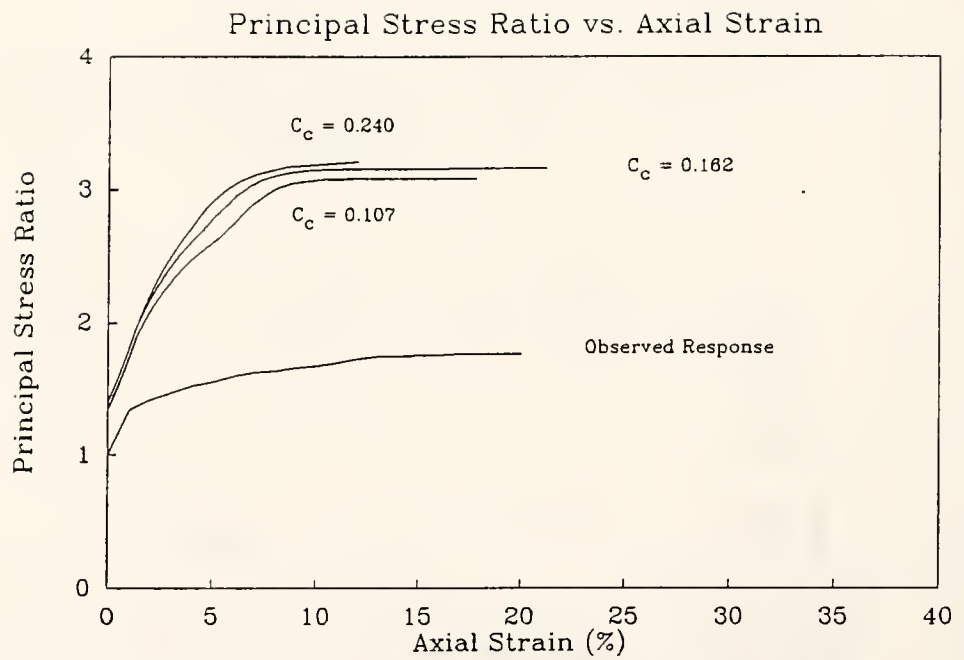


Figure A.2.2 - Effect of the Compression Index on the Principal Stress Ratio vs. Axial Strain

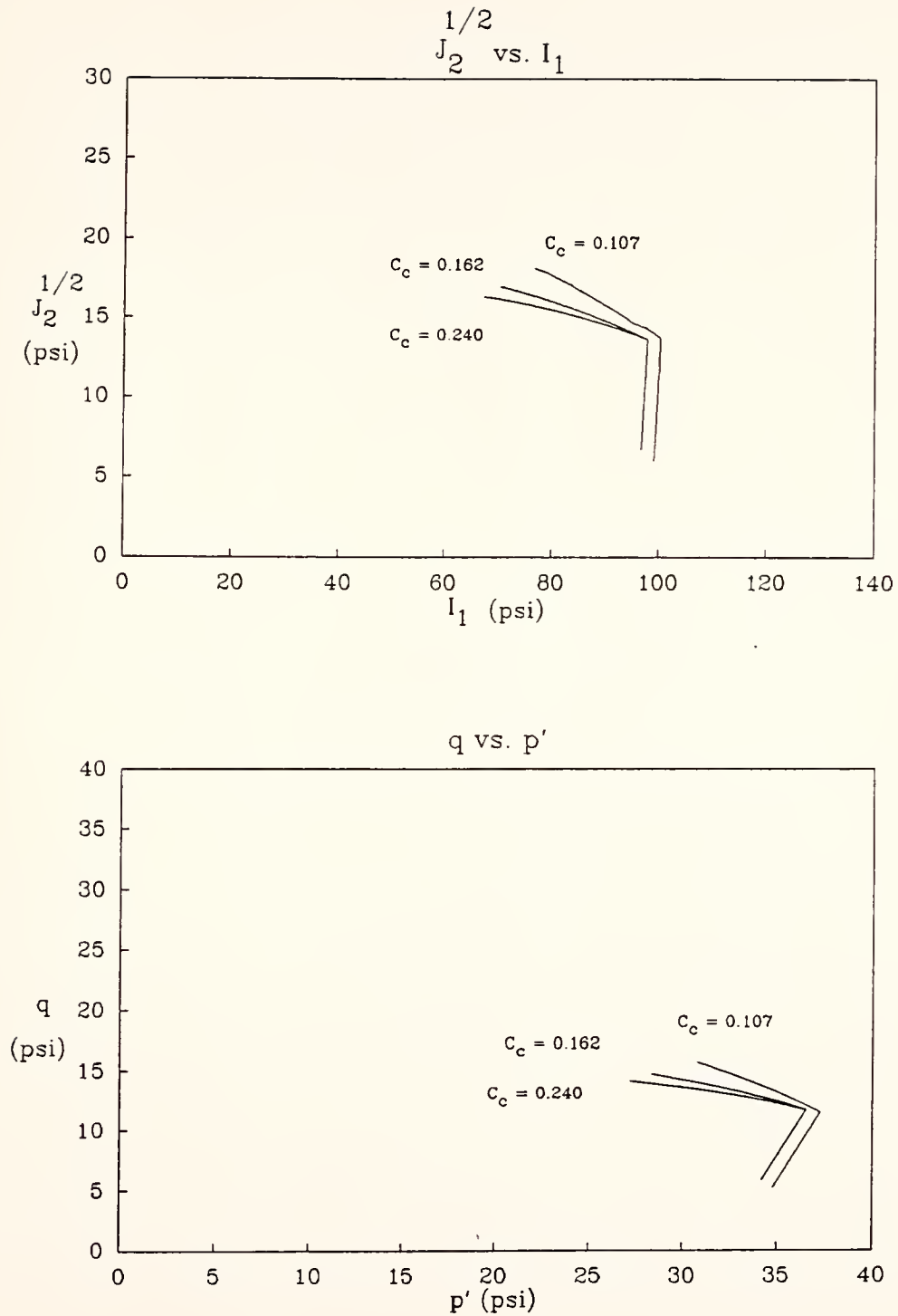


Figure A.2.3 - Effect of the Compression Index on location of the Cap in the $J_2^{1/2}$ - I_1 Space and on the q - p' Diagram

