

LIGHT VEHICLE DEVELOPMENT IMPROVED PERFORMANCE INVESTIGATIONS

In order to improve the light vehicle performance image compared to competition, the following initial program is proposed:

1. Firebird 400

- The Firebird 400 secondary throttle plates appear to have a 1-1/2 second delay after full throttle acceleration from a standing start. This permits the initial movement of the vehicle wheels prior to the secondary throttle plates becoming operative and tends to minimize wheel slip. In order to evaluate this characteristic, it is proposed to modify the Firebird carburetor so as not to delay the secondary throttle plate action and observe the effect on wheel slip.
- Excessive wheel spin from a standing start is also affected by the engine torque curve. It is proposed that driveshaft torque be measured on both the Firebird and Cougar at performance weight and at 200 lb. additional weight increments in the trunk, to progressively reduce wheel spin, so that low end torque characteristics can be observed.
- Engineering Staff has been requested to instrument both the Firebird and Cougar vehicles with spring pad and/or shackle force transducers to obtain relative measurements of weight transfer to the rear wheels.

2. Cougar 427-428

- In order to determine if the secondary throttle plate delay would reduce Cougar wheel spin, it is proposed that the secondary throttle plates be wired shut and observe if wheel spin is as severe as with a normally operating carburetor.
- If a low-end torque problem appears evident, regardless of carburetor secondary throttle plate delay, a time versus distance plot from a standing start will be run with several cam changes to de-torque the low-end of the engine torque curve. The Engineering Staff light weight time distance instrument currently being used to evaluate tire friction characteristics can be used.

3. Firebird-Cougar

- Transmission Converters - Stall speeds will be obtained and the effect of different size converter and/or stall speed will be evaluated on the Cougar.
- Investigation will be conducted as to what meaningful data could be obtained by use of cell 17-D.
- Axle ratios of 3.25, 3.50, 3.89 and 4.11 will be obtained and run in the Cougar, using the new Ford locker design.
- Engine cooling and oil temperature characteristics of Cougar and competitive vehicles will be measured.

4. All performance vehicles to have chassis investigation for start-up:
 - . Torque absorbing and weight transfer device (torque arms, struts, spring clips, spring rate and/or load change, spring angle changes, etc.).
 - . Wind-up bumper change, rubber spring snubber, rear facing torque arm.
 - . Change of ride balance front-to-rear for start-up weight transfer.
 - . Various kinds of tires --- brands, compounds, size, cord angles, P.S.I. versus tire size, versus wheel size (5-1/2", 6" or 6-1/2").

COUGAR-MUSTANG PERFORMANCE CAR (AUTOMATIC)

PACKAGE	AXLE	TIRES	0 - 4		0 - 10		1/4 MILE		REMARKS
			Sec.	ft.	Sec.	ft.	E.T.	SPEED	
1967 Mustang G.T.A. 390-4V Survey Vehicle	3.00	F-70x14	1.05		595		N.A.	N.A.	T.V. 3/21
1967 Cougar G.T.A. 390-4V Survey Vehicle	3.00	F-70x14	1.02		581		N.A.	N.A.	T.V. 3827
1967 Mustang G.T.A. 390-4V Improved Perf. 390 Engine-Trans.	3.25	Michelin Radial Fly 165R14	1.15		682		*14.7	*100.1	* Data from oscillograph, not chronodeck timers. N.P.G. Data
1968 Mustang G.T.A. 390-4V Slag-Off Vehicle	3.25	F-70x14	1.15		631		N.A.	N.A.	
1967 Cougar 427-4V H.T S-713-62 Dev. Car	3.25 Equis Lock	F-70x14	*1.15		*657		N.A.	N.A.	* Mod. Throttle w/mi. wheel spin T.V. 3500 plus driver
S713-62	3.50 Equis Lock	F-70x14	N.A.		N.A.		*14.41	*97.28	* Perf. numbers would be better if start-up wheel spin problem was improved.
S-713-62	3.50	FR70x14 Goodrich @ 28 PSI	Sec. 0 - 5 <u>230</u>		633				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	FR70x14 Goodrich @ 20 PSI	247		649				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Pirestone P-70x14 @ 28 PSI	231		617				Data is not corrected, observed from "black-box" test device.

