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Waterways Experiment Station

Results of Traction and Slope Climbing Tests with Selected Military Vehicles and Retrofit Tires in Support of Operation Desert Shield/Storm

by David M. Rogillio, William E. Willoughby, Randolph A. Jones

Prepared for U.S. Army Tank-Automotive Command

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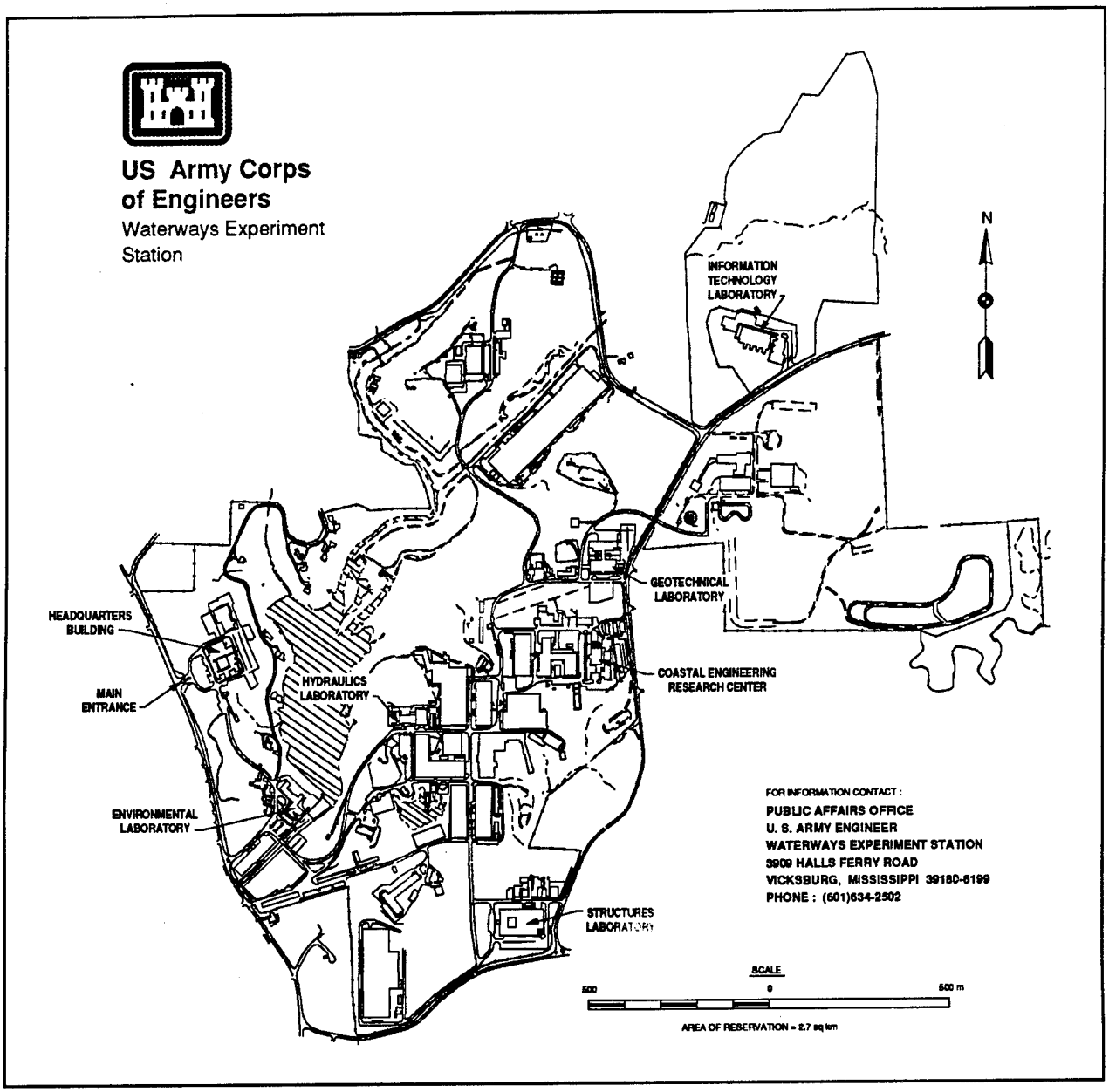

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Contents

Preface

Personnel of the U.S. Army Engineer Waterways Experiment Station (WES) conducted the study described herein during the period November 1991 through February 1992 for the U.S. Army Tank Automotive Command (TACOM).

The study was conducted under the general supervision of Dr. William F. Marcuson III, Director, Geotechnical Laboratory, and under the direct supervision of Messrs. Newell R. Murphy, Jr., Chief, Mobility Systems Division (MSD), and Richard H. Gillespie, Chief, Mobility Investigations Branch (MIB).

The field test program was directed by Mr. David M. Rogillio, MSD. The field test support was provided by Messrs. D. Strong, A. Roberson, D. McClurg, R. Tennant, and T. McCaffrey, MSD; Mr. R. Lackey, Hilton Systems; and Mr. J. Powell, Instrumentation Services Division (ISD). Mr. Randolph A. Jones, MSD, was instrumental in developing the data reduction methodology techniques. Mr. Quante Durante, North Carolina Agricultural and Technical State University, assisted in the implementation of the data reduction methodology. Ms. P. May assisted in the development of the plots and Ms. S. Griffin of Computer Science Corporation assisted in the development of this report.

This report was written by Mr. David M. Rogillio, Dr. William E. Willoughby, and Mr. Randolph A. Jones..

TACOM provided overall test direction through Mr. Arnie Pacis, and acknowledgement is made to Messrs. J. Marchant, A. Kowalsky, and Al Conde, Yuma Proving Ground (YPG) for their field test coordination during desert testing YPG.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander and Deputy Director was COL Bruce K. Howard, EN.

Conversion Factors, Non-Si to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
degrees (angle)	0.01745329	radians
Fahrenheit degrees	5/9	Celsius degrees or Kelvins[1]
feet	0.3048	meters
foot-pounds (force)	1.355818	meter-newtons or joules
gallons (U.S. liquid)	3.785412	cubic decimeters
horsepower (550 foot-pounds (force) per second)	745.6999	watts
horsepower (550 foot-pounds (force) per second per ton (force))	83.82	watts per kilonewton
inches	2.54	centimeters
miles (U.S. statute)	1.609347	kilometers
pounds (force)	4.448222	newtons
pounds (force) per square inch	6.894757	kilopascals
pounds (force) per cubic foot	992.845	kilopascals
pounds (mass)	0.4535924	kilograms
square inches	6.4516	square centimeters
tons (force)	8.896444	kilonewtons
tons (2,000 pounds, mass)	907.1847	kilograms

[1] To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: C = (5/9)(F-32). To obtain Kelvin (K) readings, use: K = (5/9)(F-32) + 273.15.

1 Introduction

Background

As a result of reported trafficability/tire problems by wheeled military support vehicles in sandy desert soils in support of Operation DESERT SHIELD/STORM, a priority project was established by the U.S. Army Tank-Automotive Command (TACOM), Warren, MI, and the U.S. Army Test and Evaluation Command (TECOM), Yuma Proving Ground (YPG), AZ to conduct tests in areas of the southwestern United States which are analogous to Middle Eastern (ME) terrains. Based on site support and availability, as well as terrain analogies (which showed strong similarities between YPG and ME terrain) (Gillespie, et al.1988) (Jones 1992) conducted by various federal agencies, the site selected for these tests was YPG. Results of tests conducted will be used to provide guidance on recommended tire inflation pressures or suggested commercial retrofit/replacement tires for military support vehicles.

On October 3, 1990, personnel of TACOM, TECOM, YPG, the U.S. Army Engineer Waterways Experiment Station (WES) and Nevada Automotive Test Center (NATC), met at YPG to plan the scope of work for this test program. The scope of work previously had been discussed by YPG and TACOM personnel, but firm commitments to portions of the testing had not been assigned and details had not been discussed with WES and NATC personnel. As a result of this meeting, NATC was assigned a review of available literature and tire mechanical/thermal testing, while WES was assigned traction and slope performance testing and mobility evaluations based on vehicle/tire test results. The tire durability testing, logistics support, test course scheduling, and vehicle/tire procurement were assigned to YPG. Overall program execution, overview, and guidance were to be TACOM functions.

During subsequent discussions among the test agencies, a decision was made to test vehicles and tires generally as they became available. Therefore, in November 1990, WES began testing available vehicle/tire configurations at YPG. The report herein describes the performance data collected and analyzed during the WES traction and slope testing.

Pertinent tire characteristics and soils data were collected for each vehicle/tire configuration. Tire pressures were generally based on those published in vehicle operating manuals, except in those cases where replacement tires were larger than those specified; then manufacturer-suggested pressures or estimates were used. A range of pressures was tested to permit development of performance relations for various vehicle configurations.

Purpose

The purpose of these tests was to provide vehicle/tire traction/slope performance data in sandy desert soils for use in matching appropriate vehicle/commercial tire configurations with terrain conditions encountered in desert operations such as those in support of Operation DESERT SHIELD/STORM. These test results will also be used to evaluate retrofit or replacement tire systems and kits for military combat and support vehicles in future operations in sandy desert terrains.

Scope

Thirty six vehicle\tire configurations (thirty five commercial tires and one military tire) involving eight manufacturers were tested. The tests were conducted with a group of eight wheeled military support vehicles in a single loose sandy soil condition at YPG that was somewhat analogous to loose sandy soils in ME desert terrain. This loose, low strength sand was considered to be a worst case trafficability condition. Several tire pressures were used on the same vehicle/tire/soil configuration to allow mobility comparisons of tire/pressure variations during expected off road missions of the vehicles. Several tires of each size tested by WES were selected for thermal profile tests conducted by NATC. Results of these tests and their subsequent effects on mobility will ultimately lead to the selection/recommendation of commercial replacement radials for use on wheeled support vehicles operating in ME terrains.

Definitions

The following are definitions of terrain and vehicle terms:

a. *Absorbed power*. The rate at which vibrational energy is absorbed by a typical human measured in watts. A criterion of 6-watts average absorbed power has been established as the upper-bound of vibration that will permit crew members to perform their tasks. Humans will accept considerably higher absorbed power levels (20 or more watts) for a short period (10 to 12 min) at the risk of injury and vehicle and

cargo damage. Thus, the 6-watt absorbed power level is not an absolute human tolerance limit but represents an effective performance limit (Pradko, Lee, and Kaluza, 1966).

b. *Cone index.* An index of the shearing resistance of a medium obtained with a cone penetrometer.

c. *Cone penetrometer.* An instrument used to obtain an index of insitu shear strength of soil. It consists of a 30-deg cone with a 0.5- or 0.2- in. sq. base area mounted on one end of a shaft. The shaft has circumferential bands to indicate depth of penetration. At the top of the shaft is mounted a dial indicator within a proving ring which indicates the force applied axially to the penetrometer. The instrument is forced vertically into the soil while records are made of the dial readings for various penetration depths.

d. *Coarse-grained soil.* A soil of which more than 50 percent of the grains, by weight, will be retained on a No. 200 sieve (larger than 0.074 mm in diameter).

e. *Critical layer.* The layer of soil that is most pertinent to establishing relations between soil strength and vehicle performance. The depth of the critical layer is dependent upon vehicle weight and the characteristics of the soil's strength-depth profile.

f. *Density.* The unit weight of the soil in pounds per cubic foot.

g. *Drawbar Pull (DBP).* The amount of sustained towing force a self-propelled vehicle can produce on a given surface. It is a function of the surface and of speed and is the net force derived from tractive effort reduced by the motion resistance.

h. *Drawbar Pull Coefficient (D/W).* Drawbar pull divided by vehicle weight.

i. *Fine-grained soil.* A soil of which more than 50 percent of the grains, by weight, will pass a No. 200 U. S. standard sieve (smaller than 0.074 mm in diameter).

j. *Gross Vehicle Weight (GVW).* Weight of a vehicle fully equipped, loaded, and serviced for operation including operating personnel.

k. *Immobilization.* The inability of a self-propelled vehicle to move forward or backward.

l. *Lean clay.* A definition used to describe a fine-grained mixture of silt and clay with a low to medium plasticity and a liquid limit less than 50.

m. *Moisture content.* The ratio expressed as a percentage of the weight of the water in the soil to the dry weight of the solid particles.

n. *Off-road.* Operation of a vehicle cross-country or operations on virgin terrain, not on a pre-established path.

o. *On-road.* Operation of a vehicle on primary roads, secondary roads, or trails.

p. *Optimum drawbar pull.* The drawbar pull value optimized at the point on the DBP-slip curve at which the vehicle work index is at a maximum.

q. *Pass.* One trip of the vehicle over a test course.

r. *Rating Cone Index (RCI).* The product of the remolding index (RI) and the average of the measured insitu CI for the same layer of soil.

s. *Remolding Index (RI).* A ratio that expresses the proportion of the original strength of a soil that will be retained after traffic of a moving vehicle. The RI is determined by taking CI measurements of an undisturbed sample of soil and CI measurements of the same sample that has been remolded by dropping a 2 1/2 lb hammer approximately 12 in. for 100 blows. The RI is the result of dividing the disturbed average CI reading by the undisturbed average CI reading.

t. *Ride.* The random, semiuniform vibrations transferred by the vehicle to the driver or other occupants as a result of traveling over an uneven surface.

u. *Sand.* A coarse-grained soil with the greater percentage of coarse material (larger than 0.074 mm) passing the No. 4 sieve (4.76 mm).

v. *Shock.* The sudden, severe change in vibration transferred from the vehicle to the driver or other occupants as a result of an impact with a discrete obstacle such as a boulder, log, rice paddy dike, or ditch. A criterion of 2.5-g vertical acceleration has been established as the upper bound of shock acceptable by humans.

w. *Slip.* The percentage of track or wheel movement ineffective in advancing a vehicle.

x. *Speed-made-good.* A speed obtained by dividing the straight line distance between two widely separated points in a terrain or test situation by the total travel time between them, irrespective of path actually taken.

y. *Surface Roughness (RMS).* A measure of the variation of the surface elevations. It is the root-mean-square value of the detrended elevations, expressed in inches. The detrending filters wavelengths beyond 60 ft, which produce little effect on vehicle ride.

z. *Towed Motion Resistance (TMR).* The force required to tow a given vehicle in neutral gear under given test conditions.

aa. *Towed Motion Resistance Coefficient (T/W).* TMR in pounds divided by the gross weight of the vehicle in pounds.

bb. *Tractive effort.* The propelling force that can be developed by the ground-contacting elements of a vehicle on a given supporting medium.

cc. *Unified Soil Classification System (USCS).* A soil classification system based on identification of soils according to their textural and plastic qualities and on their grouping with respect to engineering behavior.

dd. *Vehicle cone index (VCI).* The minimum soil strength, expressed as RCI, that will permit a vehicle to complete a specified number of passes; thus, VCI_1 means the minimum RCI necessary to complete 1 pass, and VCI_{50} means the minimum RCI necessary to complete 50 passes.

ee. *Work Index.* A dimensionless number that indicates the vehicle's efficiency and is defined as follows:

$$Work\ Index = \frac{Drawbar\ pull}{Vehicle\ weight}\left(1 - \frac{slip}{100}\right)$$

2 Test Procedures and Data Collected

Test Vehicles

Eight military vehicles equipped with various tire configurations were used in drawbar pull (DBP), motion resistance (MR), and slope climbing tests at the Sand Dynamometer and Sand Slope courses at YPG. Test vehicles were assigned a vehicle configuration number to distinguish between vehicles and tires tested. Pertinent vehicle data are shown in Table 1, and vehicle configuration numbers along with pertinent information on each tire tested are presented in Table 2. The pressures selected represented commonly used tire pressures in mission roles, generally highway, cross country, mud/sand/snow, and emergency. However, since some of these tires would be replacement radial tires for assigned equipment, tire pressures were assigned to generally reflect expected usage under the four general categories (highway, cross country, etc.). Photos of test vehicles are shown in Figure 1.