A.3 - Case 3

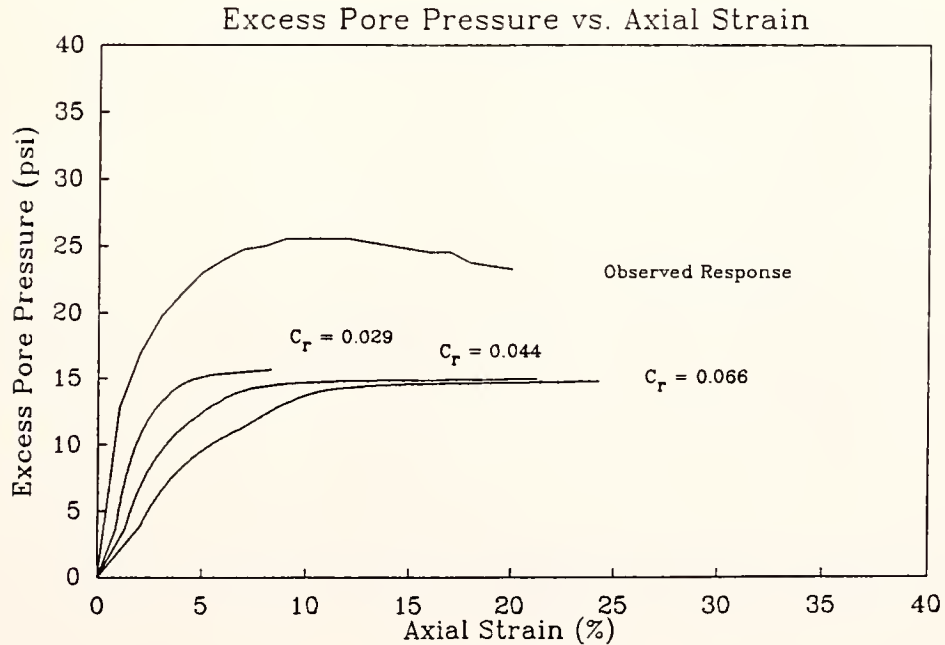
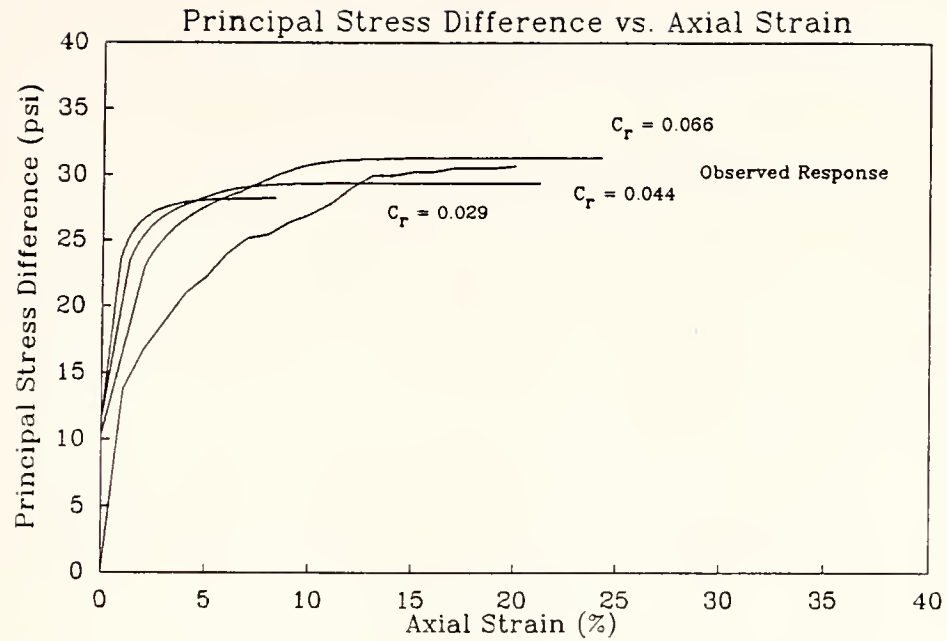


Figure A.3.1 - Effect of the Recompression Index on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

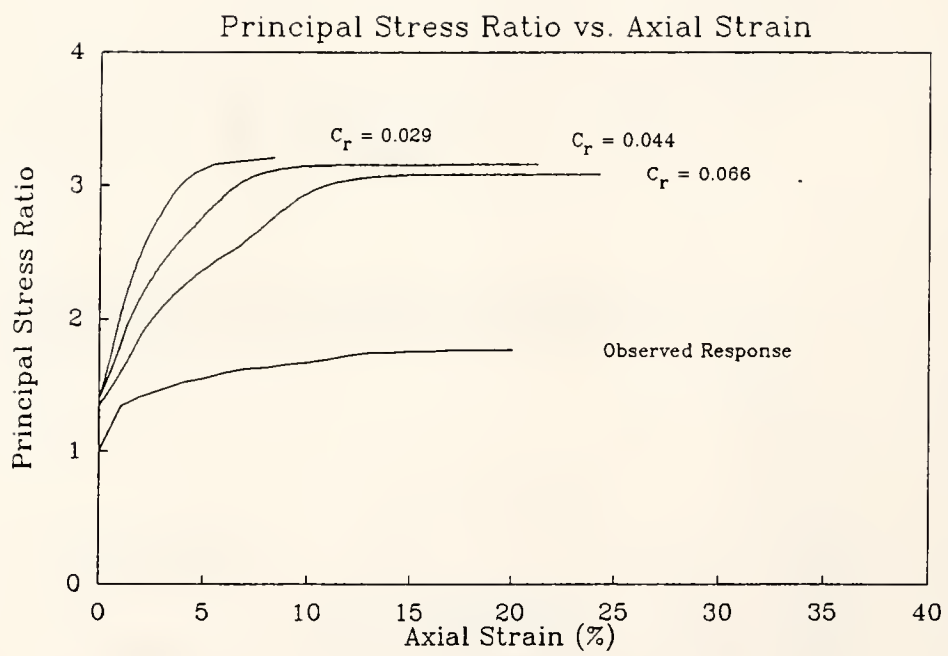


Figure A.3.2 - Effect of the Recompression Index on the Principal Stress Ratio vs. Axial Strain