COUGAR-METALING PERFORMANCE CAR (AUTOMATIC)

PACKAGE	AXLE	TIRES	0 - 4		0 - 10		1/4 MILE		REMARKS
							E.T.	SPEED	
S-713-62	3.50	Pirestone E-70x14 @ 20 PSI	233	6" Rim	621				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Pirestone Spt. Car 200 E-70x15 @ 28 PSI	271	6" Rim	693				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Pirestone Spt. Car 200 E-70x15 @ 20 PSI	262	6" Rim	674				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Pirestone E-70x14 @ 28 PSI	236	6-1/2" Rim	625				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Pirestone E-70x14 @ 20 PSI	239	6" Rim	631				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Uniroyal E-70x14 @ 28 PSI	236	6" Rim	624				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Uniroyal E-70x14 @ 20 PSI	250	6" Rim	651				Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Pirestone Spt. Car 200 E-70x15 @ 32 PSI	282	6-1/2" Rim	712				Data is not corrected, observed from "black-box" test device. <u>Best so far.</u>
S-713-62	3.50	Pirestone Spt. Car 200 E-70x15 @ 28 PSI	280	6" Rim	710				Data is not corrected, observed from "black-box" test device.

COUGAR-MUSTANG PERFORMANCE CAR (AUTOMATIC)

PACKAGE	AXLE	TIRES	0 - 4	0 - 10	1/4 MILE		REMARKS
					E.T.	SPEED	
S-713-62	3.50	Firestone Spt. Car 200 E-70 x 15 @ 24 PSI	274	702			Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	General FR-70x14 @ 28 PSI	244	646			Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	General FR-70x14 20 PSI	249	651			Data is not corrected, observed from "black-box" test device.
S-713-62	3.50	Michelin 185R14 @ 28 PSI	215	586			Data is not corrected observed from "black-box" test device. <u>Worst times so far</u>
S-713-62	3.50	Michelin 185R14 20 PSI	224	606			
Tasca 428-4V Mustang Auto.	3.50	F.70 x 14 Firestone			13.74	103.44	Results from management show 7-25-67
Tasca 428-4V	3.50	F70x14			13.46	104.47	7-26 - baseline for carb. evaluation (Tasca carb. ram air)
Tasca 428-4V	3.50	F70x14			13.65	102.5	7-26 Tasca carb. w/Mustang H.P. 2" cleaner
Tasca 428-4V	3.50	F70x14			13.51	103.16	7-26 sample Holley w/ram air

COUGAR-MUSTANG PERFORMANCE CAR (AUTOMATIC)

PACKAGE	AXLE	TIRES	1/4 MILE		REMARKS
			E.T.	SPEED	
Tasca 428-4V	3.50	F70x14	13.61	102.97	7-27 sample #LST 3300X Holley - same flow as Thues carb. (more humid weather)
Tasca 428-4V	3.50	F70x14	13.59	103.76	7-27 Rerun of Tasca carb. because of weather.
Tasca 428-4V	3.50	F70x14	13.68	102.78	7-28 Holley 600-750 from Imp. 390 engine test.
Tasca 428-4V					Spot check of total exhaust back pressure: (L. & R.) 4000 R.P.M. - 9" 5000 - 12" to 13" 6000 - 14" to 15"
Prod. 1967 390-4V Fairlane					Exhaust back pressure check of current system 4 to 4.5" at 4000 R.P.M.
Tasca 428-4V	3.50	F70x14	13.47	104.4	7-28 Prod. Fairlane Comet GT mufflers 3300 x carb. (Equal best run prev. day)

COUGAR-MUSTANG PERFORMANCE CAR (AUTOMATIC)

PACKAGE	AXLE	TIRES	0 - 4	0 - 10	1/4 MILE		REMARKS
					E.T.	SPEED	
S713-62	3.50	Firestone Super 128.5 Sport 200-E70-15 with rail bumpers and no isoclamps 6-1/2" Rim @ 32 PSI	128.5	711	14.0	99.6	
S713-62	3.50	Firestone Super 129.0 Sports 200, E70-15 no isoclamp 6-1/2" rim @ 32 PSI	129.0	710			Rail bumpers no help.
S713-62	3.50	Firestone Super 129.0 Sports 200 E70-15 no isoclamp with traction bars. at 32 PSI	129.0	709			No help

NOTE: Recommend suspension investigation be discontinued at this point. isoclamps, etc. are no help at this power level, per M. J. Donner