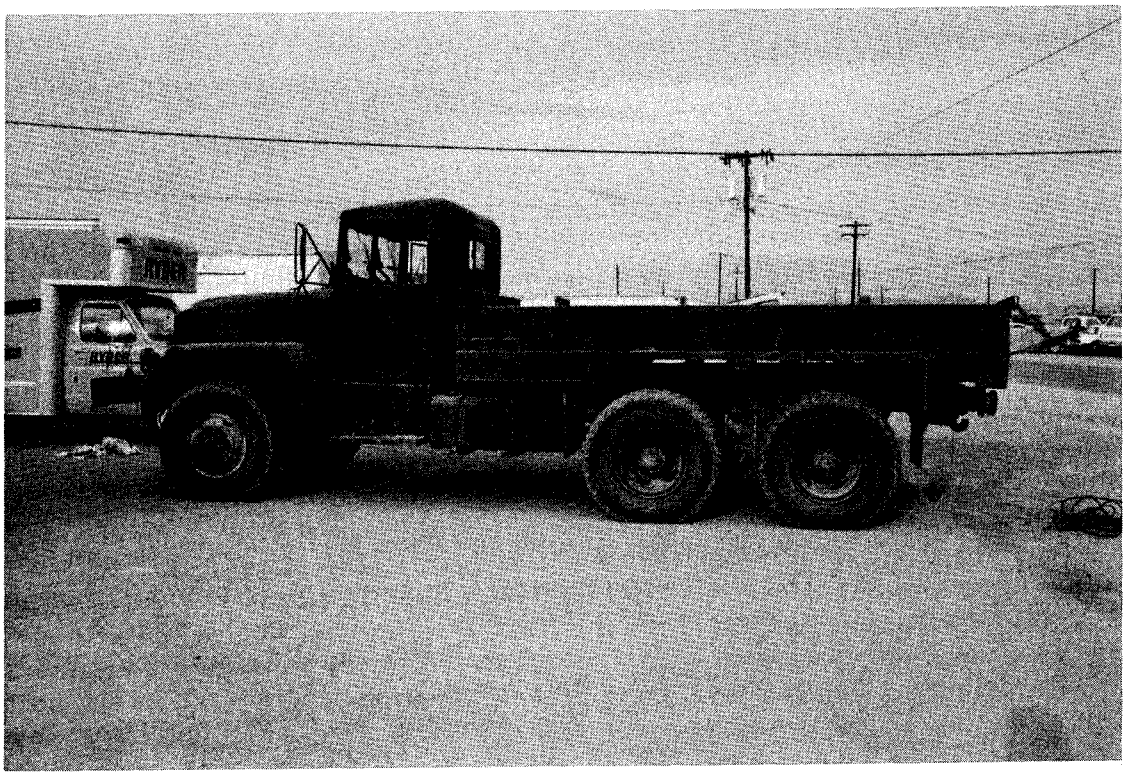
Test Areas

In order to assure uniformity within test areas over the long period of projected testing and maintain test control/consistency in a worst case terrain condition, the tilled, loose, dry sand areas of the Sand Dynamometer Course and Sand Slopes were selected as the test areas for this program. Results of these baseline tests will be used to estimate vehicle/tire performances for other vehicles being used in the ME after Operation DESERT SHIELD/STORM or in other similar desert terrains. Photos of the test areas are shown in Figure 2.

a. M1009.

b. M1028.

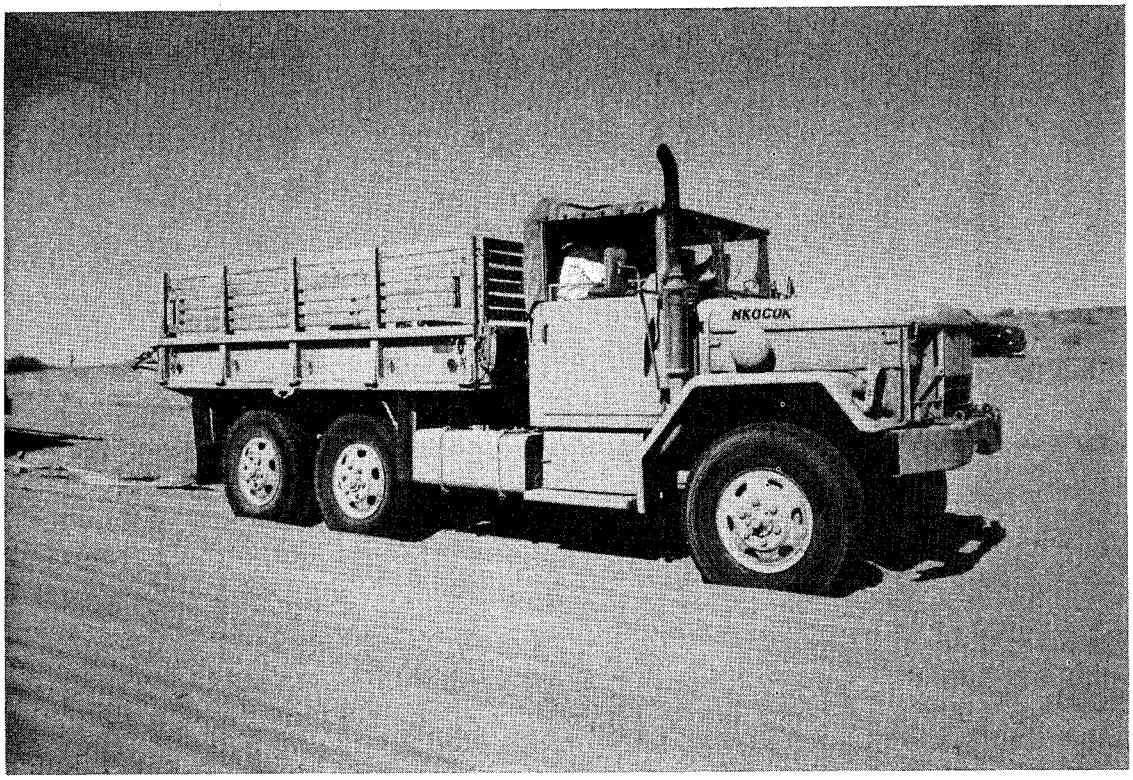
Figure 1. Photos of test vehicles. (Sheet 1 of 4)



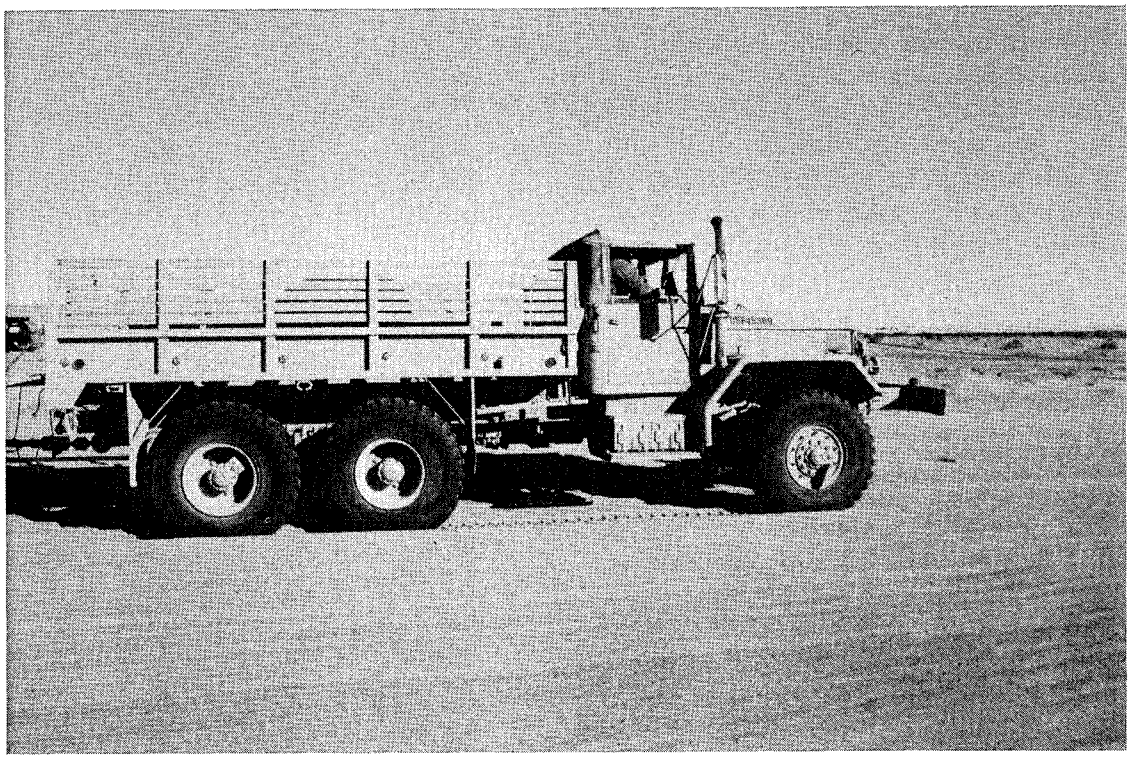
c. M54A2.

d. M35A2.

Figure 1. (Sheet 2 of 4)

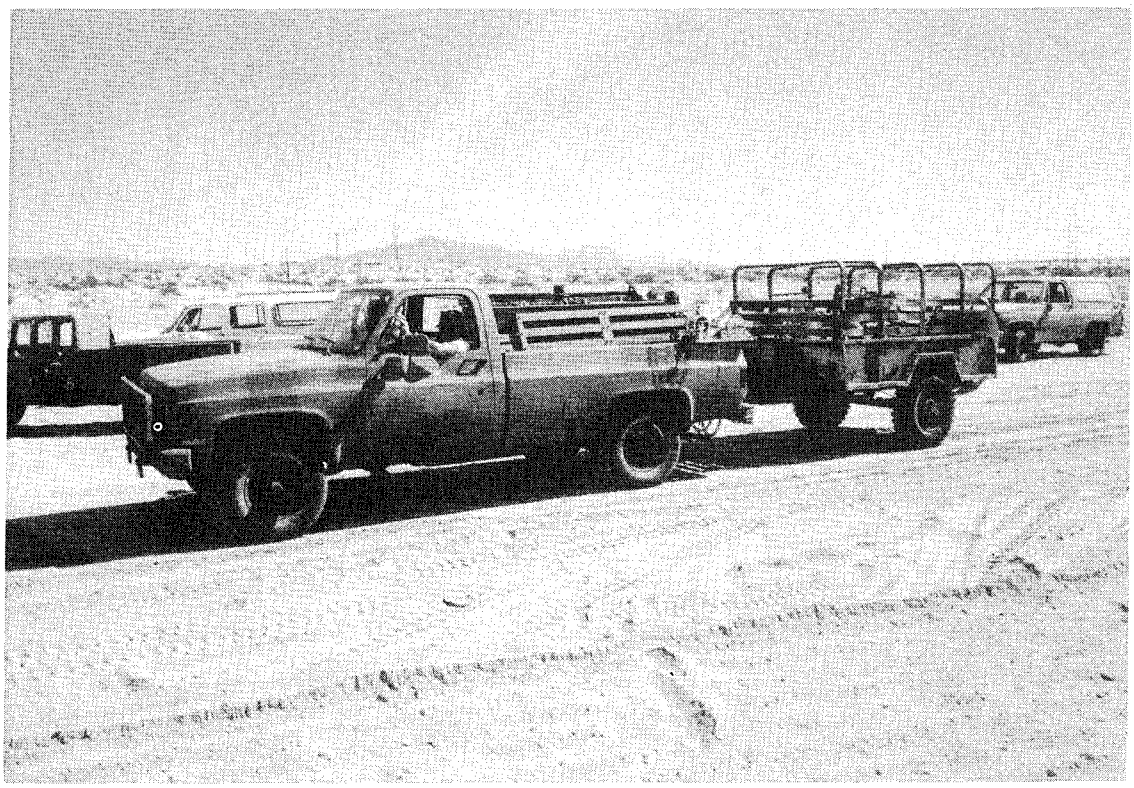


e. M35A2 with singles.



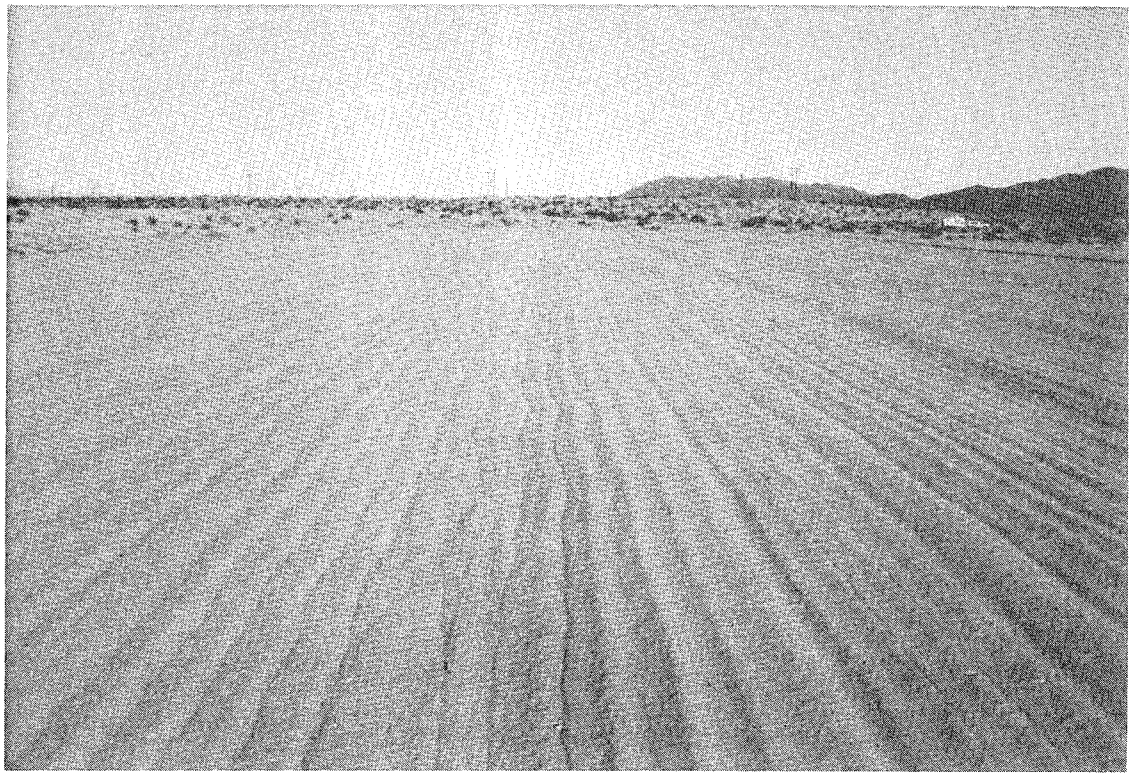
f. M813.

Figure 1. (Sheet 3 of 4)

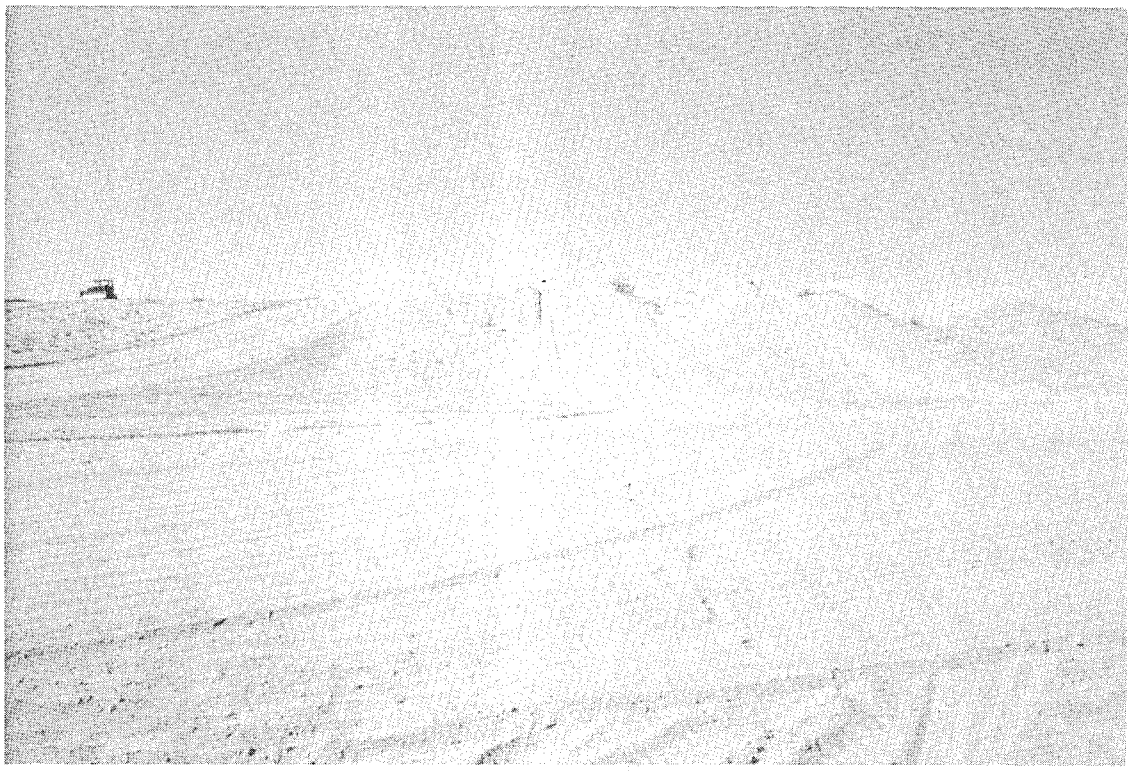


g. M1008.