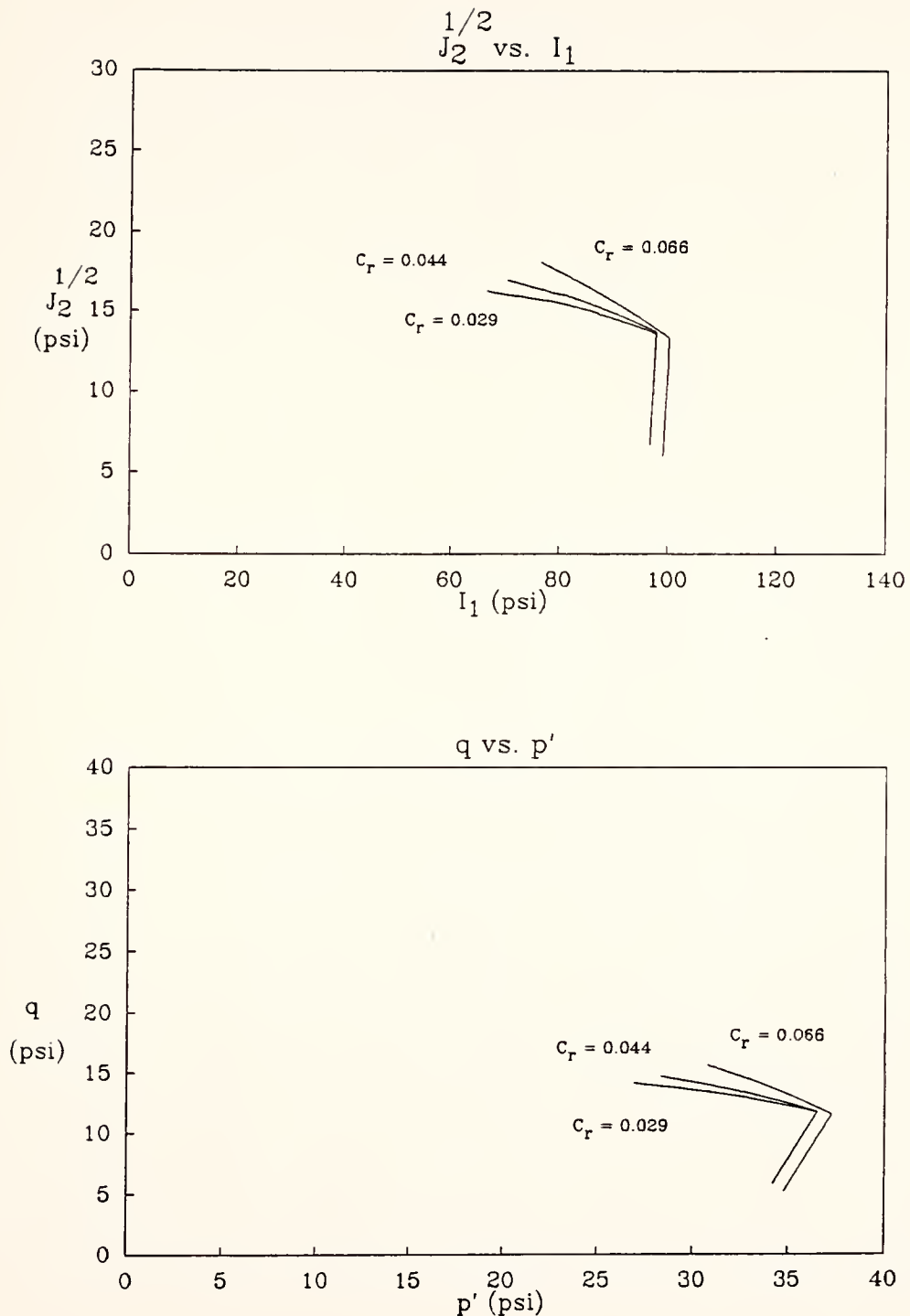


Figure A.3.3 - Effect of the Recompression Index on location of the Cap in the $J_2^{1/2}$ - I_1 Space and on the q - p' Diagram

A.4 - Case 4

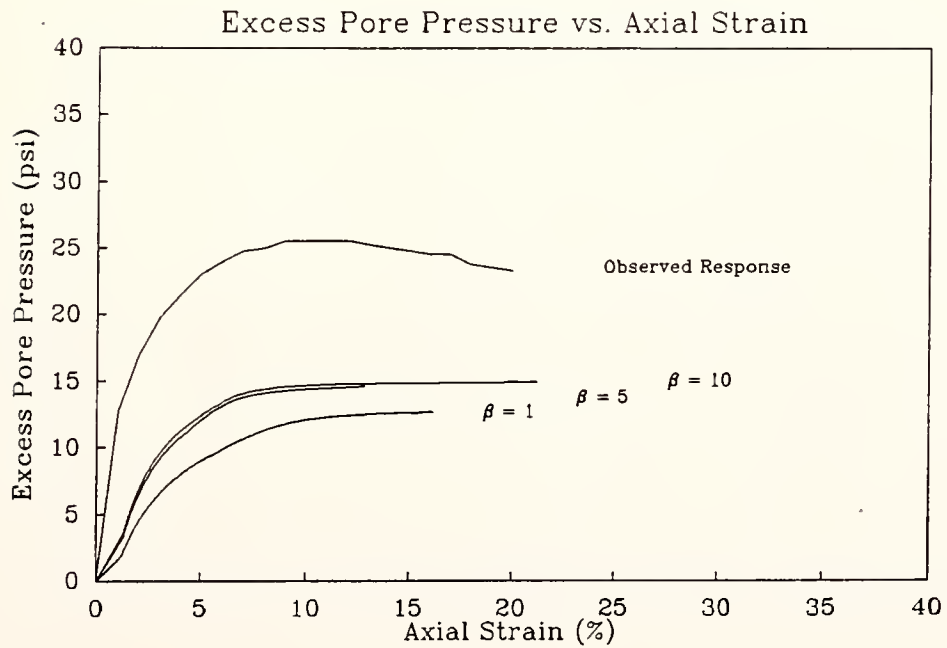
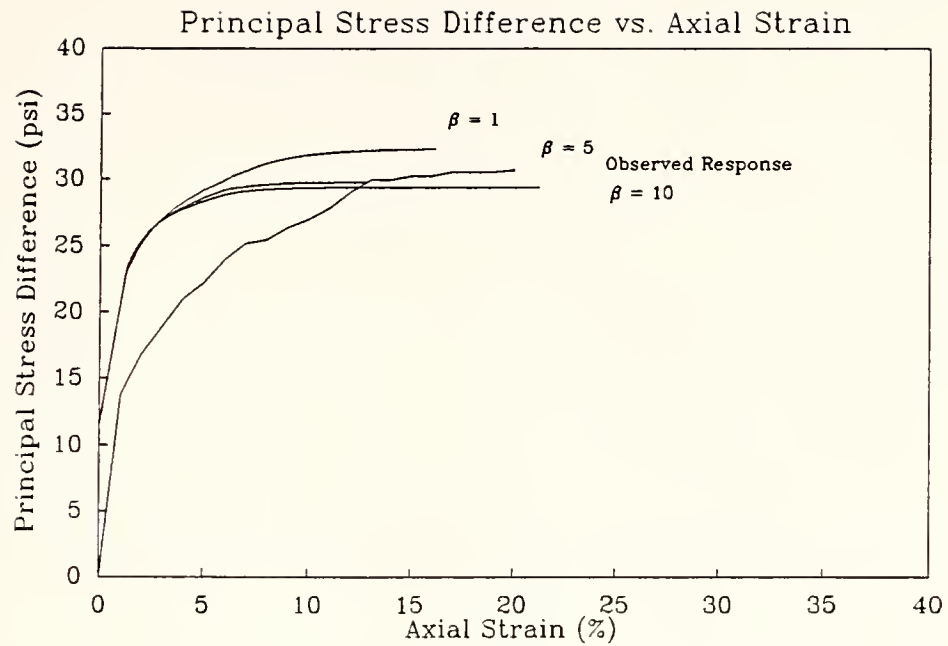


Figure A.4.1 - Effect of the Pore Pressure Response Factor on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

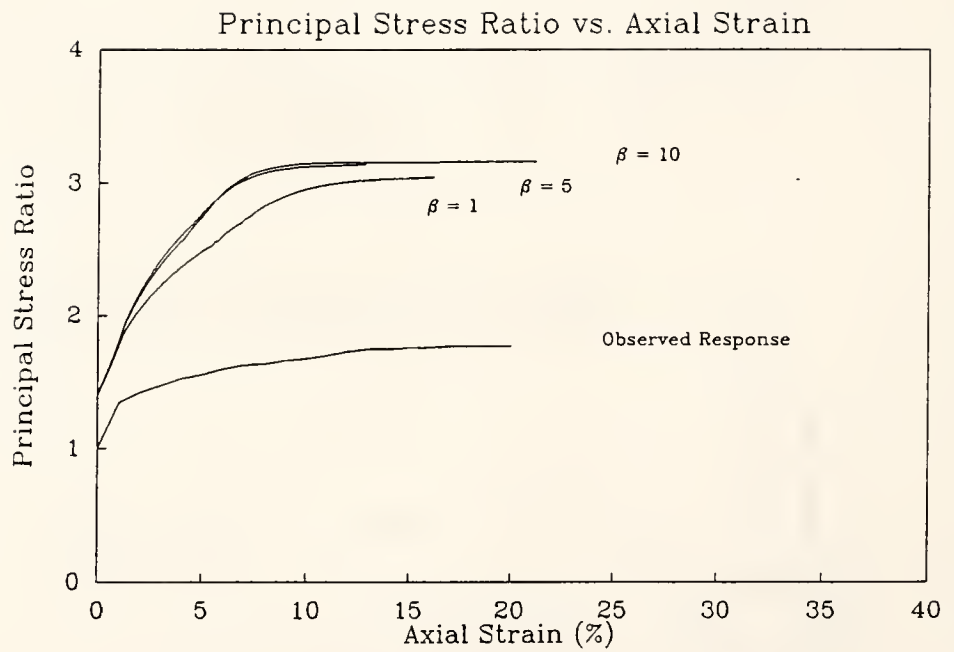


Figure A.4.2 - Effect of the Pore Pressure Response Factor on the Principal Stress Ratio vs. Axial Strain

