GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[X] ORIGINAL [ ] REVISION NO. ____

Project No. E-25-617 R5989-0A0 — GTRC/GIT — DATE 9 / 9 / 85

Project Director: Ward Winer/Scott Bair — School/~~Unit~~ ME

Sponsor: General Motors Corporation Rochester Products Division
2100 Burlingame, S.W. Grand Rapids, MI 49501-2167

Type Agreement: Purchase Order No. DSB01586

Award Period: From 2/5/85 To 2/4/87 (Performance) 2/4/87 (Reports)

Sponsor Amount:	This Change	Total to Date
Estimated: $		$ 55,000.00
Funded: $	55,000.00	$ 55,000.00

Cost Sharing Amount: $ ____ Cost Sharing No: ____

Title: Cam/Roller Follower Simulation

ADMINISTRATIVE DATA

OCA Contact R. Dennis Farmer X4820

1) Sponsor Technical Contact:

Don Wortman
General Motors Corporation
Rochester Products Division
2100 Burlingame, S.W.
Grand Rapids, MI 49501-2167
(616) 247-2167

2) Sponsor Admin/Contractual Matters:

John McDaniel
Senior Buyer
General Motors Corporation
Rochester Products Division
2100 Burlingame, S.W.
Grand Rapids, MI 49501-2167
(616) 246-6927

Defense Priority Rating: ____ Military Security Classification: ____

(or) Company/Industrial Proprietary: ____

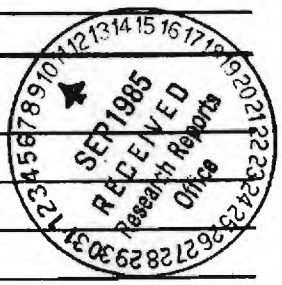
RESTRICTIONS

See Attached ____ Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with Sponsor

COMMENTS:



SPONSOR'S I. D. NO. 02.206.000.85.006

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GEORGIA INSTITUTE OF TECHNOLOGY **OFFICE OF CONTRACT ADMINISTRATION**

SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

Date 7-1-87

Project No. E-25-617 School/~~Lab~~ ~~XXX~~ ME

Includes Subproject No.(s) N/A

Project Director(s) Ward Winer and Scott Bair GTRC /~~GIT~~ ~~XXX~~

Sponsor General Motors Corporation Rochester Products Division

Title Cam/Roller Follower Simulation

Effective Completion Date: 2/4/87 (Performance) 2/4/87 (Reports)

Grant/Contract Closeout Actions Remaining:

- [ ] None
- [X] Final Invoice or Final Fiscal Report
- [ ] Closing Documents
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other

Continues Project No. Continued by Project No.

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Project File
Other Duane H.
Angela DuBose
Russ Embry

FORM OCA 69.285

E-25-617

GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

GEORGE W. WOODRUFF
SCHOOL OF MECHANICAL ENGINEERING

Office of the Director

(404) 894-3200

April 1, 1987

To: Mr Marv Knauf
Rochester Products Division of GM
2100 Burlingame SW
Grand Rapids, MI 49501-2167

Regarding: Sleeve Bearing Roller Lifter Engine Test

Roller lifters received from Rochester last fall were run in an engine test at idle speed for a preliminary determination of roller support bearing and shaft wear. An analysis using the Mobility method indicated a possible reduction in mechanical loss over the conventional needle support bearing. However, the film thickness was quite low (0.06 micron at 1900 engine rpm), giving the possibility of a wear problem at idle speed. A four-specimen lifter wear test rig was designed and parts have been machined. It was decided, however, to perform an engine test.

Lifters were received from Rochester with rollers having a bronze bushing press fitted. These run on the shaft usually used for the needle bearing. Rotation of the shaft was not restrained. Engine speed was 950 rpm. Temperature was controlled by the engine thermostat and SAE 10W-30 oil was used. Rollers were weighed before and after the test. Shafts were measured for diameter at three locations after the test only. A total of 70 hours of running was accumulated in twenty one periods.

Shaft diameters are shown in Table I. Five shafts showed a polished zone on only part of the circumference at the roller bushing, indicating that these may not have rotated. (see the figure with Table I.) The diameter variations are within the error of the measurements.

In table II are the roller/bushing masses before and after the test. The largest weight loss corresponds to a radial wear of 4.7 micron of bronze. The average was about 1.4 micron on the radius. No wear was visible on the O.D. of the roller.

This apparatus is still available should there be interest in further tests. Apart from the engine test, the new lift measurement instrumentation (1kHz response) has been received and

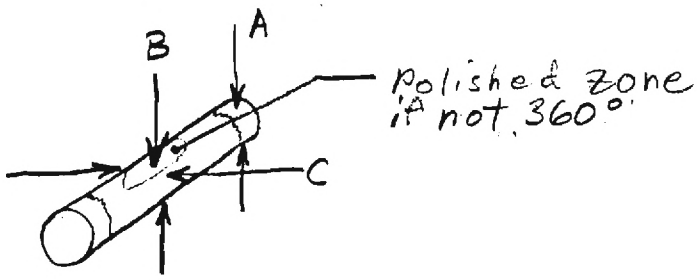
connected to the high speed cam/tappet simmulator. This has reduced or eliminated signal distortion in a test at 3300 cam rpm.

Sincerely,

Scott Bair,
Senior Research Engineer

SB/vj

TABLE I. Shaft Diameters (inches) after Test.



Res - .0001
E - ±.0002

	A	B	C	
SH 1	0.2979	0.2980	0.2977	
SH 2	0.2980	0.2979	0.2979	rotated*
SH 3	0.2980	0.2980	0.2979	
SH 4	0.2980	0.2980	0.2980	
SH 5	0.2980	0.2980	0.2980	rotated*
SH 6	0.2980	0.2980	0.2980	rotated*
SH 7	0.2980	0.2980	0.2980	
SH 8	0.2980	0.2980	0.2980	

* On these shafts the polished area at "B" extended completely around the shaft.

Table II. Roller Mass (grams) before and after Testing.

Bearing #	Original Weight [gm]	New Weight [gm]	change [gm]
1	19.10530	19.10394	0.00136
2	19.11657	19.10366	0.01291
3	19.11973	19.11684	0.00289
4	19.08666	19.08318	0.00348
5	19.11095	19.10966	0.00129
6	19.08788	19.08474	0.00314
7	19.12214	19.11992	0.00222
8	19.11004	19.10807	0.00197

ave = .00365
std. dev. = .0038