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13. ABSTRACT (Maximum 200 words)

An electronically controlled, hydraulically actuated multaxial (tension - torsion) mechanical testing system has been purchased from MTS and installed in the Peterson Laboratory at Stanford University. The instrument is controlled by a DEC computer. The equipment was made operational in September 1985 and is now available for use.

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Final Report

for

Grant No. AFOSR-84-0276

Integrated Multiaxial and High Precision Computer Controlled Servohydraulic Mechanical Testing System

Submitted to:

AFOSR/DOD-URIP
Building 410, Room C216
Bolling Air Force Base, D.C. 20332
Attention: Dr. Alan H. Rosenstein

Submitted by:

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February 1, 1986

This grant was awarded as a part of the DOD-University Research Instrumentation Program. The equipment awarded is an Automated Axial-Torsional Testing System complete with grips, extensometers and associated instrumentation. Also included in the award is a SX-RA50-EX (PDP 11/23) Microcomputer for control of the testing system. As required by the grant, cost sharing has been provided by Stanford University. Table 1 is a list of the equipment provided by this grant, together with an account of the cost sharing provided.

The testing equipment was purchased from MTS Corporation and the microcomputer from Digital Equipment Corporation. The equipment arrived at Stanford University in June of 1985 and was installed by MTS personnel in July of that year. Students began to use the equipment in August and by September were sufficiently proficient to demonstrate the full capabilities of the instrument. The equipment is now fully operational and is available for use by students, faculty and staff at Stanford.

The equipment provided by the grant will permit a new kind of mechanical testing to be done at Stanford University. Multiaxial mechanical tests can be done by using the combined tension-torsion capabilities of the new instrument. This will permit not only a more complete investigation of the mechanisms of deformation and fracture than can be done with axial testing alone but also a study of structural material behavior under the complex loading conditions which arise in practice. The torsional testing mode will also permit studies of deformation at large strains, such as those which arise in metal forming operations.

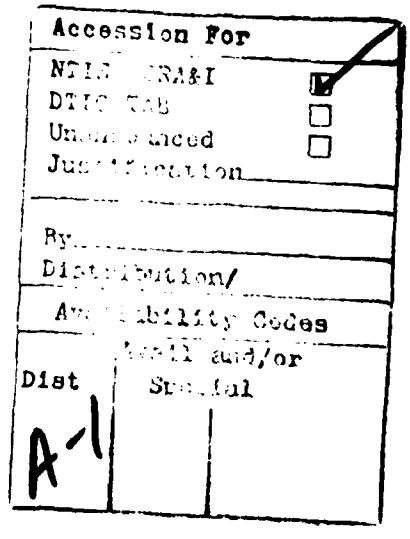

Table 1

Integrated Multiaxial Testing System

Equipment Purchased and Distribution of Cost Sharing

Funding Source	DOD/URIP	DOE	ME/SU	MSE/SU	SE/SU	TOTAL
Equipment Item						
Series 809 Automated Axial-Torsional Testing System	$125,000	-	$4,000	$6,250	$22,500	$157,750
Axial-Torsional Extensometer MTS 632.22	-	$9,750	-	-	-	$9,750
Axial-Torsional Grips MTS 64AT.22	-	$9,000	-	-	-	$9,000
SX-RA50-EX Microcomputer PDP 11/23	-	$9,831	-	$3,298	-	$13,129
HP 7475A Plotter	-	-	-	$1,042	-	$1,042
Tax, Shipping	-	$1,419	-	$6,142	-	$7,561
Totals	$125,000	$30,000	$4,000	$16,732	$22,500	$198,232

DOE = Department of Energy (Research Grant to A.K. Miller)
ME/SU = Department of Mechanical Enginering, Stanford University
MSE/SU = Department of Materials Science and Engineering, Stanford University
SE/SU = School of Engineering, Stanford University