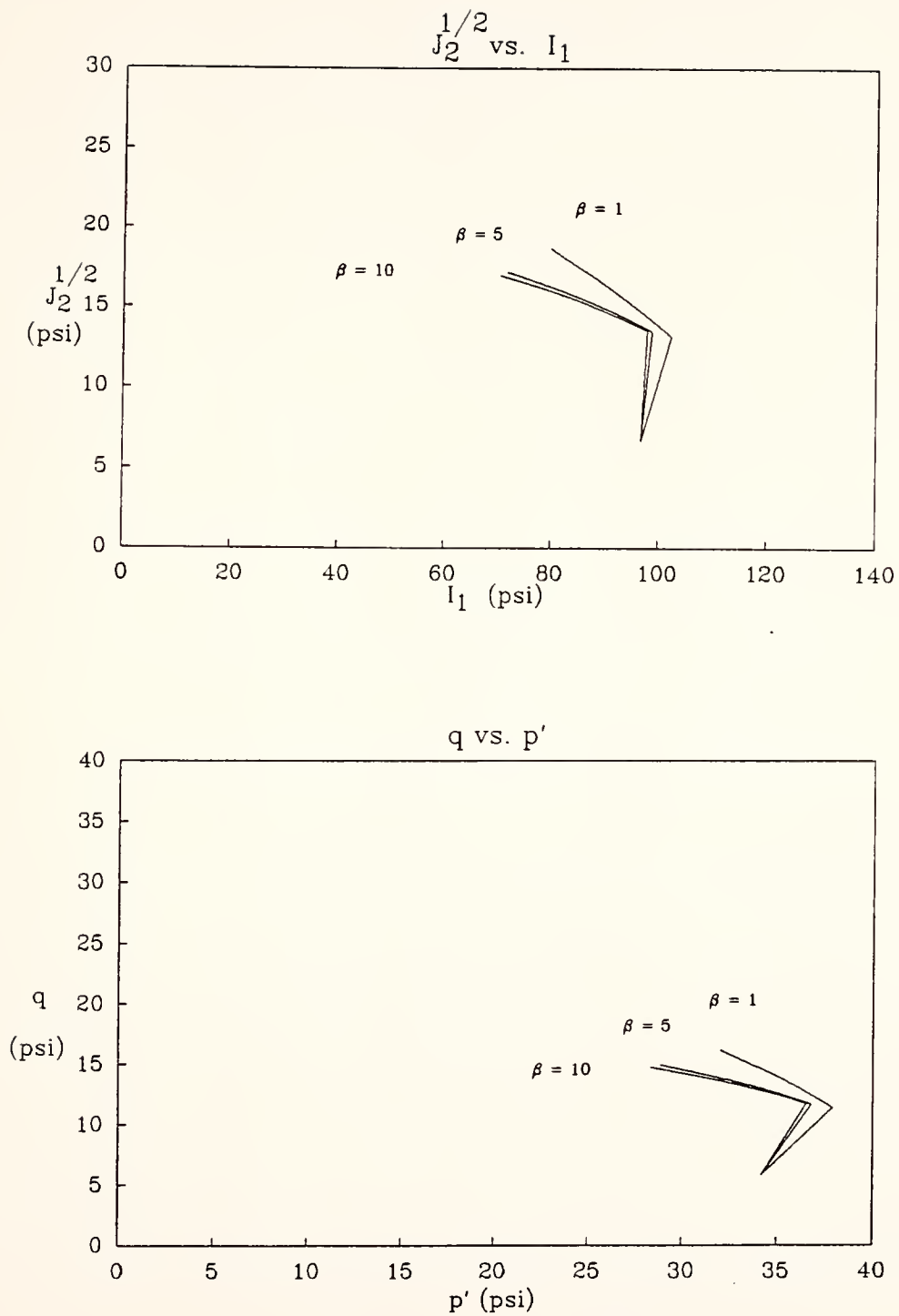


Figure A.4.3 - Effect of the Pore Pressure Response Factor on location of the Cap in the $J_2^{1/2}$ - I_1 Space and on the q - p' Diagram

A.5 - Case 5

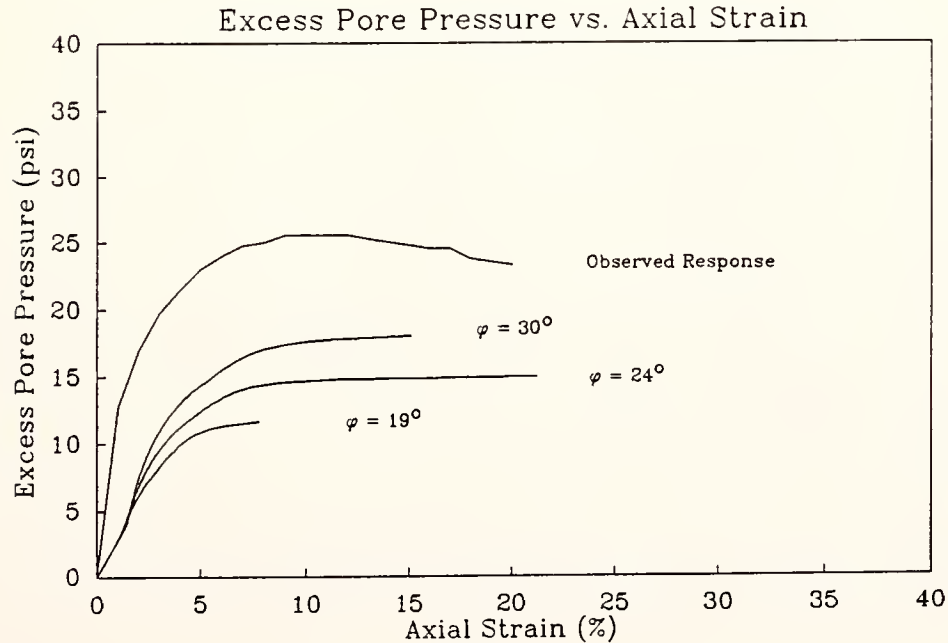
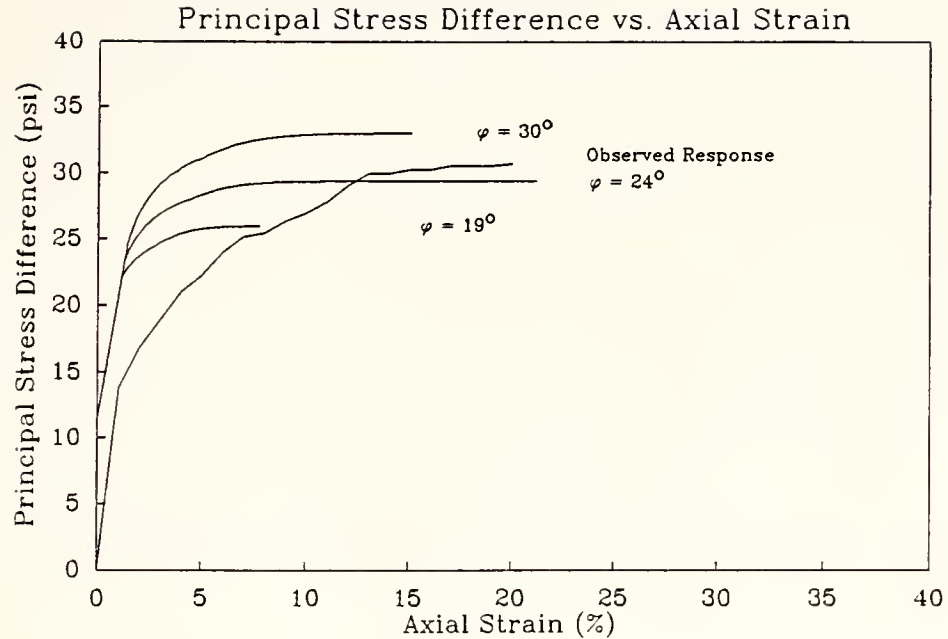