Figure 1. (Sheet 4 of 4)



a. Sand Dynamometer.



b. Sand Slopes.

Figure 2. Photos of test courses.

Test Types

Drawbar pull/motion resistance (DBP/MR) tests

The off-road performance of a vehicle is dependent to a large extent on the net traction (DBP) that develops between the ground surface and the running gear (Willoughby, et al. 1991). Dramatic reductions in performance can occur with traction loss in loose sand or wet, fine-grained soils, even though the soil strength may be adequate to support the vehicle. The total (gross) traction of a vehicle on a given soil condition is the sum of the DBP and the MR developed in providing useful work or making forward progress. Because the total traction is difficult to measure in itself, the two additive values of DBP and MR are usually measured independently and added to determine the total traction.

Prior to traction testing with each configuration, tire pressures were selected by WES and YPG to reflect expected usage for each application. Tire deflections and tire prints (used for measuring contact area) were obtained on a non-deformable surface at each pressure for each configuration for reference purposes and for use in tire evaluations. These data are presented in Table 2 by vehicle and configuration.

DBP and MR tests were conducted on the Sand Dynamometer Course. In order to provide a test medium that could be reproduced as necessary for uniformity and consistency that extended over the 3 - 4 months of testing, a level site was selected with tillage planned before each test sequence. Tilling was accomplished using a D7 dozer pulling a 10-in. disk plow, thus creating a soft, worst case condition that is only analogous to some of the areas found in off-road desert terrains. The tillage did, however, produce uniform test lanes but they exhibited artificially lower soil strengths than those commonly found in natural desert terrain. Such low strengths (Table 3) in the 0- to 6-in. layer will generally only be found in the "blow-sand" or sand dune areas exposed to desert winds or on soft sand areas subjected to heavy vehicle traffic (worst case scenarios). The soil was classified as a silty sand (SP-SM) by the Unified Soil Classification System (USCS). To determine the soil strength, 10 cone index measurements were taken throughout the length of the test lane. Soil samples were collected at the surface and at the 0-to 6-in. layers to determine soil moisture content as presented in Table 3.

Each DBP test began with the test vehicle positioned on the test course in a position that allowed for a 300-ft test lane. A nylon strap was connected from the load vehicle to the rear of the test vehicle. The test vehicle was operated at approximately 2 mph, with the transmission in it's lowest gear and the transfer case in all-wheel-drive. The vehicle was driven into the test lane with the load vehicle following such that the cable between them was in a slack, unloaded condition. The driver of the load vehicle gradually applied braking to the load vehicle. The test vehicle initially experienced a "no load-no slip" condition that gradually increased by stages to a "high load-high slip"

condition.

At selected measured values of DBP from the test record, the vehicle slip was calculated from the corresponding measured values of true ground distance traveled and apparent ground distance traveled. The vehicle slip in percent is equal to:

$$Percent\ Slip = \left[1 - \frac{Measured\ wheel\ distance\ travelled,\ ft}{Apparent\ wheel\ distance\ travelled,\ ft}\right] * 100$$

Data were reduced in this manner until a sufficient number of load and slip combinations were recorded to develop the drawbar pull-slip curve.

MR of the test vehicle was measured for each vehicle/tire/pressure configuration tested by pulling the test vehicle backwards. For the MR tests, the load cell was attached by the tow strap to the disk plow and the vehicle was towed behind the D7 dozer. This allowed for the MR to be measured in the same soil condition as for the DBP without the vehicle being pulled through ruts made during the DBP tests. During towing, the test vehicle's transmission was in neutral and the engine was running at idle. A towing speed near 2 mph was maintained for a sufficient distance to permit the motion resistance to stabilize and be recorded on magnetic tape. Photographs of DBP and MR testing are shown in Figure 3.

Slope tests

Soil strength and slopes are the two primary elements which limit a vehicle's performance in cross-country terrain. Dramatic reductions in performance occur as slope increases (Rogillio 1990). Therefore to assess mobility performance, the vehicle's ability to climb slopes of varying percentages was determined. Slope-climbing tests are generally evaluated in terms of GO/NOGO. However, for comparison purposes in this study the actual distance achieved up the slope was measured for each NOGO.

Each test began with the driver positioning the vehicle a sufficient distance from the toe of the slope in a standing position and proceeded upslope at a steady speed of about 3-5 mph. The test proceeded with the vehicle attempting to climb the slope on the first pass, if possible. A second attempt was made with each vehicle/tire/pressure configuration to obtain an average distance completed up the slope. All tests were conducted with the vehicle's transmission in it's lowest gear and all-wheel-drive. Field notes were logged to describe the performance of the vehicle in terms of a GO or distance made up slope. Distance achieved up the slope was measured from the toe of the slope to the point where the center of the 1st axle stopped on the slope. At the end of tests where the test vehicle was unable to completely climb the slope, the driver backed the vehicle down the slope. In order to insure uniform soil conditions for each test, each slope was regroomed using the disk plow at

a. M813 at beginning of DBP test.

b. M54A2 approaching 100% slip.

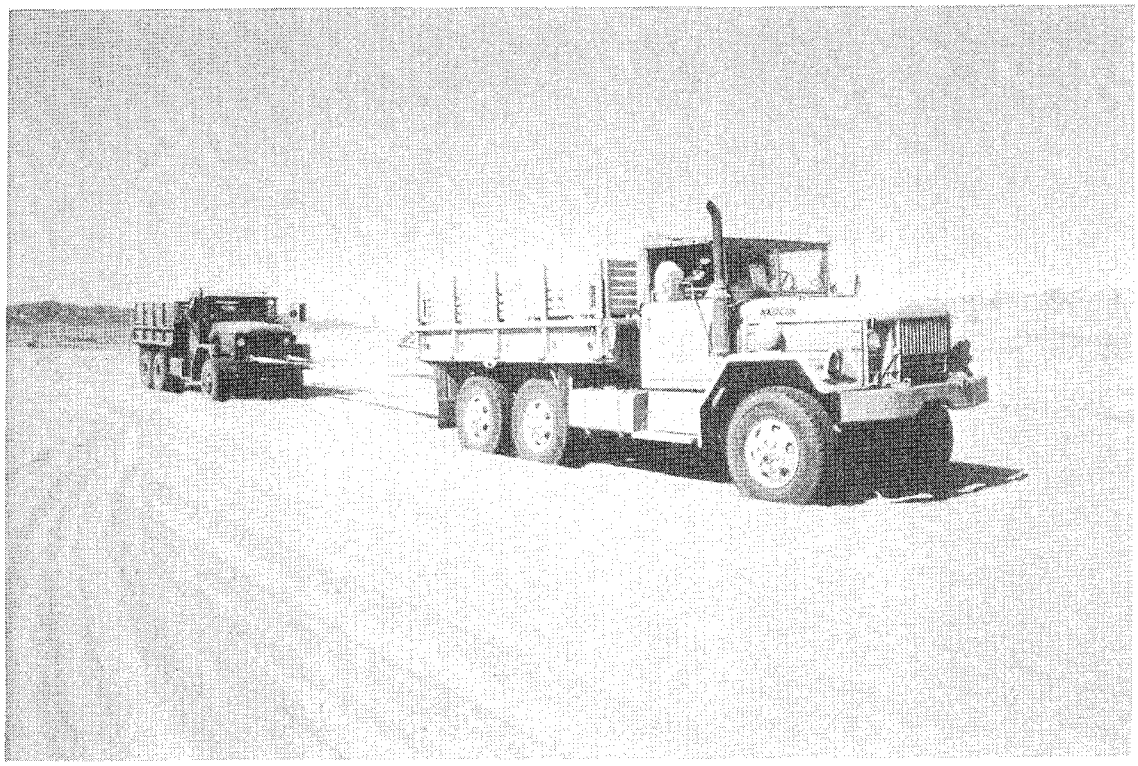
Figure 3. Photos of DBP and MR tests. (Sheet 1 of 4)

c. M1009 at during DBP test.

d. M35A2 just prior to load being applied.

Figure 3. (Sheet 2 of 4)

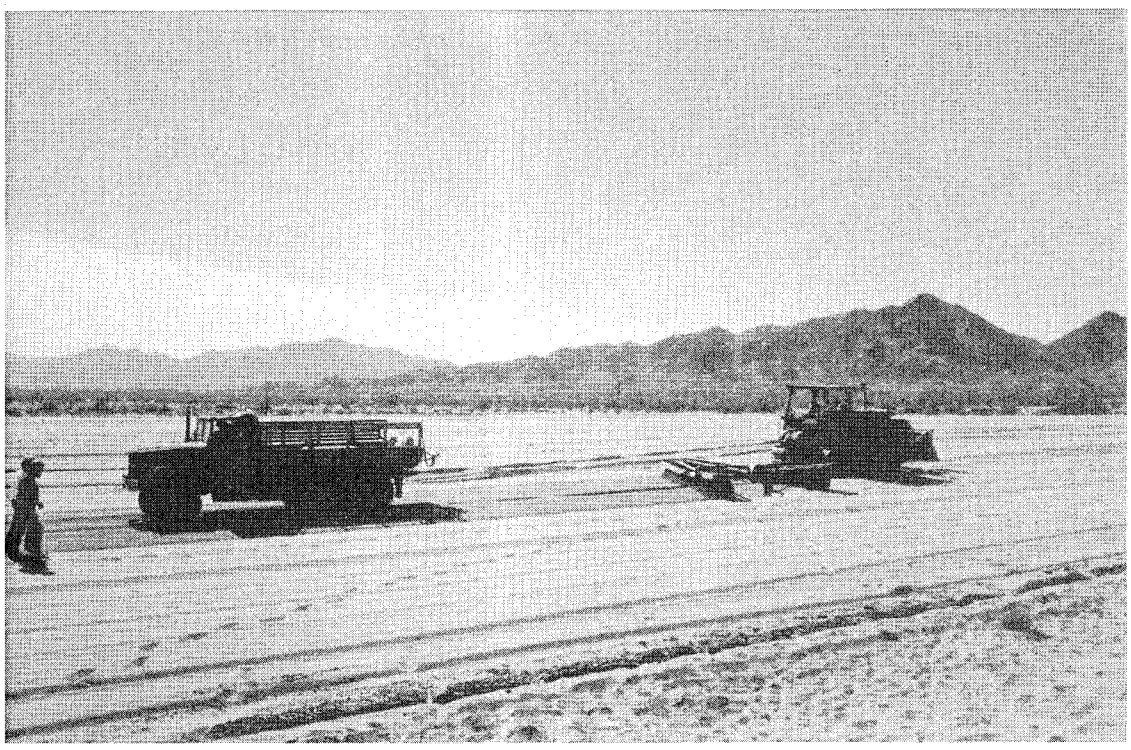
e. M1028 at 100% slip.



f. M35A2 with singles at beginning of DBP test.

Figure 3. (Sheet 3 of 4)

g. M1028 at beginning of MR test.



h. M35A2 with singles during MR test.

Figure 3. (Sheet 4 of 4)

intervals during testing to insure that no tests were conducted in ruts from previous tests. At the conclusion of testing in December 1991, it was necessary to make some repairs to the slopes. When testing resumed in February 1991, the grade of each slope had been decreased by 2 to 4 percent. Slope 1 changed from 14 to 12 percent, slope 2 changed from 19 to 16 percent and slope 3 changed from 22 to 18 percent. Photographs of slope testing are shown in Figure 4.

NATC tire mechanical/thermal tests

Several tires were selected for thermal profile tests to determine maximum speeds allowable at different tire inflation pressures and wheel load. These tests were conducted by NATC and the results provided to the WES. Of these tires, 3 were specifically selected by YPG to be used for durability testing. The data provided by NATC, along with the results of DBP/MR tests and measured tire data collected by the WES, were input by the WES into the NATO Reference Mobility Model (NRMM) to determine optimum operational tire pressures to be recommended for each vehicle based on the final user's scenario. The methodology and results of these tire recommendations on expected Desert Shield/Storm performances are given in Appendix A.

Instrumentation

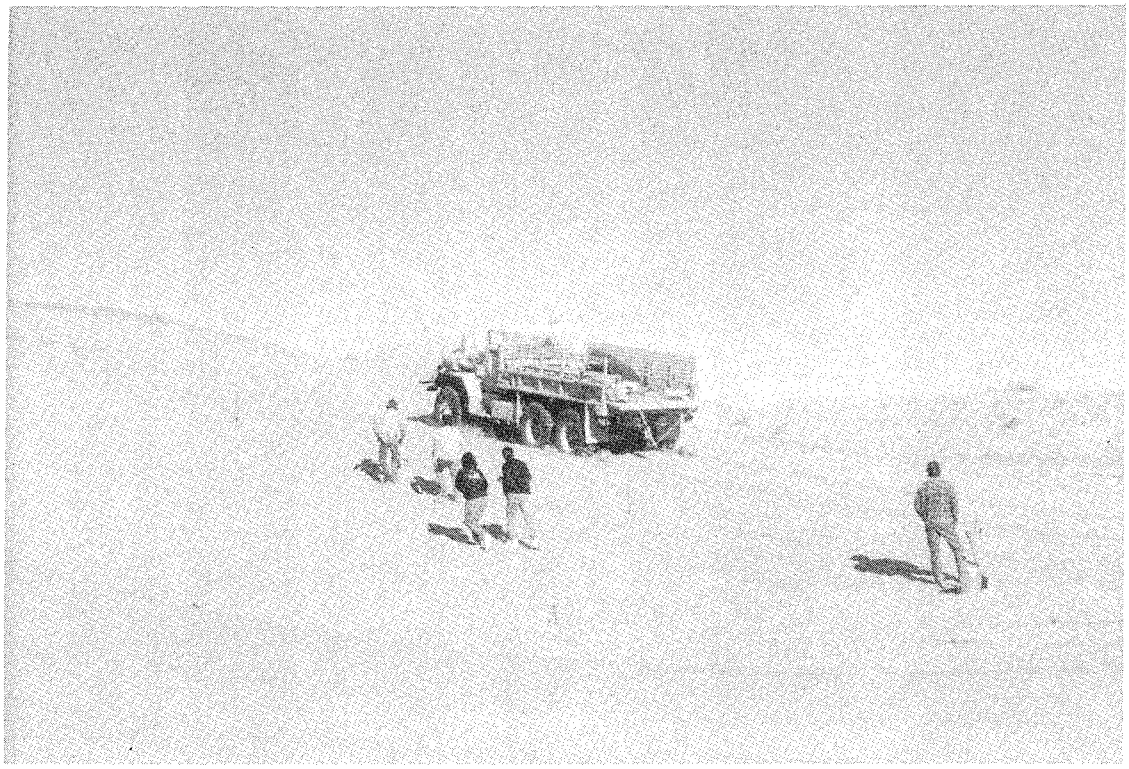
Drawbar pull/motion resistance (DBP/MR) tests

For DBP tests, a string playout device was mounted on the test vehicle for measurement of true ground distance. A sensor was mounted on the test vehicle's drive shaft in order to measure rotational speed, which is directly proportional to wheel rotation. The drive shaft sensor was calibrated on a hard surface at a creep speed so that distance per rotation could be determined without any wheel slip. A linear load cell was placed on the rear of the test vehicle in line with the tow strap that connected it to the load vehicle. A 50K load cell with 0.1% accuracy was used for the heavy vehicles and a 20K load cell with 0.1% accuracy was used for the CUCV's. All signals from the instrumentation were passed through a signal conditioning box located in the cab of the vehicle and transmitted to a TEAC tape recorder and recorded on magnetic tape. MR data were collected using only the load cell and recorded in the same manner as with the DBP data.

