

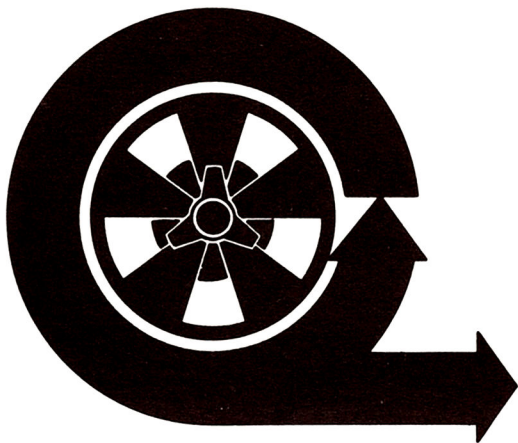
AERODYNAMICS & THE GROUP SEVEN RACING CAR

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AERODYNAMICS & THE GROUP
SEVEN SPORTS CAR

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Abstract

The interaction of aerodynamic normal and drag forces with tire and chassis characteristic of a Group 7 sports car and their effect on static stability and steady state turning are considered. Analytic techniques and objective data are applied to the analysis of vehicle motion. The influence of aerodynamic drag and download are identified and various methods of applying aerodynamic download are examined. The author's personal subjective experiences related to dynamic stability, transient response and frequency response of the Chaparral Group 7 car are recounted.

NOMENCLATURE

CF = cornering force - lbs.

C_L = lift coefficient

DF = aerodynamic downforce - lbs.

F_x = longitudinal tire tractive force - lbs.

g = acceleration due to gravity - ft/sec.²

m = $d\mu/dP$ - lbs.⁻¹

P = tire normal load - lbs.

R = corner radius - ft.

S = surface area - ft.²

v = velocity - ft/sec

W = vehicle static weight - lbs.

δ = tire load transfer - lbs.

η = acceleration - g's

μ = coefficient of friction

μ_0 = zero load coefficient of friction

ρ = mass density of air - slugs/ft.³

Subscript

F = front wheels

R = rear wheels

I = inside wheels

O = outside wheels

x = longitudinal component

y = lateral component

Superscript

- = value with no aerodynamic download