Figure A.5.1 - Effect of the Angle of Internal Friction on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

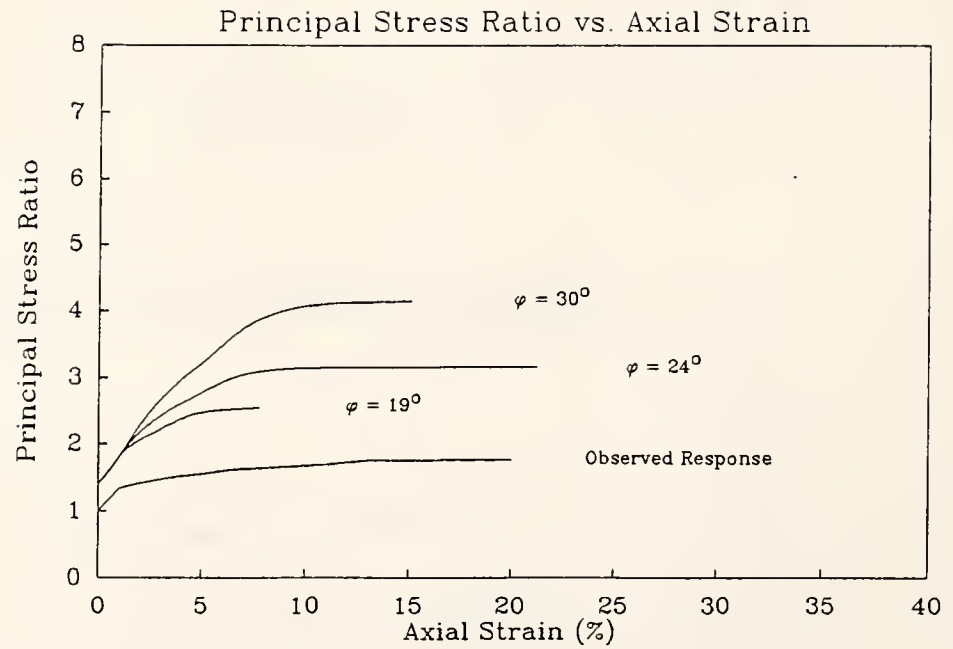


Figure A.5.2 - Effect of the Angle of Internal Friction on the Principal Stress Ratio vs. Axial Strain

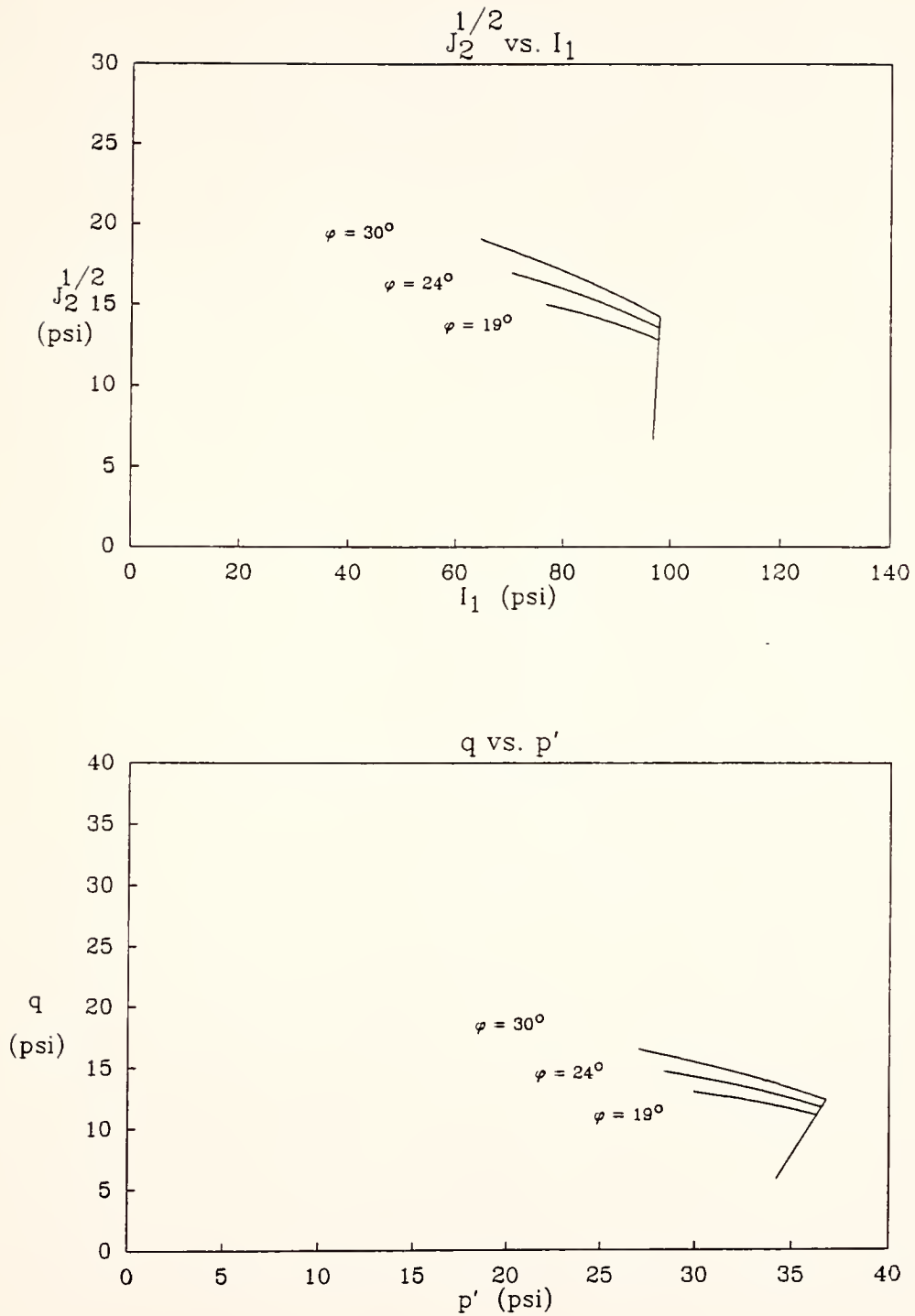


Figure A.5.3 - Effect of the Angle of Internal Friction on location of the Cap in the $J_2^{1/2}$ - I_1 Space and on the q - p' Diagram