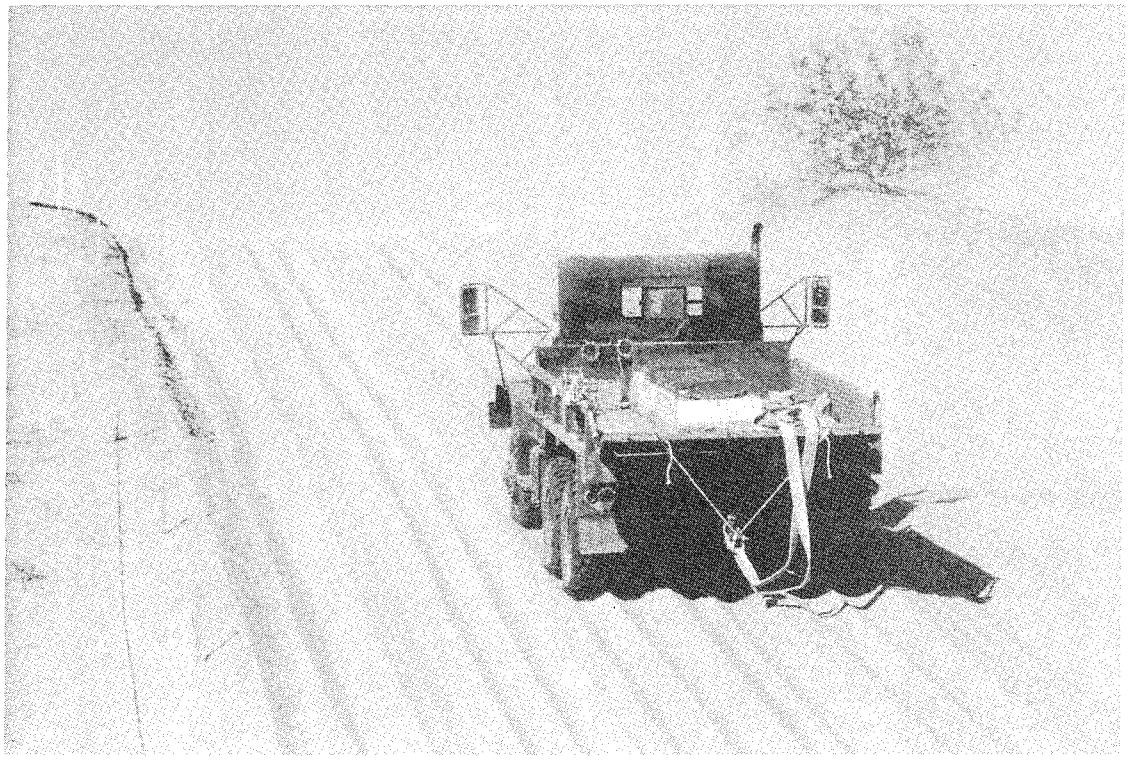
a. M1028 with duals on slope 2.

b. M1008 with trailer on slope 3.

Figure 4. Photos of slope testing. (Sheet 1 of 2)



c. M35A2 with singles at end of test on slope 3.



d. M54A2 making second go on slope 2.

Figure 4. (Sheet 2 of 2)

3 Analysis of Test Data

Drawbar Pull Test Results

In order to compare the performances of the various tire size/pressure configurations, a methodology was developed which systematically integrated the performance of the tires relative to manufacturer, dimensional properties, pressure and deflection. The methodology uses best-fit curves for the drawbar pull data bases along with the work index equation and resulting optimum drawbar pull and average vehicle tire deflections. First the drawbar pull is measured over a short time interval (1/2 to 1 sec or less) and for each pull the corresponding wheel slip is calculated using;

$$Percent\ Slip = \left[1 - \frac{Measured\ wheel\ distance\ travelled,\ ft}{Apparent\ wheel\ distance\ travelled,\ ft}\right] * 100$$

A sufficient number of measurements are made in this manner to develop a complete drawbar pull-slip curve for each test condition. These values along with the corresponding load values in lbs, and drawbar pull coefficient (D/W), and slip values for each vehicle are presented in Table 4. From previous studies (Jones 1992) it has been shown that drawbar pull test data can be accurately represented by equations in the form of a rectangular hyperbola or higher-order polynomial equations.

$$Rectangular\ Hyperbola:\ Y = \frac{X}{C(1) + C(2)\ X}$$

$$Higher\text{-}Order\ Polynomial:\ Y = C(1) + C(2)\ X + C(3)\ X^2 + \ldots + C(i)\ X^{i-1}$$

Data collected from drawbar pull tests in fine-grained soils often take the form of a rectangular hyperbola, and tests conducted in coarse-grained soils take the form of a higher-order polynomial. Drawbar pull tests conducted in soils which exhibit properties of both fine-grained and coarse-grained soils can be represented by either form. To analyze the data accurately, a computer program was designed and written that uses both equation forms in evaluating each data set. Based on the correlation coefficient between each equation and

data set, the program selects the equation which best represents the data yielding equations of the form:

$$\frac{Drawbar\ Pull}{Gross\ Vehicle\ Weight} = \frac{Slip}{C(1) + C(2)\ Slip}$$

$$\frac{Drawbar\ Pull}{Gross\ Vehicle\ Weight} = C(1) + C(2)\ Slip + C(3)\ Slip^2 + .. + C(i)\ Slip^{i-1}$$

Normalizing the drawbar pull load, by dividing the load pulled by the gross vehicle weight, produces the drawbar pull coefficient. The values of DBP coefficient and corresponding slip from Table 4 were plotted to show the relationship of DBP coefficient versus vehicle slip from 0 to 100 percent and are presented as Plates 1 - 38. The DBP coefficient allows comparisons to be made between different vehicles and vehicle configurations.

The work index equation is used to accurately determine the maximum work output of a vehicle.

$$Work\ Index = \frac{Drawbar\ Pull}{Gross\ Vehicle\ Weight}\left[\ 1 - \frac{Slip}{100}\ \right]$$

Manipulating the work index equation also yields the slip at which the maximum work index of the vehicle occurs.

$$Slip = \left[\ 1 - \left[\ \frac{(Work\ Index)X(Gross\ Vehicle\ Weight)}{Drawbar\ Pull}\ \right]\ \right] \times 100$$

Once the slip at maximum work index is calculated, the drawbar pull equation for the data set can be used to determine the optimum drawbar pull coefficient at maximum work index. These results are presented in Table 5. With each data set reduced to optimum drawbar pull coefficients at maximum work indexes, performance comparisons can be made by analyzing the optimum drawbar pull coefficient with the corresponding tire deflection. These values are presented in Table 5 and Plates 39-48. These relationships yield vehicle/tire performance trends for the soil type. To represent the combined tire performance relative to the tested tire deflection, each optimum drawbar pull coefficient was divided by the corresponding tire deflection producing a performance index as shown in Table 5. The performance index methodology presented here is for tires which follow the standard military tire designs and aspect ratios. A unique tire design, such as a very low section height, may not produce the same performance trends as the tires presented in this report. The performance index generated for standard military tires produces trends which indicate performance relationships based on the tire's deflection. If the tire does not yield significant increases in it's pulling force as the deflection

increases, the performance index yields a smaller value than the preceding performance value. This indicates that the increase in tire deflection did not follow the previous index value trend and significantly improve the drawbar pull performance. Therefore, the pull force per tire deflection is not at a maximum, but the index value could represent the largest drawbar pull force. This information can also be beneficial when operational tire deflections are being defined. It may not be cost effective, due to the durability life of a tire, to increase the tire deflection beyond a certain level if a significant amount of pulling force is not gained. The resulting performance index values presented in Table 5 were averaged to produce a single performance index value for the associated tire/deflection/vehicle configuration. This numeric of average optimum drawbar pull coefficient versus average percent tire deflection is a performance index which indicates the tire's average pull per deflection and are presented in Table 5 and Plates 49-54.

This performance index number is used as the traction value which represents the overall tire performance for tire comparisons. Table 6 presents the ranking of each vehicle/tire configuration performance and the average tire deflection of the associated vehicle/tire configurations. The configuration's average tire deflection represents the average of all the tested deflections for each vehicle/tire configuration. This is an indication of how each tire deflection varied for the given vehicle/tire configuration. The performance ranking in Table 6 is dependent on the performance index value of the ratio of the average optimum drawbar pull coefficient to the average percent tire deflection. The performance ranking follows a descending order, which is represented by the largest value being the best performer.

To understand how the overall tire performance index relates to real performance, use the values presented in Table 6 to determine the amount of DBP two different tires created for a common tire deflection. For example the M1009 CUCV was tested with ten different tires. The performance index equation to determine the vehicle pull is (performance index) x (percent tire deflection) x (vehicle weight). Using configuration 7 data in the equation would produce an optimum vehicle pull of, 0.007259 x 25% x 7250 lb = 1315.7 lb, and configuration 9 would produce a pull of, 0.005815 x 25% x 7250 = 1054.0 lb. Therefore, configuration 7 would produce approximately 262 lb more of terrain traversing force. This is not substantial, but can make a difference when the maximum performance of the vehicle is needed during slope climbing and towing configurations.

M1009

Table 6 and Plate 49 show the results of testing with the M1009. In general, from these results it can be seen that the M1009 performed better all around with the larger 33x12.50R15LT tires than it did with the standard 31x10.50R15LT. This was largely due to the increase in ground contact area with the larger tires. Of the larger tires tested three performed equally well,

the Firestone ATX , the Armstrong Norsemen Tredlok and the Goodyear Wrangler MT, which gave the best overall performance. The least overall performance of the ten tires tested came from the Uniroyal Laredo A/T tire. The remaining six tires performed about the same.

M1009 Stormer

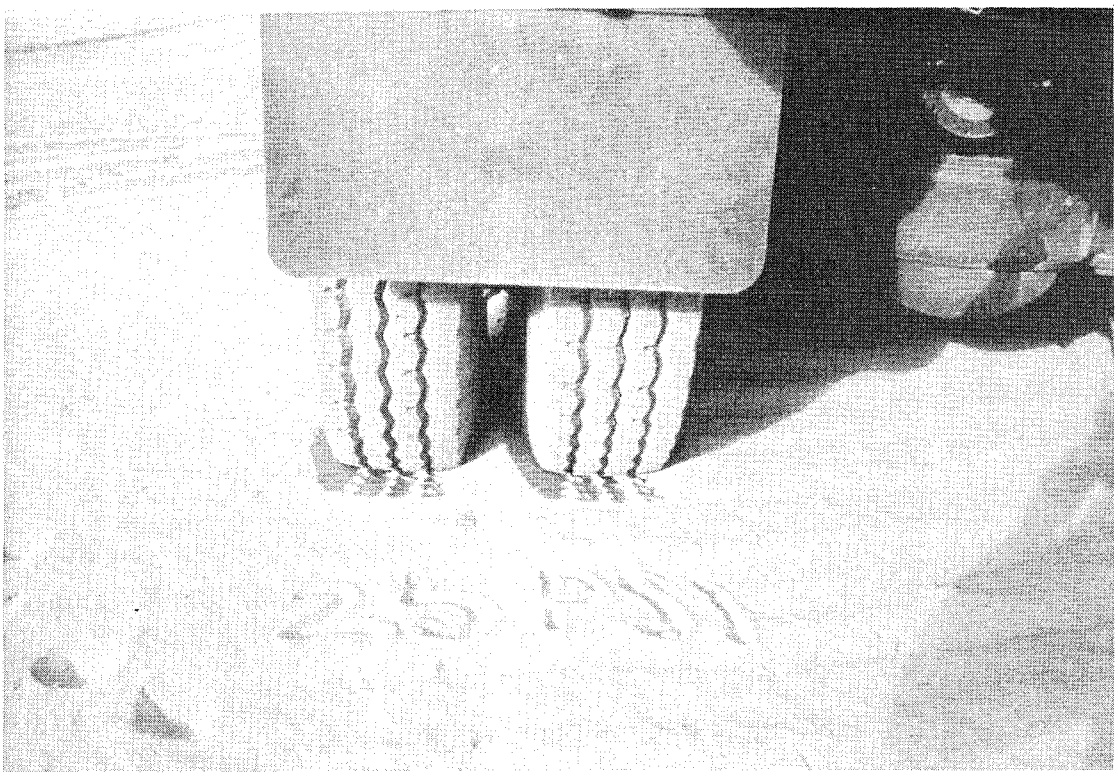
The results of tests with the M1009 Stormer are presented in Table 6 and Plate 54. This vehicle is an M1009 modified for desert operation. Comparison with the standard M1009 with Goodyear Wrangler HT 33x12.50R15LT shows very similar results to the Stormer with Goodyear Wrangler HT 33x12.50R15. The slight differences might be attributed to the test area. The Stormer was tested in an area of the Sand Dyno Course that had a slight slope and was less suitable for DBP testing. This area was used only because the original test area had been disturbed during some low-level dust tests that were conducted the day before by YPG with a helicopter.

M1028

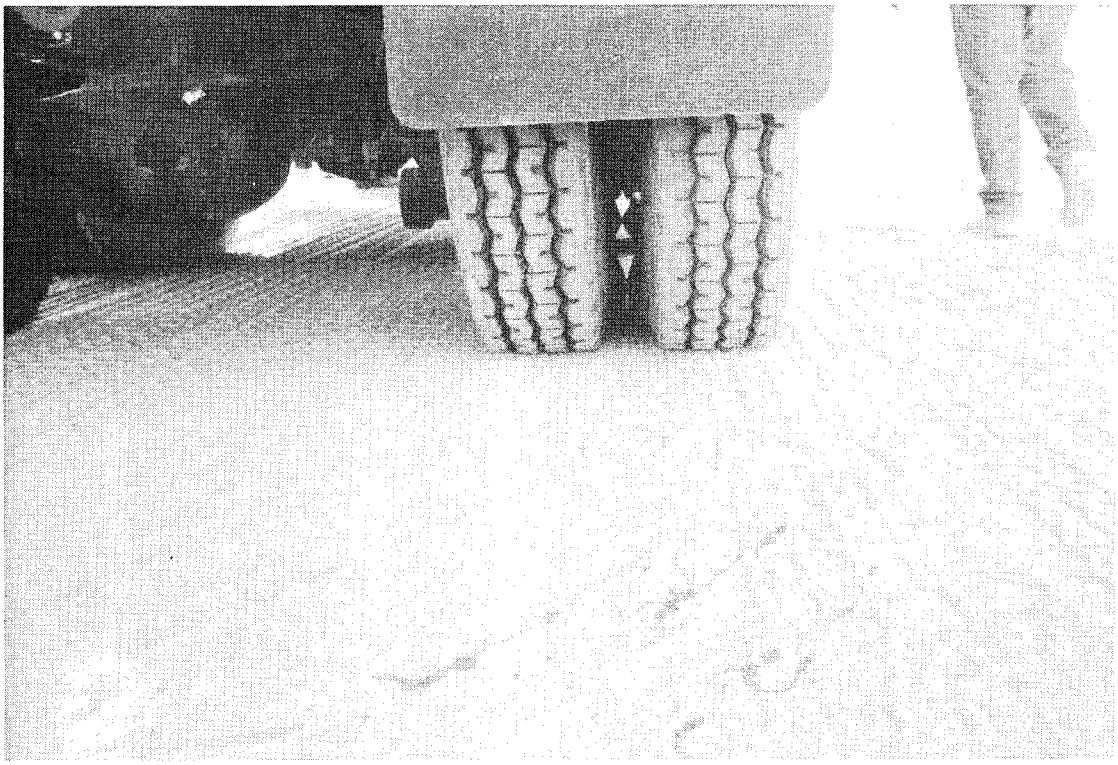
Table 6 and Plates 50 and 51 show the results of testing with the M1028. The M1028 that was selected as a test vehicle was configured to support dual wheels in the rear. However, only one tire was tested in a dual configuration. The dual wheels in the rear proved to be less desirable for traversing a loose sandy soil. At higher tire inflation pressures the vehicle had difficulty maneuvering except in a straight line. As the tire inflation pressure was decreased, the performance of the vehicle increased. At lower tire inflation pressures (20 psi), the bulge in the rear tires became large enough to allow the tires to touch (See Figure 5). This would only be an acceptable pressure configuration in emergencies where only a short distance was to be traveled. The balance of the tires were separated into two sizes, 16- and 16.5-in. The 16.5-in. tires were mounted on split rims like the ones used for the HMMWV. This seemed to work well except at lower pressures some tires developed wrinkles in the sidewall. From this group, the Goodyear Wrangler MT 33x12.50R16.5LT and Goodyear Wrangler AT 33x12.50R15LT produced the best overall performance with the remaining eight tires performing at a slightly lower level.

