Subject: UN46 Status DRAFT/PRELIMINARY

Overview:
Current "strategies" for development of utility vehicle stability have changed over the past few years due the increased availability of rollover accident data and analyses. Previous strategies were partially driven by the Insurance Institute tests of the Jeep CJ7 in the early 80's which emphasized risk from rollovers caused by extreme (rate and magnitude) steering inputs in emergency maneuvers. Independent DOT, GM and Ford studies have confirmed that rollovers directly induced by extreme steering inputs are rare for any Utility vehicle (including the CJ7). The following quote from GM's recent SAE Paper (Reconstruction of Rollover Collisions, SAE 890857), summarizes current wisdom ... "A common pre-rollover maneuver is an off-road path by the car, followed by heavy steer correction back towards the road leading to a side slide, and, ultimately, a trip followed by the rollover". Based on this new information, the UN46 was developed using a handling philosophy notably different from the BII. A comparison of BII and UN46 handling strategies is summarized below:

Model	Response	Cornering Capacity	Body Roll
BII	"Quick" steering and moderate understeer for good response and minimal tire "squeal". Develop vehicle for high speed through lane change pylons.	Maximize for good accident avoidance capability and fast "lap times" on handling track.	Minimize for "flat" feel and high cornering confidence.
UN46	Reduce steering gain and increase understeer to slow steering response. This will increase driver feedback (more tire "squeal") and reduce sensitivity to driver over-correction (common with drivers "under the influence").	Not to exceed current BII levels. Limit cornering capacity with larger tires through suspension revisions and tire pressure reduction.	Increase body roll to reduce cornering confidence and thereby discourage aggressive driving.

Parametric Comparison:

Parameter	2 dr 4x2	UN46 4x4	4 dr 4x2	UN46 4x4	'89 BrII 4x2	BrII 4x4	S-Blaz(4x4) Std	S-Blaz(4x4) Opt	Path/Fdr 4x4
Avg. Track Width	58.1	58.3	58.1	58.3	56.9	56.9	55.8	55.8	55.6
C.G. Height (curb)	26.9	26.8	27.1	27.1	27.5	26.7	25.7	25.7	26.3
Stability Index	2.16	2.17	2.14	2.15	2.07	2.13	2.17	2.17	2.11
Versace Metric 1/	.349	.348	.336	.336	.3760	.3650	.3459	.3459	.3447
Roll Gain (°/g)	TBD	5.6	TBD	5.7	N/A	3.7	6.9(e)	N/A	9.0
U/steer @ .3g (°/g)	TBD	6.5	TBD	TBD	N/A	4.4	4.2	N/A	3.2
U/steer @ .6g (°/g)	TBD	TBD	TBD	TBD	N/A	19.8	24.6	N/A	9.8
Overall Str Ratio	19:1	19:1	19:1	19:1	19:1	19:1	20:1	20:1	20:1
Wheelbase	102.1	102.1	111.9	111.9	94.0	94.0	100.5	100.5	104.3
WB/Tan(20°/SR) 2/	463.0	463.0	507.5	507.5	426.3	426.3	479.8	479.8	497.9
Engine Disp.	4.0L	4.0L	4.0L	4.0L	2.9L	2.9L	2.8L	4.3L	2.9L
Horsepower	170	170	170	170	140	140	125	160	139
Curb Weight	3576	3791	3719	3907	3278	3371	3217	3267	3715
HP/Weight 3/	.048	.045	.046	.044	.043	.042	.039	.049	.037

1/ This a measure of stability that shows high correlation with actual FARS rollover data. Unlike the "Stability Index", this measure includes wheelbase effects (important for "directional stability") ... lower is "better".
2/ This is an analytical measure of steering gain. The smaller the value, the "quicker" is the perceived steering response.
3/ High power/weight is believed to promote aggressive driving.

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TTs # 57

Subject: UN46 Status

DRAFT/PRELIMINARY

Overview:

Model	Response	Cornering Capacity	Body Roll
Bronco II	"Quick" steering and moderate understeer for good response and minimal tire "squeal". Develop vehicle for high speed through lane change pylons.	Maximize for good accident avoidance capability and fast "lap times" on handling track.	Minimize for "flat" re and high cornering confidence.

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Parametric Comparison:

Parameter	'89 BrII 4x2	'89 BrII 4x4
Avg. Track Width	56.9	56.9
C.G. Height (curb)	27.5	26.7
Stability Index	2.07	2.13
Versace Metric 1/	.3760	.3650
Roll Gain (°/g)	N/A	3.7
U/steer @ .3g (°/g)	N/A	4.4
U/steer @ .6g (°/g)	N/A	19.8
Overall Str Ratio	19:1	19:1
Wheelbase	94.0	94.0
WB/Tan(20°/SR) 2/	426.3	426.3
Engine Disp.	2.9L	2.9L
Horsepower	140	140
Curb Weight	3278	3371
HP/Weight 3/	.043	.042

1/ This a measure of stability that shows high correlation with actual FARS rollover data. Unlike the "Stability Index", this measure includes wheelbas effects (important for "directional stability") ... lower is "better".
2/ This is an analytical measure of steering gain. The smaller the value, the "quicker" is the perceived steering response.
3/ High power/weight is believed to promote aggressive driving.

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