A.6 - Case 6

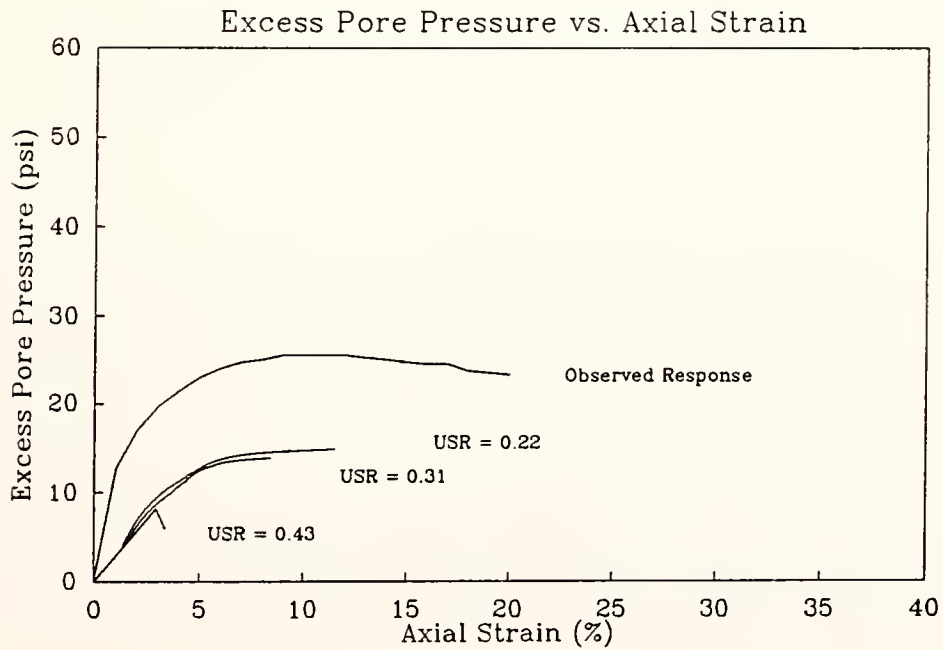
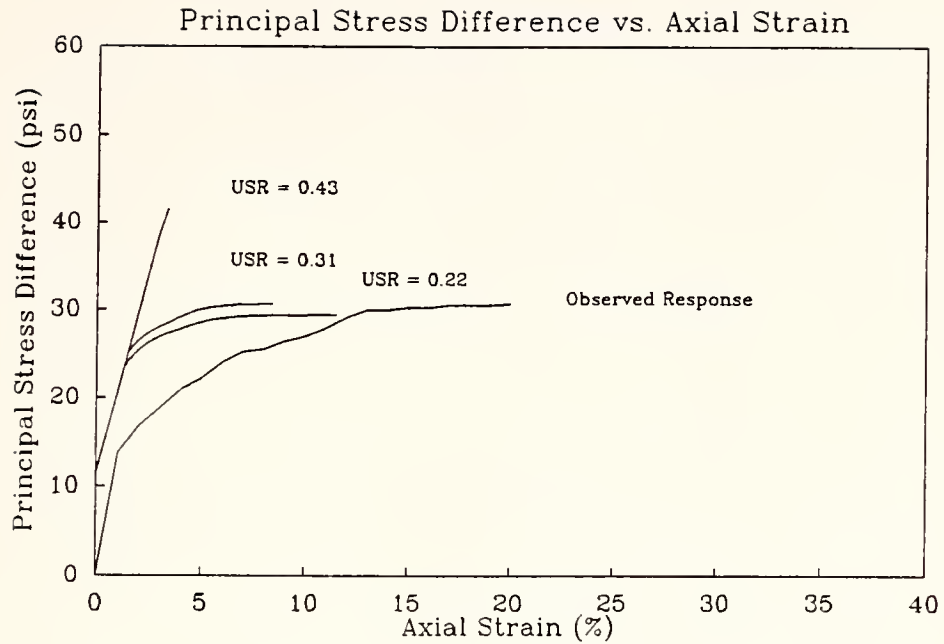


Figure A.6.1 - Effect of the Undrained Shear Strength Ratio on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

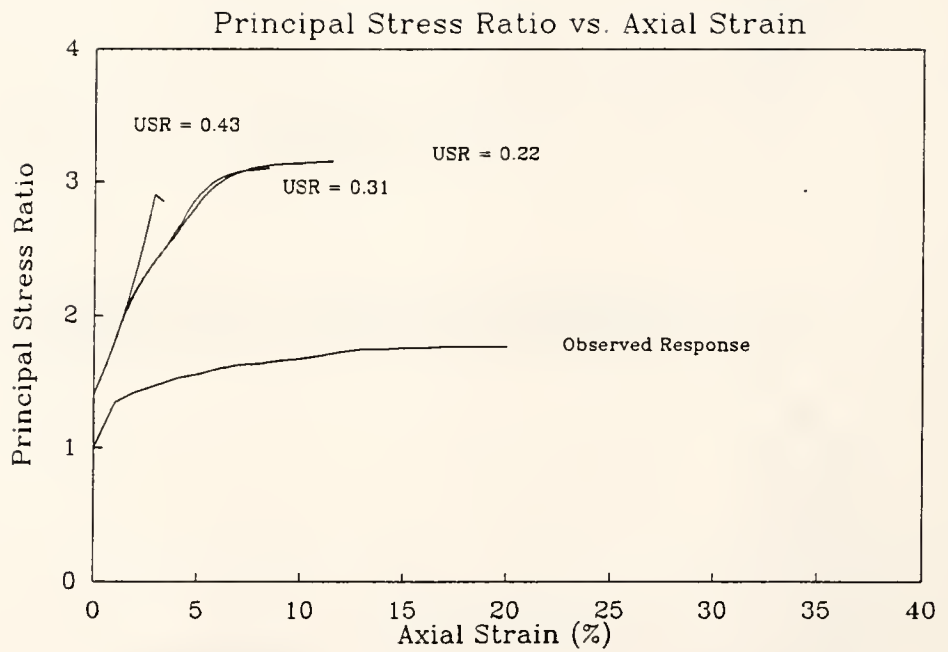


Figure A.6.2 - Effect of the Undrained Shear Strength Ratio on the Principal Stress Ratio vs. Axial Strain