M54A2

Table 6 and Plate 52 show the results of testing with the M54A2. The tires with the best overall performance were the Goodyear G286 11.00R20 and the Goodyear Unisteel G188 11.00R20. The remaining tires performed about the same. Since the M54A2 has duals in the rear, the same problem as with the M1028 arose. As the tire inflation pressure in the rear was decreased to about 25 psi, the tires began to touch. This can be seen clearly in the photographs



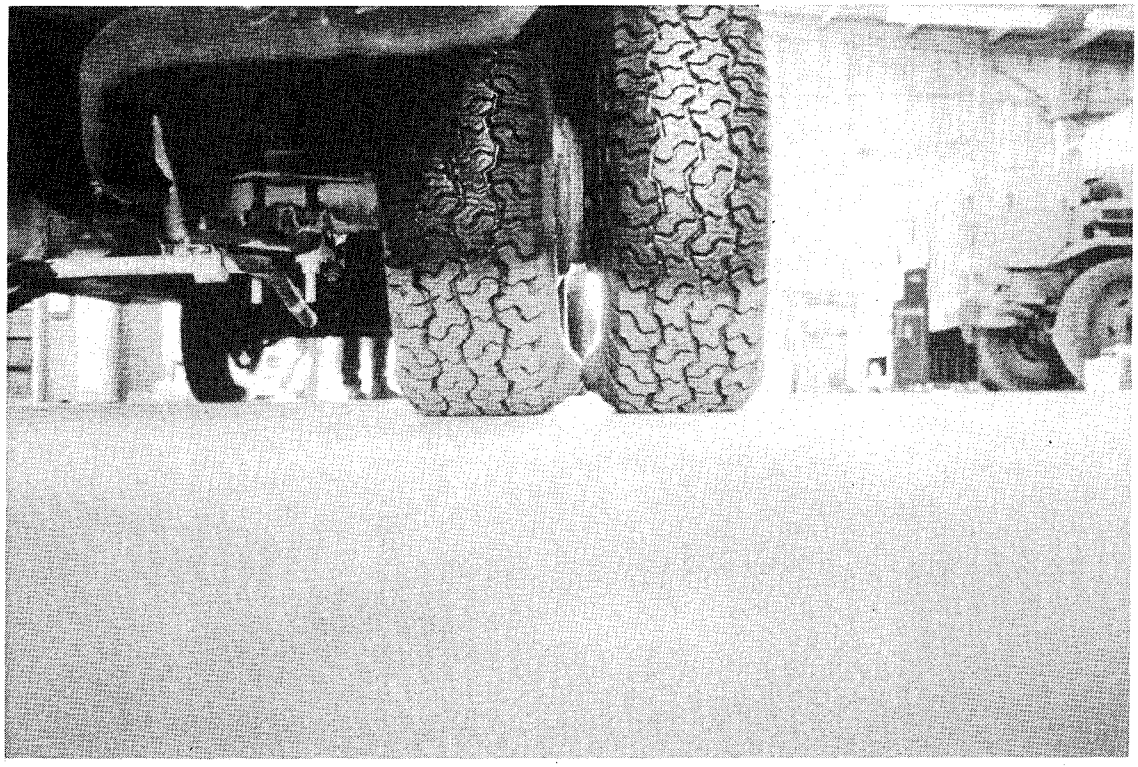
a. M54A2 with 11.00R20 tires at 25 psi inflation pressure.



b. M54A2 with 11.00R20 tires at 20 psi inflation pressure.

Figure 5. Effects of tire inflation pressure on dual wheels. (Sheet 1 of 2)

c. M54A2 with 11.00R20 tires at 15 psi inflation pressure.



d. M1028 with 235/85R15 tires at 10 psi inflation pressure.

Figure 5. (Sheet 2 of 2)

in Figure 6 and could be the reason for the wider Michelin XS 12.00R20 performing at a lower level.

M35A2 with duals and singles

Table 6 and Plate 53 show the results of testing with the M35A2 with dual and single tires. The dual and single tire configurations had similar performance results for configurations 26, 30, and 34. The dual tire configuration 24 with the NDCC retreads produced a very poor result. The best configurations were 29, 32, and 28. The best overall performer was the Michelin XL 11.00R20 super single configuration. From these tests it can be seen that the performance of the M35A2 can be increased by using larger 11.00R20 single tires rather than the standard 9.00R20 tires in a dual configuration.

M813

Table 6 and Plate 54 show the results of testing with the M813. Both the Goodyear AT-2A and the Bridgestone Jamal V-Steel performed well. Once again, from these tests it can be seen that the performance of the M813 with 14.00R20 singles is far better than that of the M54A2 with 11.00R20 tires in a dual configuration. Also, it should be noted that this vehicle/tire configuration out-performed all the others.

M1008

Table 6 and Plate 54 show the results of testing with the M1008. This vehicle was tested with only one tire, the Goodyear Wrangler HT. It was tested while pulling a utility trailer. With the trailer in tow, the M1008 had difficulty maneuvering at 30 psi tire inflation pressure. Dropping the pressure to 25 psi improved the vehicle's ability to maneuver in the sand and increased the DBP slightly. Further decreases in pressure were not able to increase the DBP of the vehicle. Also, the M1008 with a towed trailer performed only slightly worse then the CUCV in its poorest performing configuration. This is a real indication how small amounts of residual vehicle pull can enhance a vehicle's performance.

Motion Resistance Test Results

The motion resistance of each vehicle configuration, for each tire pressure, was measured and are presented in Table 7. The results indicate that tire inflation pressure has a significant effect on motion resistance in loose sandy soils, for all vehicle/tire configurations. Higher tire pressures resulted in larger motion resistance and lower tire pressures resulted in smaller motion

resistance. As tire pressure is decreased, the area of the tire in contact with the sand increases, thus spreading the load over a greater area. In effect, this decreases the penetration of the tire in the sand for the same load. The amount of sand that must be displaced is also decreased allowing for easier forward movement.

Slope Test Results

For each attempt to climb the slope, the distance made up the slope by the vehicle was measured and recorded. For tests where the vehicle was able to negotiate the entire slope, the result was recorded as a GO. The results are presented in tabular form in Table 8. The results of slope tests for each vehicle are given in the following paragraphs.

M1009

Plates 55 - 64 show the results of testing with the M1009. In general, the slope performance of the M1009 was good. The worst performance of the M1009 was obtained with the standard Uniroyal Laredo tires. Being the smallest of the tires tested, it had less ground contact area and operated at higher tire inflation pressures. The Michelin XCH4, Firestone ATX, and the Armstrong Desert Dog were among the best performers of the radial tires tested. The remaining radial tires tested produced similarly good results. With all the radial tires tested, except for the Uniroyal Laredo, the M1009 was able to successfully negotiate all three slopes at the 10/10 psi setting. The only bias-ply tire tested was the Firestone All-Terrain. The performance of the M1009 with this tire was slightly better than with the smaller Uniroyal Laredo, being able to negotiate slopes 1 and 2 at the 10/10 psi setting. Compared with the same size radial tires, the slope performance of the M1009 was worse with the bias-ply tire.

M1009 Stormer

Plate 65 shows the results of testing with the M1009 Stormer. Tests with this vehicle were conducted only with Goodyear Wrangler HT tires. These tires were not tested on the standard M1009. The performance of the M1009 Stormer was good but not as good as the better performances of the standard M1009.

M1028

Plates 66 - 77 show the results of testing with the M1028. Tests with the M1028 were conducted with standard dual rear wheels, with the outside rear tires removed, and with single tires mounted on 16.5.-in. split rims. In the

dual wheel configuration, the vehicle was only able to negotiate all three slopes when the tire inflation pressure was set at 20/10 psi. In this configuration, however, the rear tires touched; thus long term use would damage the tires. In general, the overall slope performance of the M1028 with duals was poor. With single tires, the slope performance of the M1028 was fairly consistent regardless of the type of rim, and better than that with the dual tire configuration. In order for the vehicle to negotiate all three slopes, the tire pressure had to be between 15 - 20 psi. At a slightly higher pressure, 25 psi, the vehicle was generally able to negotiate Slope No. 1 but not Slope Nos. 2 and 3.

M54A2

Plates 78 - 82 show the results of testing with the M54A2. With the dual tires, the slope performance of the M54A2 was poor. In order to make any progress on the slopes the tire pressure had to be reduced to the point where the rear tires were touching. Even then, the M54A2 was able to negotiate all three slopes with only the Goodyear Unisteel G286 and the Firestone UT-2000 tires, with the tire pressure set at 15 psi in the front and rear.

M35A2

Plates 83 - 85 show the results of testing with the M35A2. The slope performance of the M35A2 was similar to, but not as good as, that of the M54A2. The M35A2 was unable to negotiate Slope No. 3 with any tire at any pressure. The best performance was with the Goodyear Unisteel G186. The bias-ply recapped NDCC tire proved to be the poorest performing tire.

M35A2 with singles

Plates 86 - 89 show the results of testing with the M35A2 with singles. The slope performance of this vehicle was similar with all tires tested. Only with Goodyear Unisteel G188 tires was the vehicle unable to negotiate all three slopes. With the remaining tires, the vehicle was able to negotiate all three slopes at 15 psi in front and rear. With the single tires, the vehicle's overall performance was better than the M35A2 with the dual tires.

M813

Plates 90 - 91 show the results of testing with the M813. The M813 was tested with two tires, the Goodyear AT-2A and the Bridgestone V-Steel Jamal. Both tires gave good performances with the Bridgestone being slightly better. Compared to the standard M54A2, the M813 performed better with the larger single tires.

M1008

Plates 92 - 93 show the results of testing with the M1008. The slope performance of the M1008 was good. The vehicle was able to negotiate all three slopes with 20 psi in front and rear. With the trailer in tow, however, the vehicle was unable to completely climb any of the three slopes because of the increased resistance from the trailer.

4 Conclusions and Recommendations

Conclusions

The emphasis of this study was to determine the feasibility of replacing tires on selected military vehicles with current production commercial tires in order to:

a. Increase off-road mobility in a desert terrain scenario

b. Insure sufficient quantities of tires were available to fulfill all requirements

c. Determine the optimum tire inflation pressure/speed relationship required by each vehicle for such an application.

As a result of the tests and analysis of this program it is concluded:

a. That there are several commercial tires that will provide good traction in a loose sandy desert soil condition, based mainly on selection of tire inflation pressure. These commercial tires are not intended to replace specifically designed military tires, but supplement them if quantities of the military tires run low.

b. That there are differences in performance among commercial tires but these differences are not as significant as performance differences from the selection of the proper tire inflation pressure for a given tire. Therefore, the end result of this testing is not which tire is better (since most performed about the same for a given vehicle), but how to improve performance with the selection of proper tire inflation pressure.

c. Tire inflation pressure proved to be the single most important factor for increasing vehicle performance in the loose sandy conditions. In these tests, vehicle traction and slope performance could be increased by lowering the tire pressure in both bias and radial tires. For the tires tested this held true, regardless of the tire manufacturer or size. The

radial tire, however, gave better traction performance when compared to the bias ply tire. By lowering the tire inflation pressure, tire deflection is increased along with the area of the tire in contact with the soil surface. This increase in ground contact area is the key to allowing the vehicle to, in effect, float on top of the sand rather than plow through it. By floating on top, the vehicle has less resistance to overcome, thus the tractive effort allowable for maneuvering through the sand is increased. This is illustrated in Figure 6. As can be seen in Photo a, the vehicle is propelled through the sand with little or no evidence of a tire print shown in the sand. Progressively from Photo b to Photo d, the tire print in the sand becomes larger and more evident as the tire inflation pressure is lowered. Penetration by the tire is also decreased and the vehicle floats on the sand surface.

Finally, there is the question of which tire inflation pressure to select, which depends on several factors. High tire pressures are obviously best for highway usage but, when a vehicle encounters a loose sandy condition, a lower tire pressure would be best suited to the situation. Tire inflation pressure must be selected based on the vehicle's overall mission and the availability of air for refilling the tire if pressure changes are used to enhance off-road performance. Vehicles that are equipped with Central Tire Inflation Systems (CTIS) thus have a distinct advantage in that the vehicle is self-supporting in terms of being able to adjust inflation pressure and can benefit from performance increases available through tire inflation pressure selections optimized to the terrain conditions. Vehicles without CTIS must rely on external means of adjusting inflation pressure to meet their mission. If no external means are available, a single inflation pressure must be selected based on a compromise that will give the best off-road performance without degrading the on-road capabilities of the vehicle.

Recommendations

Based on results of this study, it is recommended that:

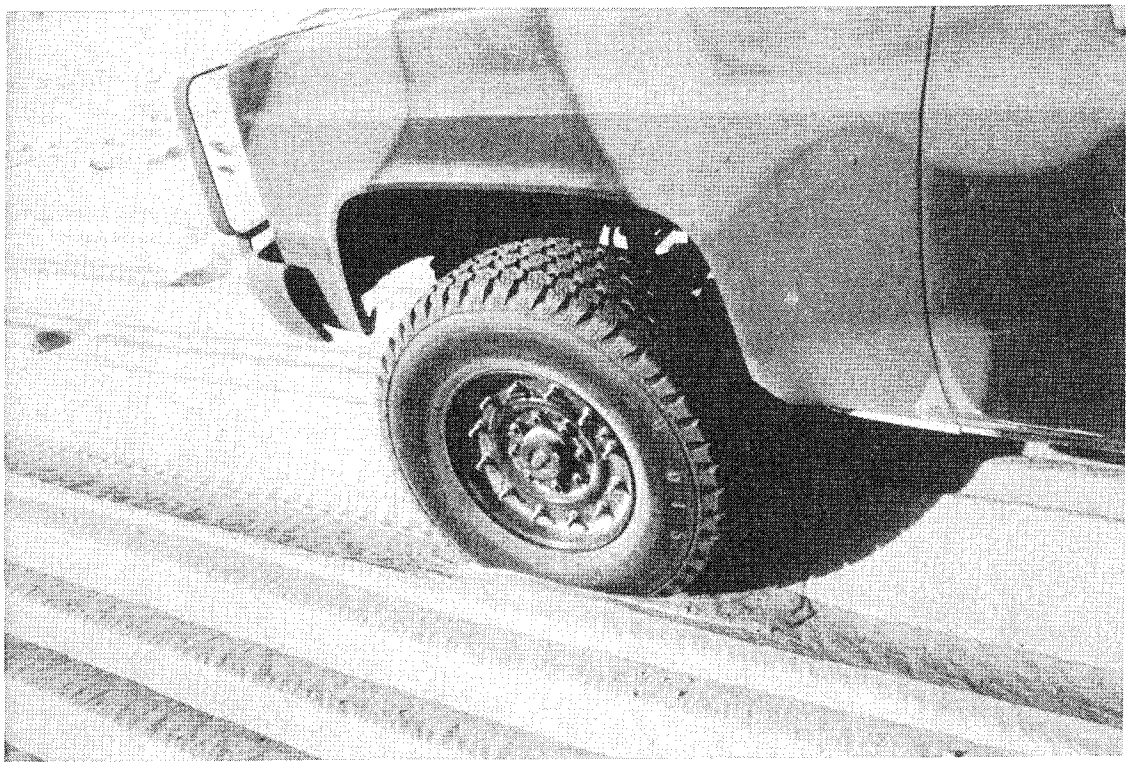
a. Testing similar to that conducted at YPG for this program be conducted in terrains more analogous to those expected in a typical vehicle mission scenario. Terrains consisting of sands, silts and clays should be incorporated into the test program to assure replacement tires perform as well as baseline tires in all expected vehicle mission scenarios.

b. The data reduction methodology presented and used in this study be accepted as a standard for tire performance comparisons and for future use in a best value tire selection processes. A best value tire selection can be achieved by designing a series of tests which cover the most critical aspects of tire design and costs. The overall value of each replacement tire investigated must consider factors other than just least

cost. To determine the true value of each replacement tire all performance controlling factors should be weighed in the final decision. The tests should include, but not be limited to, those presented in the SAE standards J2014 "Pneumatic Tires for Military Tactical Wheeled Vehicles". Each test used should have a weighting criteria which results in a best overall value numeric description. This result could then be used to adjust the effective price of the tire to compare candidate tires and indicate which tire has the best overall value related to cost and performance.