Rail bumpers, traction bars,
 Best 1/4 mile
 (5 run avg.)
 13.786 ET 101.23 MPH

COMET-FAIRLANE PERFORMANCE CARS (AUTOMATIC)

PACKAGE	AXLE	TIRES	0 - 4	0 - 10	1/4 MILE		REMARKS
					E.T.	SPEED	
1966 F/L G.T.A. 390-4V Survey Data	3.25	T75x 14	104	585			. 2" dual exhaust . T.W. 4135
1967 F/L G.T.A. 390-4V Sign-off Vehicle	3.25	F-70x14	110	609	14.97	93.43	. T.W. 4124 . 2-2-1/4" dual exhaust
1966 Comet (K668-7) G.T.A. 390-4V Baseline Vehicle For Snider Jewel Pkg.	3.25	F-70x14	110	601	14.97	93.4	. Vehicle used 11-1/4" converter, this test. . T.W. 4010 . Complete 67 power train
1966 Comet G.T.A. 390-4V K668-7 Snider Jewel	3.50	F-70x14	111	642	13.86	102.36	. Report #FFC-45 (Auto.) . Report #CC-1 (Std.)
1968 Comet G.T.A. 390-4V K668-1 Sign-Off	3.25	F-70x14	109	591	14.98	95.39	. T.W. 4110 . 6-1-67 (D.P.G.)
1967 Comet G.T.A. 390-4V K768-12 Dev. Car (7-18-67)	3.25	F-70x14	--	--	15.86	89.02	. T.W. 3735 plus driver . E & F Eng. FX-384-1-1 . GFD 4300 Carb.
Comet K768-12 7-18-67	3.25	F-70x14	--	--	15.61	91.27	. Prod. 67 Holley Carb.

LIGHT VEHICLE COMPETITIVE CARS

PACKAGE	AXLE	TIRES	0 - 4	0 - 10	1/4 MILE		REMARKS
					E.T.	SPEED	
1965 Pontiac G.T.O. Tempest 389-4V Auto.	3-23	775 x 14	100	581	15.6	90.6	
1966 Pontiac G.T.O. Tempest 389-6V Man. (4)	3-55	775 x 14	109	622	14.7	93.43	1/4 Mi. is questionable
1967 Pontiac G.T.O. Tempest 400-4V Auto. 7-18-67	3-55 Locker	F-70x14			14.62	97.36	T.W. 3707 plus driver
1967 Pontiac Firebird 400 400-4V Auto. 7-18-67	3-90	E-70x14	N.A.	N.A.	14.1	100.28	T.W. 3500 plus driver
1967 Camero 396-4V SS Auto.		E-70x14					
1967 Barracuda 383-4V Auto. 5-1-67	3-23	D-70x14	113	618	N.A.	N.A.	Survey Data Modulated throttle T.W. 3632

This is 22 of west
field bend down - country
of Bob.

O-938-1

C1-A8V 442 - SK-39789 ^{hyd.} Cam (CSAX-C)

B - Cyl. heads SK-40860 2.16 Dist. x 1.625 inh. valves

C - adj. Rocker arms - 1.26:1

D - Dist. w/ 18° adv. Cam. & plate = Curve same as
68F-52

E - Thermactor installed & operating.

ET- 13.86

Speed 102.09

2 - Same as #1 without exhaust system

ET- 13.63

Speed-104.06

3 - Same as #1 But aluminum 4V
manifold & C.I. Carb. installed

E.T. 14.03

Speed-100.63

4 - changed

Cyl. heads - SK-43013 2.06 inh. Valves 1.723 - 4
Carburetor - 780 C.F.H. Holley
Removed thermactor (Cyl. heads were not drilled)

E.T. 13.61

Speed - 103.82

5 - Installed 6V T.P. intake & 24 volt
Carb. (Cyl. heads same)

E.T. - 13.7

Speed 102.34

6 - Installed C70E-B prod. "GT" (O.C.I.)
Camshaft. (otherwise same as #5)

ET - 14.10 Speed - 100.50

7 - Installed aluminum 4V & 780 Holley

ET - 13.66 Speed - 102.15

NOTE: Run #2 was ONLY run
without exhaust system. Stock 390 GT
system on vehicle at all times.

"390" System includes:

428 H Pipe

390 GT Mufflers & tailpipes

B.