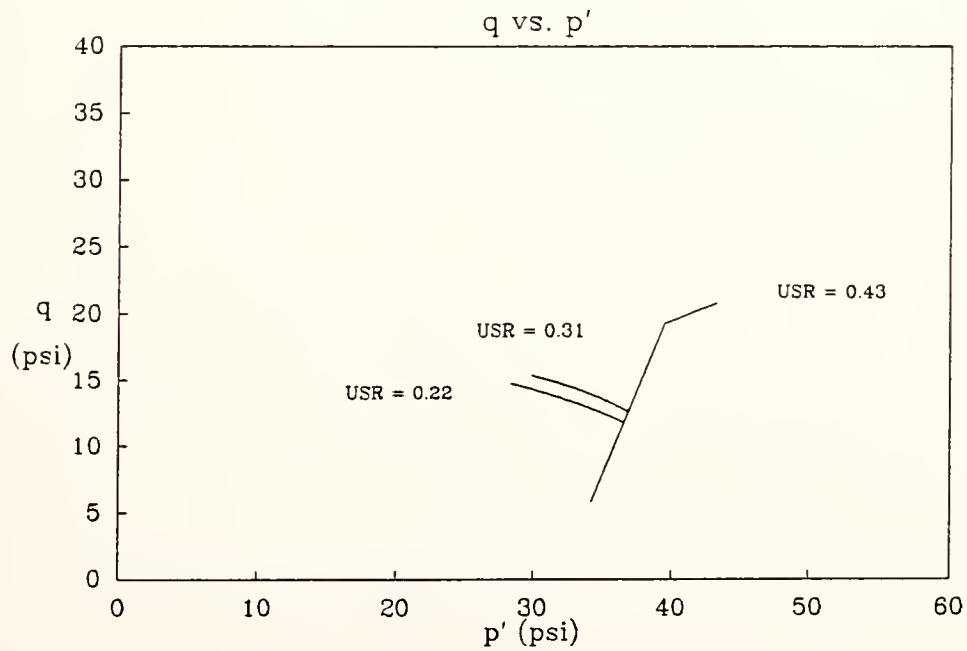
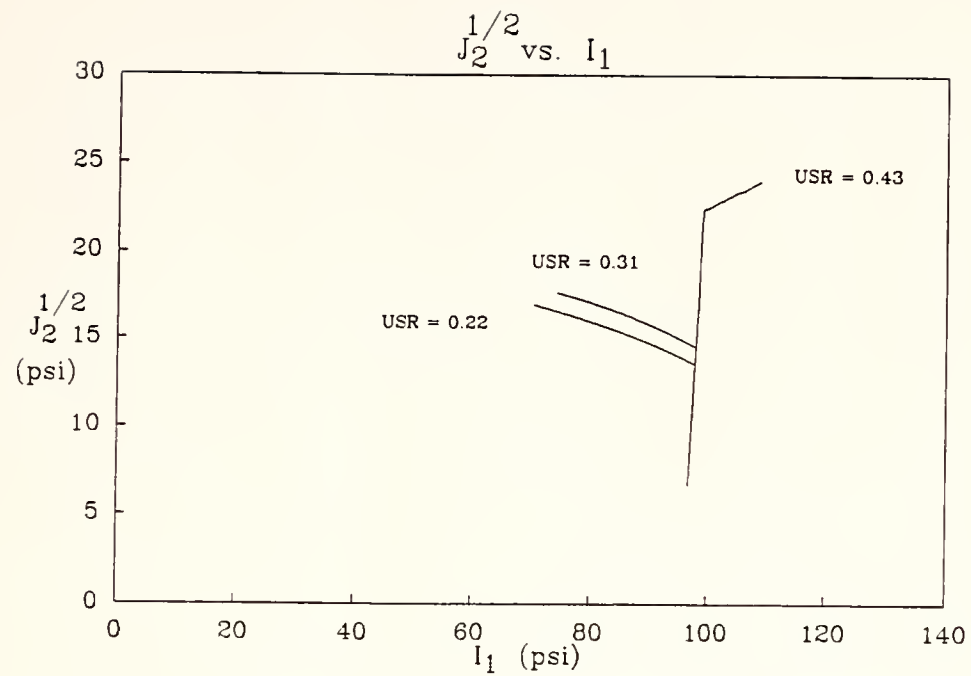


Figure A.6.3 - Effect of the Undrained Shear Strength Ratio on location of the Cap in the $J_2^{1/2}$ - I_1 Space and on the q - p' Diagram

A.7 - Case 7

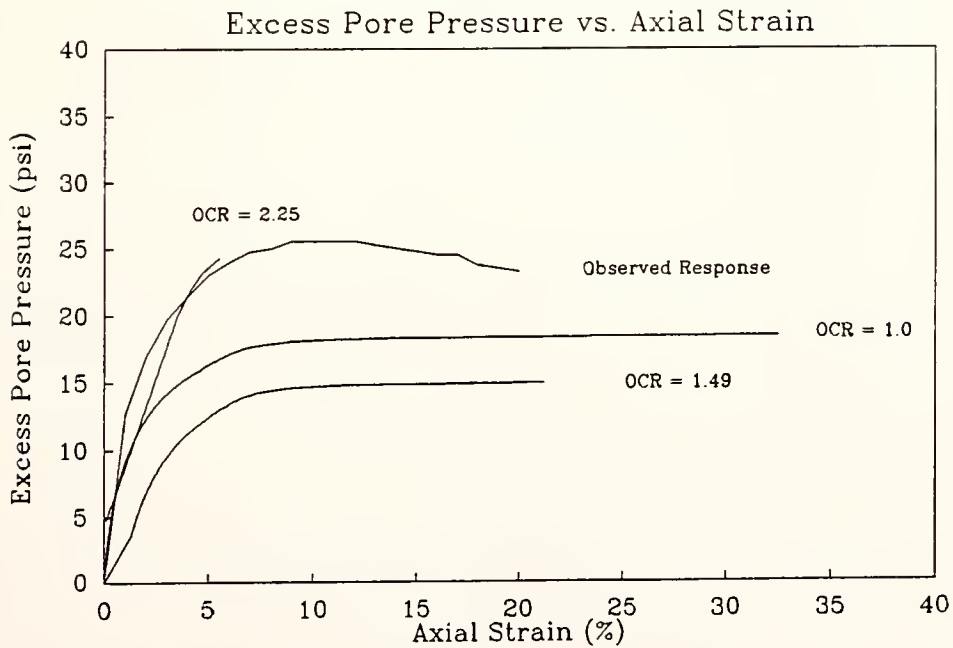
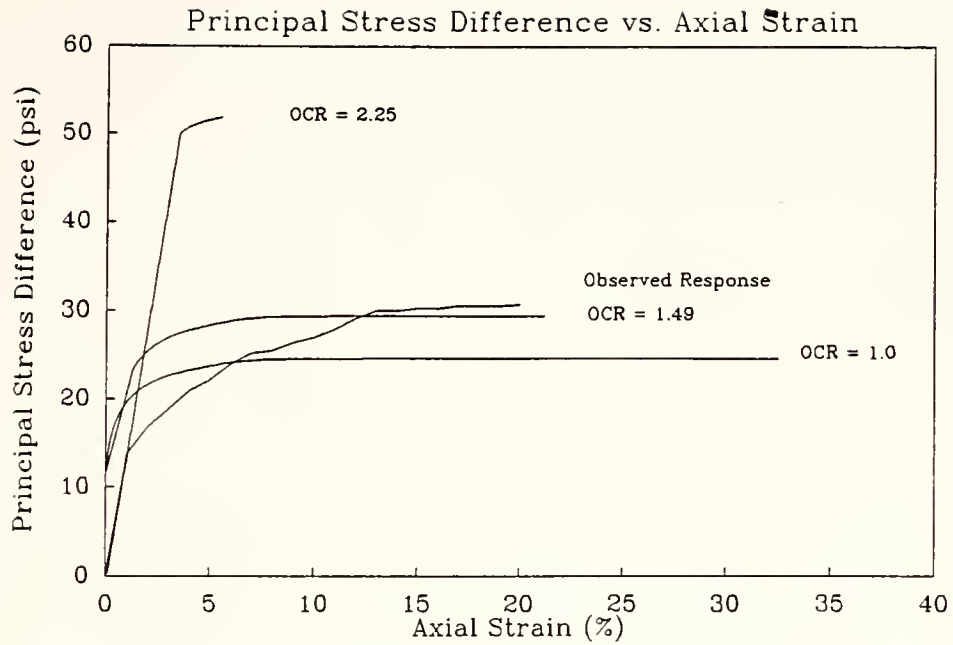