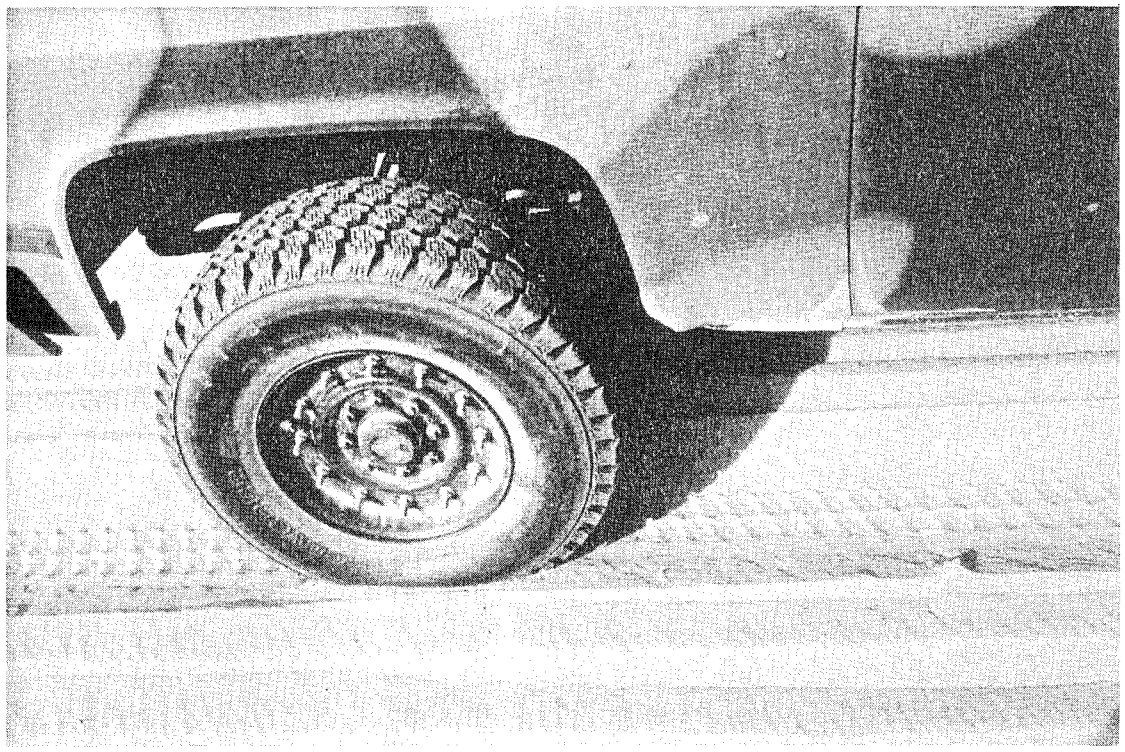
c. Parametric testing be conducted to determine the influences of discrete tire parameters on performances in different soil types. Such testing would evaluate and modify existing tire performance numerics (Freitag, 1965) based on performance differences resulting from varying tire constructions, dimensions, tire inflation pressures and tire loads.

a. M1028 with 33X12.5R16 tires at 30 psi inflation pressure.

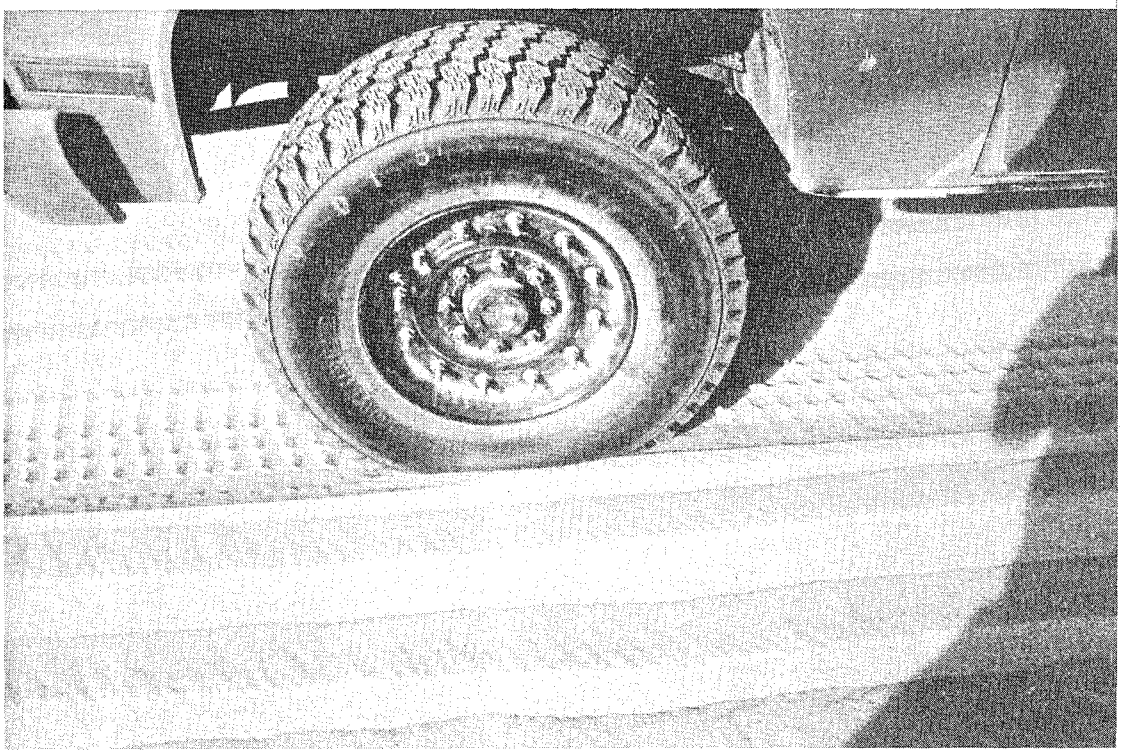


b. M1028 with 33X12.5R16 tires at 25 psi inflation pressure.

Figure 6. Effects of tire inflation pressure on motion resistance. (Sheet 1 of 2)



c. M1028 with 33X12.5R16 tires at 20 psi inflation pressure



d. M1028 with 33X12.5R16 tires at 15 psi inflation pressure

Figure 6. (Sheet 2 of 2)

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Table 1
Test Vehicles

Vehicle	Weight Distribution, lbs				Power-to-Weight ratio, hp/ton	Length, in.	Width, in.
	Axle 1	Axle 2	Axle 3	Total			
M1009	3,100	4,450		7,250	37.0	192	80
M1009 Stormer	3,100	4,450		7,250	37.0	192	80
M1028	3,650	6,350		10,200	26.6	220	81
M54A2	8,500	11,200	11,100	30,800	15.4	314	97
M35A2	6,480	6,010	6,410	18,900	14.8	264	95
M813	10,360	10,390	10,480	31,230	15.6	301	97
M35A2 with singles	6,570	5,560	6,210	18,340	15.3	264	95
M1008	4,050	5,200		9,250	29.2	220	81
Trailer for M1008	2,850			2,850			

Table 2
Test Vehicle Tire Data

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M1009									
1	Uniroyal Laredo AT	Radial	31X10.5R15	30	30	17.7	22.1	50.6	61.5
				20	20	23.2	29.2	62.2	79.6
				15	15	29.5	37.1	73.5	94.2
4	Goodyear Wrangler AT	Radial	33X12.5R15	30	30	N/A	N/A	N/A	N/A
				20	20	18.9	25.0	70.9	91.6
				15	15	22.2	26.6	89.2	108.4
				10	10	28.1	35.3	110.4	136.1
5	Goodyear Wrangler HT	Radial	33X12.5R15	30	30	14.0	16.9	55.8	71.3
				20	20	18.8	23.0	73.3	93.6
				15	15	22.8	28.7	84.1	107.6
				10	10	30.5	39.8	113.7	136.5
7	Goodyear Wrangler MT	Radial	33X12.5R15	30	30	12.5	16.5	53.2	67.1
				20	20	17.3	21.6	67.9	82.2
				15	15	20.1	25.5	84.7	103.6
				10	10	26.8	28.0	107.6	114.6
8	Michelin XCH4	Radial	33X12.5R15	30	30	14.6	18.2	53.7	71.1
				20	20	19.0	23.1	77.4	84.9
				15	15	23.5	28.4	88.3	103.4

Table 2 (Continued)

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M1009									
8	Michelin XCH4	Radial	33X12.5R15	10	10	32.3	39.5	113.1	140.0
9	Firestone All-Terrain	Bias	33X12.5R15	20	20	14.9	17.2	67.6	79.9
				15	15	17.4	21.7	77.4	96.4
				10	10	19.9	28.3	93.2	112.3
11	Firestone ATX	Radial	33X12.5R15	30	30	14.5	17.2	60.9	71.0
				20	20	19.1	23.4	75.2	93.7
				15	15	24.4	30.8	88.4	113.3
				10	10	32.4	40.5	107.3	137.0
13	Cooper Discoverer LT	Radial	33X12.5R15	30	30	14.2	16.9	53.1	69.1
				20	20	17.5	22.2	71.6	85.1
				15	15	22.9	28.7	88.1	106.6
				10	10	30.4	36.0	107.6	121.2
15	Armstrong Norsemen Tredlock	Radial	33X12.5R15	30	30	11.2	15.4	58.3	69.1
				20	20	14.8	21.5	71.1	86.8
				15	15	19.7	27.8	79.9	103.4
				10	10	23.4	39.6	92.0	130.9
17	Armstrong Desert Dog	Radial	33X12.5R15	30	30	13.2	17.5	60.5	76.9
				20	20	19.1	24.0	84.7	92.8

Table 2 (Continued)

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M1009									
17	Armstrong Desert Dog	Radial	33X12.5R15	15	15	23.5	30.2	98.4	109.9
				10	10	34.3	40.1	121.2	143.3
M1028									
2	B. F. Goodrich Trailedge	Radial	235/85R16	30	50	20.2	24.8	52.4	67.9
				35	35	20.2	32.8	52.4	80.5
				25	25	23.5	41.2	65.5	97.8
				20	20	27.5	49.8	74.0	110.9
3 (Duals)	B. F. Goodrich Trailedge	Radial	235/85R16	35	35	20.2	19.3	52.4	50.8
				20	20	27.5	28.0	74.0	70.5
				20	15	27.5	30.9	74.0	81.2
				20	10	27.5	40.6	74.0	95.5
6 (Split Rim)	Firestone ATX	Radial	33X12.5R16.5	30	30	18.2	29.6	69.1	100.2
				25	25	20.2	36.1	72.5	114.5
				20	20	23.3	40.4	85.5	125.7
10 (Split Rim)	Cooper Discoverer LT	Radial	33X12.5R16.5	30	30	16.8	29.8	66.6	102.8
				25	25	18.8	33.2	75.3	112.5
				20	20	22.0	39.7	85.2	124.6
				15	15	28.0	48.3	102.2	150.2

Table 2 (Continued)

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M1028									
12	Goodyear Wrangler AT	Radial	255/85R16	35	35	16.2	29.8	60.2	99.0
				25	25	20.9	36.4	72.2	110.7
				20	20	23.7	45.2	82.6	121.2
				15	15	30.8	53.1	95.7	143.3
14 (Split Rim)	Goodyear Wrangler HT	Radial	33X12.5R16.5	30	30	18.2	30.6	63.7	100.9
				25	25	19.8	32.5	74.3	113.6
				20	20	23.9	39.7	85.4	133.5
				15	15	27.3	48.8	99.2	156.0
16	Goodyear Wrangler TD	Radial	265/85R16	35	35	18.1	29.5	59.2	89.5
				30	30	20.0	35.8	65.9	95.5
				25	25	21.6	43.6	71.1	108.0
18 (Split Rim)	Goodyear Wrangler MT	Radial	33X12.5R16.5	30	30	16.3	30.6	62.7	103.1
				25	25	18.6	33.9	75.7	113.1
				20	20	22.8	41.1	90.3	131.3
				15	15	26.9	51.1	103.5	158.6
19	Firestone ATX	Radial	255/85R16	35	35	18.2	30.6	57.0	93.0
				30	30	20.4	33.3	65.1	102.3
				25	25	22.5	41.3	75.5	108.2

Table 2 (Continued)

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M1028									
19	Firestone ATX	Radial	255/85R16	20	20	28.7	44.5	82.8	120.1
20 (Split Rim)	Goodyear Wrangler AT	Radial	33X12.5R16.5	30	30	16.9	29.3	67.3	97.4
				30	30	18.5	32.2	57.0	97.8
				25	25	21.5	39.2	69.2	109.1
				20	20	24.8	45.4	80.3	118.7
M54A2									
22	Goodyear Unisteel G286	Radial	11.00R20	60	30	17.7	17.7	93.3	94.7
				25	25	28.5	21.7	130.5	95.8
				25	20	28.5	26.4	130.5	103.8
				15	15	36.7	27.5	150.2	116.8
25	Michelin XL	Radial	11.00R20	70	70	15.3	10.5	91.3	54.3
				35	35	27.1	16.3	128.4	80.7
				15	15	47.3	24.5	182.9	127.7
27	Goodyear Unisteel G188	Radial	11.00R20	70	70	13.2	9.2	99.9	68.6
				35	35	22.6	13.9	128.3	90.2
				15	15	39.1	23.2	187.6	125.2
31	Firestone UT-2000	Radial	11.00R20	70	70	15.2	8.6	87.0	56.3
				35	35	22.1	12.2	115.0	75.7

Table 2 (Continued)

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M54A2									
31	Firestone UT-2000	Radial	11.00R20	15	15	39.0	24.4	160.6	104.8
33	Michelin XS	Radial	11.00R20	70	70	16.0	8.1	84.2	46.1
				35	35	24.3	13.0	121.1	71.8
				15	15	40.0	23.5	198.4	111.6
M35A2									
24	NDCC Retreads	Bias	9.00X20	50	50	14.8	7.5	68.0	37.4
				35	35	17.5	8.4	77.5	46.5
				15	15	34.0	14.1	119.6	62.4
26	Goodyear Unisteel G186	Radial	9.00R20	50	50	20.6	7.5	77.7	47.1
				35	35	21.6	9.1	90.0	54.4
				15	15	41.4	16.7	138.5	73.2
29	Michelin XL	Radial	9.00R20	50	50	14.9	7.3	75.8	41.4
				35	35	23.4	10.4	81.8	55.0
				15	15	39.3	19.5	127.9	81.8
M813									
23	Goodyear AT-2A	Radial	14.00R20	60	60	14.6	13.6	108.8	104.9
				36	36	18.6	18.2	151.2	157.5
				28	28	23.0	22.2	165.1	173.1

Table 2 (Continued)

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M813									
23	Goodyear AT-2A	Radial	14.00R20	15	15	34.2	33.5	231.7	229.7
37	Bridgestone V-Steel Jamal	Radial	14.00R20	60	60	14.3	13.7	114.6	113.0
				36	36	18.7	17.9	149.9	149.5
				28	28	22.8	21.3	177.7	175.0
				15	15	36.7	34.5	244.3	255.9
M35A2 with singles									
28	Michelin XL	Radial	11.00R20	50	50	15.3	14.7	84.3	79.4
				35	35	18.6	17.2	95.1	89.0
				15	15	31.7	27.6	138.7	131.5
30	Firestone UT-2000	Radial	11.00R20	50	50	15.3	13.9	84.2	73.4
				35	35	19.6	17.9	86.0	85.6
				15	15	31.0	29.5	144.4	120.0
32	Goodyear Unisteel G286	Radial	11.00R20	50	50	14.7	12.7	82.7	75.8
				35	35	18.1	16.4	99.7	88.6
				15	15	30.4	27.4	145.2	131.4
34	Goodyear Unisteel G188	Radial	11.00R20	50	50	13.3	12.5	90.9	84.2
				35	35	16.9	16.1	107.2	95.2
				15	15	30.6	29.9	151.8	138.9

Table 2 (Concluded)

Configuration	Tire	Tire Type	Tire Size	Inflation Pressure, psi		Percent Deflection		Contact Area, in^2	
				Front	Rear	Front	Rear	Front	Rear
M1009 Stormer									
35	Goodyear Wrangler HT	Radial	33X12.5R15	30	30	14.0	16.9	55.8	71.3
				25	25	15.7	19.6	64.1	82.3
				20	20	18.8	23.0	73.3	93.6
				15	15	22.8	28.7	84.1	107.6
M1008									
36	Goodyear Wrangler LT	Radial	255/85R16	30	30	20.7	29.7	62.3	87.4
				25	25	15.7	19.6	64.1	82.3
				20	20	27.1	38.2	80.6	99.2
				15	15	30.7	49.0	87.1	123.7