Figure A.7.1 - Effect of the Over-consolidation Ratio on the Principal Stress Difference and Excess Pore Pressure vs. Axial Strain

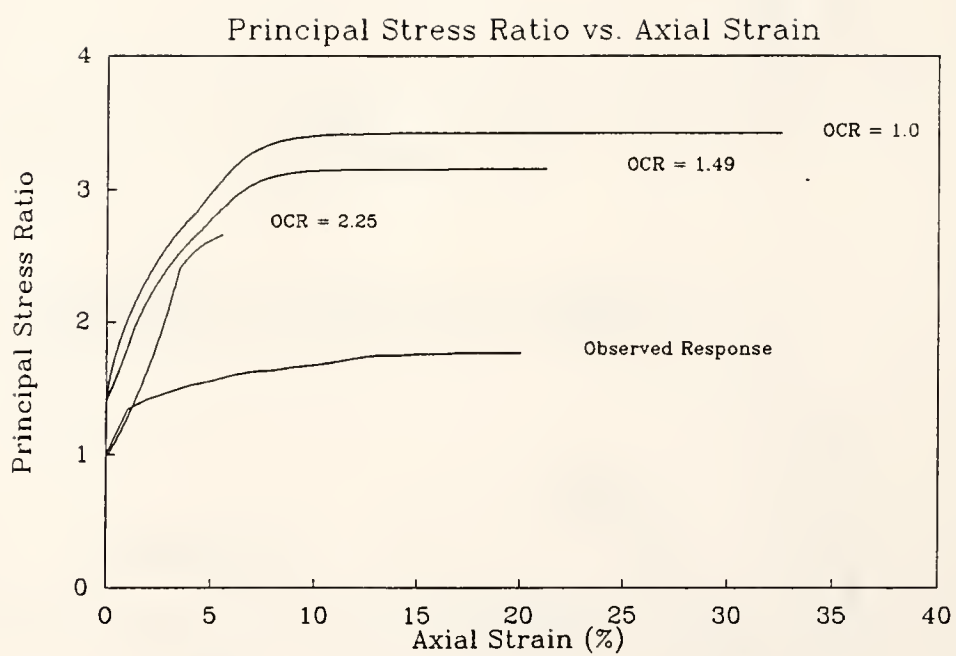


Figure A.7.2 - Effect of the Over-consolidation Ratio on the Principal Stress Ratio vs. Axial Strain

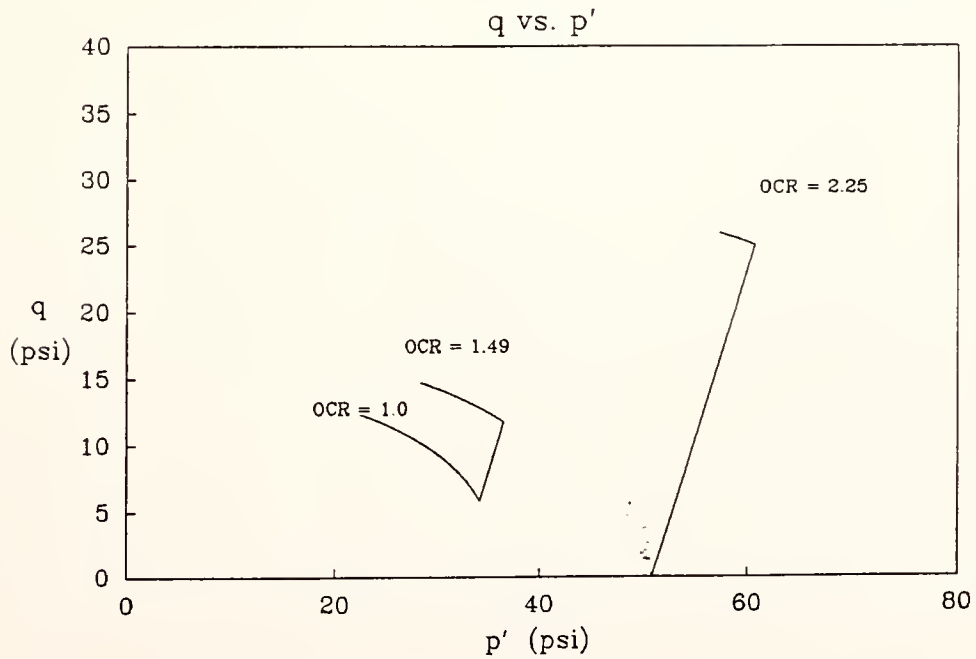
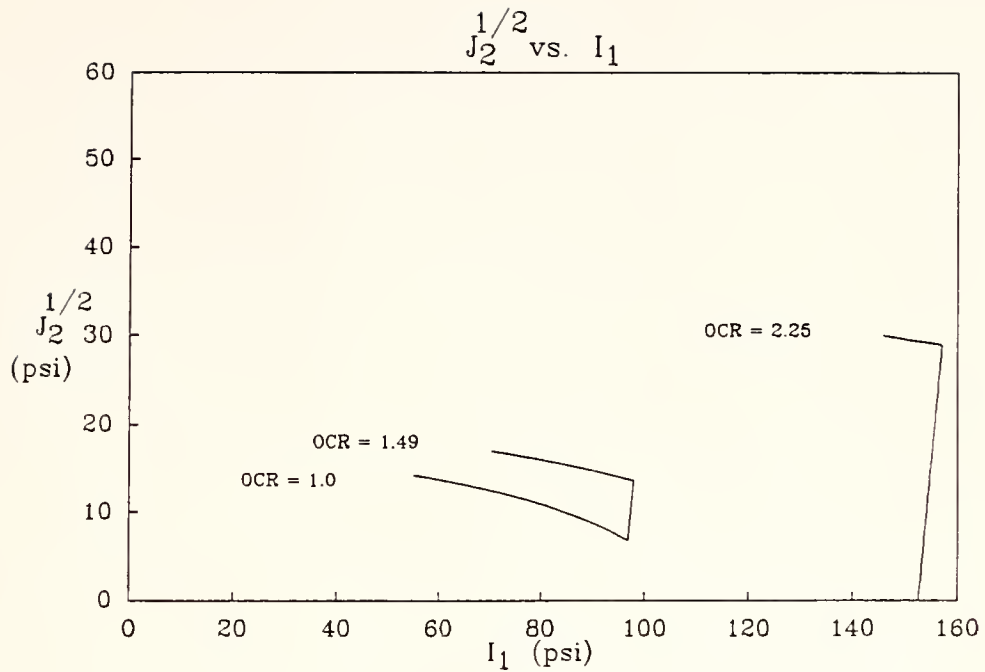


Figure A.7.3 - Effect of the Over-consolidation Ratio on location of the Cap in the $J_2^{1/2}$ - I_1 Space and on the q - p' Diagram

APPENDIX B

Computer disk with input data files

APPENDIX C

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