Table 3
Results of Soils Data Collected

Test Site	Dates Collected	Average Cone Index, Layers			Moisture Content of Layers, percent Dry Soil	
		Surface	0 - 6 in.	6 - 12 in.	Surface	0 - 6 in.
Sand Dyno	11/30/90 - 12/13/90	1	19	218	0.36	0.45
Slope 1		0	20	215	0.31	0.41
Slope 2		0	21	220	0.35	0.43
Slope 3		0	20	219	0.43	0.57
Sand Dyno	02/04/91 - 02/15/91	0	17	218	0.46	0.51
Slope 1		0	15	177	0.38	0.40
Slope 2		0	17	181	0.41	0.56
Slope 3		0	15	228	0.46	0.68

Table 4
Drawbar Pull Results With the M1009, M1028, M54, M35A2, M813, and the M1008

Configuration	Tire	Tire Pressure, psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims					
1	Uniroyal Laredo A/T	35F/35R	7.0	300	0.041
	31x10.50R15LT		9.7	200	0.028
			10.9	300	0.041
			12.8	200	0.028
			12.8	300	0.041
			18.6	425	0.059
			22.5	450	0.062
			26.4	475	0.066
			34.1	500	0.069
			37.0	475	0.066
			45.7	400	0.055
			49.6	425	0.059
			50.4	550	0.076
			51.6	475	0.066
			56.7	500	0.069
			63.8	600	0.083
			65.1	700	0.097
			65.3	725	0.100
			67.2	700	0.097
			72.3	700	0.097
			74.2	450	0.062
			80.6	975	0.134
			100.0	1200	0.166
		30F/30R	1.8	300	0.041
			3.1	350	0.048
			7.0	350	0.048
			14.7	450	0.062

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
1	Uniroyal Laredo A/T	30F/30R	20.5	600	0.083
	31x10.50R15LT		22.5	625	0.086
			26.4	550	0.076
			31.3	600	0.083
			39.7	600	0.083
			48.3	625	0.086
			54.2	600	0.083
			59.6	600	0.083
			67.7	675	0.093
			68.3	600	0.083
			75.7	625	0.086
			85.1	725	0.100
			95.6	1100	0.152
			100.0	1200	0.166
		20F/20R	3.1	425	0.059
			7.0	550	0.076
			11.4	800	0.110
			17.3	950	0.131
			19.9	1025	0.141
			25.5	950	0.131
			32.2	1000	0.138
			38.3	1050	0.145
			41.3	1025	0.141
			46.7	1000	0.138
			53.5	1100	0.152
			59.2	1025	0.141
			67.7	1075	0.148
			78.7	1100	0.152

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
1	Uniroyal Laredo A/T	20F/20R	84.5	1350	0.186
	31x10.50R15LT		92.1	1500	0.207
			100.0	1500	0.207
		15F/15R	3.1	750	0.103
			7.0	800	0.110
			12.8	1225	0.169
			12.8	1350	0.186
			19.3	1350	0.186
			22.5	1375	0.190
			30.8	1325	0.183
			31.1	1375	0.190
			43.0	1300	0.179
			53.5	1250	0.172
			61.2	1175	0.162
			69.9	1150	0.159
			70.2	1100	0.152
			75.8	1150	0.159
			80.5	1125	0.155
			91.6	1100	0.152
			92.7	1175	0.162
			100.0	2100	0.290
4	Goodyear Wrangler AT	30F/30R	11.4	125	0.017
	33x12.50R15LT		16.7	450	0.062
			20.2	375	0.052
			25.5	425	0.059
			32.6	325	0.045
			40.4	200	0.028
			46.8	300	0.041

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
4	Goodyear Wrangler AT	30F/30R	55.7	125	0.017
	33x12.50R15LT		64.5	100	0.014
			74.1	325	0.045
			85.8	400	0.055
			95.1	850	0.117
			100.0	1700	0.234
		20F/20R	4.7	800	0.110
			10.1	900	0.124
			13.7	1075	0.148
			16.1	1100	0.152
			17.0	1000	0.138
			22.2	975	0.134
			22.3	975	0.134
			28.1	1000	0.138
			29.3	1050	0.145
			34.4	1000	0.138
			41.8	1050	0.145
			43.3	1025	0.141
			48.4	950	0.131
			51.4	900	0.124
			54.4	925	0.128
			64.0	950	0.131
			71.2	1000	0.138
			77.7	1050	0.145
			84.4	1050	0.269
			85.6	1125	0.155
			96.8	1800	0.248
			100.0	2200	0.303

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
4	Goodyear Wrangler AT	15F/15R	4.7	850	0.117
	33x12.50R15LT		10.1	1075	0.148
			12.8	1250	0.172
			12.9	1300	0.179
			23.6	1450	0.200
			25.1	1500	0.207
			32.5	1475	0.203
			40.9	1500	0.207
			52.0	1500	0.207
			55.0	1500	0.207
			64.0	1550	0.214
			71.2	1525	0.210
			82.0	1750	0.241
			91.0	1725	0.238
			96.1	1700	0.234
			97.4	1800	0.248
			100.0	2250	0.310
		10F/10R	4.5	1025	0.141
			8.2	1475	0.203
			17.0	1950	0.269
			17.8	1700	0.234
			22.7	1600	0.221
			31.3	2050	0.283
			37.1	2100	0.290
			48.3	1975	0.272
			57.5	1950	0.269
			58.0	1825	0.252
			68.7	2025	0.279

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
4	Goodyear Wrangler AT	10F/10R	72.3	2000	0.276
	33x12.50R15LT		80.0	1775	0.245
			83.6	2025	0.279
			96.3	2175	0.300
			100.0	2800	0.386
5	Goodyear Wrangler HT	30F/30R	9.4	300	0.041
	33x12.50R15LT		13.0	475	0.066
			16.7	500	0.069
			20.3	425	0.059
			27.5	400	0.055
			34.8	375	0.052
			37.2	375	0.052
			38.4	350	0.048
			48.2	400	0.055
			57.5	400	0.055
			67.1	425	0.059
			74.1	425	0.059
			84.9	575	0.079
			91.8	800	0.110
			96.2	1275	0.176
			100.0	1950	0.269
		20F/20R	5.8	450	0.062
			9.4	500	0.069
			9.4	1050	0.145
			16.7	1050	0.145
			20.3	1125	0.155
			27.5	1100	0.152
			39.0	1050	0.145

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
5	Goodyear Wrangler HT	20F/20R	39.8	1100	0.152
	33x12.50R15LT		45.7	1050	0.145
			54.6	1050	0.145
			69.9	1225	0.169
			74.2	1050	0.145
			90.5	1275	0.176
			94.3	1425	0.197
			95.5	1475	0.203
			97.3	1700	0.234
			100.0	2500	0.345
		15F/15R	5.8	300	0.041
			9.4	400	0.055
			9.4	600	0.083
			9.4	675	0.093
			9.4	1050	0.145
			14.9	1275	0.176
			18.5	1350	0.186
			23.9	1400	0.193
			27.5	1350	0.186
			31.2	1375	0.190
			38.4	1350	0.186
			42.0	1325	0.183
			52.9	1350	0.186
			63.8	1425	0.197
			63.8	1475	0.203
			74.2	1500	0.207
			93.0	1350	0.186
			95.9	1650	0.228

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
5	Goodyear Wrangler HT	15F/15R	97.8	2000	0.276
	33x12.50R15LT		100.0	2400	0.331
			4.0	950	0.131
			7.6	975	0.134
			9.4	1450	0.200
		10F/10R	13.0	1625	0.224
			18.5	1725	0.238
			23.9	1725	0.238
			31.2	1750	0.241
			39.8	1850	0.255
			44.1	1750	0.241
			51.7	1750	0.241
			63.8	1750	0.241
			69.9	1600	0.221
			74.2	1550	0.214
			84.9	1550	0.214
			94.3	1675	0.231
			98.5	2400	0.331
			100.0	3025	0.417
7	Goodyear Wrangler MT	30F/30R	3.4	100	0.014
	33x12.50R15LT		7.8	450	0.062
			13.1	650	0.090
			17.8	500	0.069
			22.7	450	0.062
			23.6	600	0.083
			25.6	450	0.062
			31.2	525	0.072
			37.3	625	0.086

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
7	Goodyear Wrangler MT	30F/30R	45.5	475	0.066
	33x12.50R15LT		49.6	475	0.066
			53.5	425	0.059
			60.0	425	0.059
			71.2	450	0.062
			75.3	475	0.066
			82.0	500	0.069
			93.3	850	0.117
			97.8	2200	0.303
			100.0	3100	0.428
		20F/20R	6.8	800	0.110
			11.5	875	0.121
			16.1	975	0.134
			21.7	1175	0.162
			26.7	1225	0.169
			33.2	1225	0.169
			42.4	1100	0.152
			47.2	1000	0.138
			56.8	1075	0.148
			60.7	1025	0.141
			68.2	1050	0.145
			75.4	1050	0.145
			83.3	1125	0.155
			93.5	1250	0.172
			95.4	1675	0.231
			100.0	2400	0.331
		15F/15R	3.2	200	0.028
			8.4	350	0.048

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
7	Goodyear Wrangler MT	15F/15R	12.0	650	0.090
	33x12.50R15LT		13.7	1150	0.159
			15.7	900	0.124
			18.5	1200	0.166
			25.1	1100	0.152
			32.6	1150	0.159
			35.4	1025	0.141
			37.1	900	0.124
			40.0	775	0.107
			52.0	725	0.100
			64.0	700	0.097
			70.7	725	0.100
			81.3	600	0.083
			89.1	1300	0.179
			94.9	1950	0.269
			100.0	2800	0.386
		10F/10R	4.8	1425	0.197
			8.9	1500	0.207
			11.7	1800	0.248
			16.1	1850	0.255
			20.9	1850	0.255
			26.7	1900	0.262
			27.0	1900	0.262
			35.3	1875	0.259
			44.8	1875	0.259
			47.7	1825	0.252
			59.7	1600	0.221
			67.2	1475	0.203

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
7	Goodyear Wrangler MT	10F/10R	72.2	1325	0.183
	33x12.50R15LT		83.3	1225	0.169
			89.1	1350	0.186
			94.3	2100	0.290
			100.0	3600	0.497
8	Michelin XCH4	30F/30R	14.3	375	0.052
	33x12.5R15LT		21.4	425	0.059
			28.6	450	0.062
			33.9	475	0.066
			37.5	375	0.052
			42.9	450	0.062
			46.4	500	0.069
			55.4	400	0.055
			57.1	375	0.052
			63.3	550	0.076
			69.6	475	0.066
			75.0	500	0.069
			85.1	500	0.069
			93.6	650	0.090
			94.8	1200	0.166
			100.0	2650	0.366
		20F/20R	5.4	400	0.055
			10.7	425	0.059
			14.3	875	0.121
			17.9	975	0.134
			19.6	1000	0.138
			25.0	925	0.128
			28.6	925	0.128

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
8	Michelin XCH4	20F/20R	33.9	850	0.117
	33x12.5R15LT		41.1	775	0.107
			50.0	700	0.097
			57.1	500	0.069
			66.1	450	0.062
			75.0	400	0.055
			7.77	425	0.059
			86.3	475	0.066
			87.5	575	0.079
			94.9	750	0.103
			97.7	1900	0.262
			100.0	3000	0.414
		15F/15R	7.1	850	0.117
			10.7	675	0.093
			10.7	975	0.134
			14.3	1300	0.179
			19.6	1425	0.197
			25.0	1425	0.197
			32.1	1400	0.193
			41.1	1350	0.186
			46.4	1150	0.159
			53.6	975	0.134
			62.5	950	0.131
			69.9	725	0.100
			76.2	650	0.090
			79.6	725	0.100
			82.1	725	0.100
			88.8	1300	0.179

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
8	Michelin XCH4	15F/15R	94.9	1425	0.197
	33x12.5R15LT		100.0	2900	0.400
		10F/10R	7.1	975	0.134
			12.5	1025	0.141
			17.9	1600	0.221
			21.4	1650	0.228
			28.6	1650	0.228
			32.1	1625	0.224
			41.1	1525	0.210
			50.0	1375	0.190
			54.8	1400	0.193
			61.9	1200	0.166
			71.4	1250	0.172
			79.0	1150	0.159
			88.1	1175	0.162
			91.9	1625	0.224
			97.3	2550	0.352
			100.0	3000	0.414
9	Firestone All Terrain Bias-Ply	20F/20R	7.8	450	0.062
	33x12.5R15LT		14.6	425	0.059
			16.0	400	0.055
			19.6	500	0.069
			22.6	800	0.110
			28.6	700	0.097
			37.7	600	0.083
			39.4	400	0.055
			46.9	375	0.052
			49.0	275	0.038

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
9	Firestone All Terrain Bias-Ply	20F/20R	56.2	300	0.041
	33x12.5R15LT		67.3	400	0.055
			73.0	425	0.059
			78.6	525	0.072
			86.7	425	0.059
			92.1	575	0.079
			98.5	2025	0.279
			100.0	2700	0.372
		15F/15R	4.1	325	0.045
			4.9	625	0.086
			10.5	400	0.055
			14.5	700	0.097
			17.3	800	0.110
			18.4	825	0.114
			25.9	900	0.124
			27.5	1000	0.138
			32.1	925	0.128
			38.1	800	0.110
			39.6	700	0.097
			47.8	600	0.083
			54.2	525	0.072
			62.0	575	0.079
			70.3	600	0.083
			74.1	625	0.086
			85.5	675	0.093
			93.0	875	0.121
			96.1	1100	0.152
			100.0	2900	0.400

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
9	Firestone All Terrain Bias-Ply	10F/10R	2.1	750	0.103
	33x12.5R15LT		8.6	900	0.124
			14.0	975	0.134
			17.4	1000	0.138
			22.6	1100	0.152
			25.9	1250	0.172
			27.1	1200	0.166
			36.0	1200	0.166
			42.0	1075	0.148
			52.4	1000	0.138
			56.6	975	0.134
			66.2	925	0.128
			77.1	800	0.110
			83.1	825	0.114
			94.7	1225	0.169
			98.0	2050	0.283
			100.0	2950	0.407
11	Firestone ATX	30F/30R	9.4	325	0.045
	33x12.5R15LT		13.0	325	0.045
			18.5	525	0.072
			23.9	525	0.072
			31.2	475	0.066
			38.4	425	0.059
			45.7	325	0.045
			54.7	225	0.031
			63.8	250	0.034
			69.9	250	0.034
			80.9	225	0.031

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
11	Firestone ATX	30F/30R	84.2	225	0.031
	33x12.5R15LT		86.6	275	0.038
			93.3	400	0.055
			96.5	775	0.107
			100.0	1650	0.228
		20F/20R	9.4	625	0.086
			13.0	650	0.090
			13.0	800	0.110
			18.5	1175	0.162
			22.1	1275	0.176
			27.5	1275	0.176
			34.8	1000	0.138
			42.0	1000	0.138
			49.3	800	0.110
			56.5	725	0.100
			63.4	550	0.076
			74.1	500	0.069
			84.2	425	0.059
			92.5	500	0.069
			96.4	1275	0.176
			100.0	3000	0.414
		15F/15R	9.4	425	0.059
			13.0	950	0.131
			16.7	1200	0.166
			20.3	1475	0.203
			27.5	1350	0.186
			34.8	1325	0.183
			42.0	1225	0.169

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
11	Firestone ATX	15F/15R	52.9	1225	0.169
	33x12.5R15LT		60.1	1000	0.138
			71.0	900	0.124
			79.8	775	0.107
			89.9	950	0.131
			95.7	1700	0.234
			100.0	3000	0.414
		10F/10R	2.2	650	0.090
			5.8	1050	0.145
			9.4	1250	0.172
			16.7	1950	0.269
			22.1	2050	0.283
			27.5	2000	0.276
			33.0	1925	0.266
			38.4	1950	0.269
			45.7	1850	0.255
			54.7	1475	0.203
			62.0	1400	0.193
			69.8	1575	0.217
			75.9	1600	0.221
			86.0	1600	0.221
			92.1	1700	0.234
			95.4	2300	0.317
			100.0	3600	0.497
13	Cooper Discoverer LT	30F/30R	9.4	325	0.045
	33x12.50R15LT		13.0	350	0.048
			17.8	500	0.069
			27.5	475	0.066

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
13	Cooper Discoverer LT	30F/30R	31.2	425	0.059
	33x12.50R15LT		38.4	350	0.048
			47.5	300	0.041
			56.5	225	0.031
			63.8	125	0.017
			68.5	300	0.041
			77.4	300	0.041
			87.1	325	0.045
			93.0	600	0.083
			97.5	1250	0.172
			100.0	2150	0.297
		20F/20R	2.2	600	0.083
			11.2	700	0.097
			17.9	900	0.124
			20.3	850	0.117
			27.5	750	0.103
			38.4	700	0.097
			42.0	700	0.097
			49.3	700	0.097
			58.3	600	0.083
			67.1	675	0.093
			74.1	725	0.100
			84.9	750	0.103
			92.5	1150	0.159
			96.6	2175	0.300
			100.0	2700	0.372
		15F/15R	5.8	250	0.034
			9.4	400	0.055

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
13	Cooper Discoverer LT	15F/15R	13.0	975	0.134
	33x12.50R15LT		18.5	1375	0.190
			23.9	1325	0.183
			29.4	1250	0.172
			33.0	1200	0.166
			38.4	1150	0.159
			47.5	1100	0.152
			54.7	1050	0.145
			30.1	1000	0.138
			69.2	925	0.128
			77.4	900	0.124
			84.2	925	0.128
			94.7	1350	0.186
			100.0	3000	0.414
		10F/10R	4.0	950	0.131
			9.4	1450	0.200
			16.7	1550	0.214
			18.5	1725	0.238
			22.1	1625	0.224
			27.1	1625	0.224
			36.6	1750	0.241
			42.0	1725	0.238
			54.7	1500	0.207
			62.0	1425	0.197
			69.2	1325	0.183
			74.1	1550	0.214
			87.1	1675	0.231
			95.1	2200	0.303

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
13	Cooper Discoverer LT	10F/10R	97.1	2925	0.403
	33x12.50R15LT		100.0	3400	0.469
15	Armstrong Norsemen Tredlok	30F/30R	8.6	175	0.024
	33x12.50R15LT		9.4	175	0.024
			13.0	275	0.038
			20.3	425	0.059
			27.8	375	0.052
			35.1	350	0.048
			37.4	300	0.041
			48.9	250	0.034
			58.9	200	0.028
			63.0	100	0.014
			72.2	125	0.017
			81.1	200	0.028
			90.3	375	0.052
			95.6	800	0.110
			100.0	2100	0.290
		20F/20R	6.1	850	0.117
			14.1	1000	0.138
			15.1	1100	0.152
			21.0	1050	0.145
			22.9	1025	0.141
			31.6	1000	0.138
			39.6	950	0.131
			45.9	775	0.107
			53.1	750	0.103
			60.9	575	0.079
			67.5	425	0.059

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
15	Armstrong Norsemen Tredlok	20F/20R	72.0	400	0.055
	33x12.50R15LT		77.1	475	0.066
			86.7	575	0.079
			94.6	1100	0.152
			97.4	1800	0.248
			100.0	2700	0.372
		15F/15R	6.3	875	0.121
			11.1	1050	0.145
			12.4	1275	0.176
			17.5	1400	0.193
			24.9	1325	0.183
			31.1	1275	0.176
			37.3	1175	0.162
			44.6	1025	0.141
			52.0	975	0.134
			53.7	875	0.121
			60.4	825	0.114
			64.1	750	0.103
			68.6	700	0.097
			73.9	650	0.090
			82.7	825	0.114
			91.3	975	0.134
			96.5	1650	0.228
			100.0	3000	0.414
		10F/10R	5.8	1000	0.138
			9.2	1350	0.186
			9.7	1500	0.207
			12.4	1600	0.221

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
15	Armstrong Norsemen Tredlok	10F/10R	18.9	1750	0.241
	33x12.50R15LT		20.5	1900	0.262
			28.9	2025	0.279
			39.8	1825	0.252
			47.0	1650	0.228
			53.3	1425	0.197
			63.2	1375	0.190
			75.5	1150	0.159
			78.6	1175	0.162
			83.9	1350	0.186
			94.9	1800	0.248
			96.6	2700	0.372
			100.0	3300	0.455
17	Armstrong Desert Dog	30F/30R	15.0	400	0.055
	33x12.50R15LT		29.3	500	0.069
			31.1	550	0.076
			28.6	775	0.107
			21.4	550	0.076
			19.6	475	0.066
			28.6	450	0.062
			25.0	350	0.048
			25.0	375	0.052
			25.0	400	0.055
			28.6	425	0.059
			32.1	425	0.059
			41.1	425	0.059
			46.4	450	0.062
			54.3	400	0.055

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
17	Armstrong Desert Dog	30F/30R	57.1	250	0.034
	33x12.50R15LT		65.0	225	0.031
			71.4	175	0.024
			80.2	325	0.045
			86.8	250	0.034
			92.2	625	0.086
			97.3	1750	0.241
			100.0	2700	0.372
		20F/20R	13.0	750	0.103
			19.6	900	0.124
			25.0	950	0.131
			28.6	950	0.131
			34.6	800	0.110
			46.4	775	0.107
			42.9	775	0.107
			46.4	550	0.076
			55.4	525	0.072
			64.3	300	0.041
			70.4	125	0.017
			78.6	175	0.024
			83.9	125	0.017
			90.8	300	0.041
			96.1	1125	0.155
			100.0	2750	0.379
		15F/15R	10.7	550	0.076
			13.0	725	0.100
			16.1	1225	0.169
			19.6	1250	0.172

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
17	Armstrong Desert Dog	15F/15R	23.2	1375	0.190
	33x12.50R15LT		31.1	1400	0.193
			39.3	1225	0.169
			46.4	1175	0.162
			51.8	925	0.128
			60.7	925	0.128
			66.8	900	0.124
			71.4	925	0.128
			79.0	925	0.128
			87.2	950	0.131
			92.4	1100	0.152
			94.8	2200	0.303
			100.0	2925	0.403
		10F/10R	6.3	950	0.131
			6.3	975	0.134
			10.8	1200	0.166
			12.0	1775	0.245
			17.0	1825	0.252
			23.2	1950	0.269
			26.3	2000	0.276
			33.0	2050	0.283
			39.3	1800	0.248
			43.8	1775	0.245
			48.6	1750	0.241
			55.4	1675	0.231
			59.8	1575	0.217
			68.8	1450	0.200
			78.6	1425	0.197

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 CUCV With 15 in. Rims (Continued)					
17	Armstrong Desert Dog	10F/10R	88.8	1475	0.203
	33x12.50R15LT		96.0	2200	0.303
			100.0	3700	0.510
M1028 Shelter Carrier With 16 in. Rims					
2	B.F. Goodrich Trailedge	35F/50R	8.2	25	0.002
	LT235/85R16		11.9	50	0.005
			15.7	325	0.032
			19.3	675	0.066
			19.4	750	0.074
			22.5	725	0.071
			27.3	875	0.086
			36.0	1075	0.105
			38.6	925	0.091
			39.7	1200	0.118
			49.3	1200	0.118
			50.2	1150	0.113
			57.6	1200	0.118
			63.0	1125	0.110
			73.6	1125	0.110
			76.7	1175	0.115
			79.9	1125	0.110
			83.1	1225	0.120
			89.2	1150	0.113
			91.9	1675	0.164
			96.7	1600	0.157
			100.0	2700	0.265
		35F/35R	5.9	550	0.054
			7.0	750	0.074

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
2	B.F. Goodrich Trailedge	35F/35R	9.2	975	0.096
	LT235/85R16		12.5	1150	0.113
			16.5	1150	0.113
			20.7	1325	0.130
			26.8	1425	0.140
			27.3	1375	0.135
			33.1	1425	0.140
			41.9	1425	0.140
			50.7	1400	0.137
			61.2	1600	0.157
			65.9	1675	0.164
			70.2	1750	0.172
			72.3	1875	0.184
			100.0	2675	0.262
		25F/25R	5.0	500	0.049
			5.5	675	0.066
			8.9	975	0.096
			11.6	1400	0.137
			16.9	1550	0.152
			23.5	1500	0.147
			24.8	1700	0.167
			27.9	1750	0.172
			31.1	1600	0.157
			41.3	1675	0.164
			41.9	1700	0.167
			53.5	1725	0.169
			59.8	1750	0.172
			73.0	1775	0.174

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
2	B.F. Goodrich Trailedge	25F/25R	80.6	1800	0.176
	LT235/85R16		94.3	2775	0.272
			95.8	2275	0.223
			100.0	3000	0.294
		20F/20R	5.5	1150	0.113
			6.3	1775	0.174
			9.3	1425	0.140
			11.2	1800	0.176
			12.8	1950	0.191
			13.3	2200	0.216
			19.7	2200	0.216
			21.7	2000	0.196
			21.7	2200	0.216
			24.1	2225	0.218
			24.5	2400	0.235
			25.0	2550	0.250
			32.2	2250	0.221
			41.9	2500	0.245
			54.4	2300	0.225
			61.2	2575	0.252
			64.2	2575	0.252
			68.3	2500	0.245
			72.0	2500	0.245
			81.9	2700	0.265
			92.1	3000	0.294
			92.3	2800	0.275
			100.0	3075	0.301

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
3 Duals	B.F. Goodrich Trailedge	35F/35R	3.1	350	0.034
	LT235/85R16		6.0	350	0.034
			7.0	400	0.039
			12.8	450	0.044
			15.5	550	0.054
			17.1	550	0.054
			22.5	550	0.054
			27.9	525	0.051
			34.1	475	0.047
			44.2	475	0.047
			55.8	500	0.049
			65.1	525	0.051
			71.3	575	0.056
			78.7	700	0.069
			87.5	725	0.071
			91.9	1250	0.123
			97.2	1800	0.176
			100.0	2450	0.240
		20F/20R	3.1	400	0.039
			3.9	400	0.039
			7.0	425	0.042
			7.0	500	0.049
			10.9	800	0.078
			14.0	950	0.093
			20.2	1050	0.103
			24.4	950	0.093
			28.3	950	0.093
			35.7	1100	0.108

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
3 Duals	B.F. Goodrich Trailedge	20F/20R	41.9	1175	0.115
	LT235/85R16		53.8	1225	0.120
			61.2	1050	0.103
			71.3	1025	0.100
			82.0	1075	0.105
			87.9	1400	0.137
			94.1	2275	0.223
			100.0	2775	0.272
		20F/15R	3.1	125	0.012
			3.1	425	0.042
			7.0	1025	0.100
			14.7	1600	0.157
			22.5	1775	0.174
			28.9	2250	0.221
			36.1	2125	0.208
			41.9	2025	0.199
			45.7	2175	0.213
			51.5	2150	0.211
			61.3	2050	0.201
			70.2	2150	0.211
			83.9	2225	0.218
			90.3	2350	0.230
			93.5	2925	0.287
			100.0	3100	0.304
		20F/10R	2.9	500	0.049
			2.9	800	0.078
			7.1	1250	0.123
			10.9	900	0.088

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
3 Duals	B.F. Goodrich Trailedge	20F/10R	15.4	2100	0.206
	LT235/85R16		22.5	2000	0.196
			30.2	2350	0.230
			38.0	2275	0.223
			48.5	2375	0.233
			53.9	2325	0.228
			67.6	2175	0.213
			78.5	2100	0.206
			85.1	2100	0.206
			90.8	2875	0.282
			100.0	3425	0.336
12	Goodyear Wrangler AT	35F/35R	1.2	675	0.066
	LT255/85R16		10.8	800	0.078
			12.5	900	0.088
			12.7	1000	0.098
			17.6	1150	0.113
			20.4	1075	0.105
			23.3	1200	0.118
			25.9	1350	0.132
			31.6	1300	0.127
			39.6	1250	0.123
			45.6	1100	0.108
			52.2	1100	0.108
			60.9	1050	0.103
			70.3	900	0.088
			77.6	825	0.081
			89.6	975	0.096

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
12	Goodyear Wrangler AT	25F/25R	3.0	500	0.049
	LT255/85R16		7.0	575	0.056
			13.8	900	0.088
			16.1	1200	0.118
			19.2	1400	0.137
			24.7	1475	0.145
			31.8	1575	0.154
			39.1	1600	0.157
			45.3	1550	0.152
			54.9	1500	0.147
			57.6	1425	0.140
			65.2	1300	0.127
			71.4	1300	0.127
			79.8	1200	0.118
			83.8	1150	0.113
			89.0	1325	0.130
			95.8	1950	0.191
			100.0	4100	0.402
		20F/20R	7.4	225	0.022
			9.2	975	0.096
			13.3	1100	0.108
			16.7	1475	0.145
			18.2	1700	0.167
			25.9	1725	0.169
			32.2	1800	0.176
			40.2	1875	0.184
			46.1	2000	0.196
			55.2	1875	0.184

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
12	Goodyear Wrangler AT	20F/20R	57.9	1950	0.191
	LT255/85R16		66.4	1925	0.189
			76.0	2000	0.196
			84.4	2075	0.203
			91.6	2300	0.225
			91.6	3050	0.299
			100.0	3500	0.343
		15F/15R	5.1	1400	0.137
			7.4	1650	0.162
			10.2	1750	0.172
			10.3	1525	0.150
			12.2	1925	0.189
			14.9	2225	0.218
			20.1	2525	0.248
			29.3	2475	0.243
			35.6	2350	0.230
			37.8	2375	0.233
			48.6	2425	0.238
			50.6	2400	0.235
			55.8	2350	0.230
			60.3	2400	0.235
			66.3	2550	0.250
			77.8	2650	0.260
			87.2	2800	0.275
			94.1	3175	0.311
			96.0	3650	0.358
			100.0	3800	0.373

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
16	Goodyear Wrangler TD	35F/35R	14.1	725	0.071
	LT265/75R16		19.9	750	0.074
			23.8	800	0.078
			29.7	925	0.091
			36.3	850	0.083
			41.4	800	0.078
			53.1	750	0.074
			59.0	700	0.069
			64.8	675	0.066
			74.6	550	0.054
			83.8	575	0.056
			92.2	700	0.069
			95.0	1325	0.130
			100.0	2750	0.270
		30F/30R	3.1	650	0.064
			10.2	700	0.069
			12.1	1050	0.103
			12.1	1100	0.108
			14.8	1100	0.108
			21.9	1200	0.118
			27.7	1275	0.125
			31.6	1350	0.132
			40.2	1400	0.137
			47.3	1125	0.110
			53.1	1025	0.100
			60.9	1000	0.098
			66.8	825	0.081
			75.6	775	0.076

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
16	Goodyear Wrangler TD	30F/30R	84.9	775	0.076
	LT265/75R16		95.6	1625	0.159
			100.0	3225	0.316
		25F/25R	3.1	925	0.091
			12.9	950	0.093
			16.0	1800	0.176
			21.9	1950	0.191
			27.7	2050	0.201
			31.6	2075	0.203
			41.4	1900	0.186
			47.3	1800	0.176
			51.2	1450	0.142
			59.8	1375	0.135
			64.8	1200	0.118
			74.6	1100	0.108
			80.5	1100	0.108
			90.2	1325	0.130
			96.2	2400	0.235
			100.0	3275	0.321
19	Firestone Radial ATX	35F/35R	6.0	200	0.020
	LT255/85R16		8.1	750	0.074
			9.1	625	0.061
			12.0	825	0.081
			14.3	1125	0.110
			22.2	1225	0.120
			27.4	1200	0.118
			33.5	1225	0.120
			42.4	1175	0.115

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
19	Firestone Radial ATX	35F/35R	48.0	1100	0.108
	LT255/85R16		56.4	1000	0.098
			62.8	800	0.078
			72.6	575	0.056
			78.9	575	0.056
			81.6	675	0.066
			91.3	875	0.086
			97.7	1800	0.176
			100.0	2600	0.255
		30F/30R	6.0	500	0.049
			12.5	575	0.056
			13.1	650	0.064
			15.4	750	0.074
			17.7	1000	0.098
			24.8	1025	0.100
			27.3	1150	0.113
			34.5	1175	0.115
			42.3	1100	0.108
			50.1	1050	0.103
			58.8	1075	0.105
			62.8	1175	0.115
			68.3	1125	0.110
			75.5	1100	0.108
			80.8	1150	0.113
			90.2	1400	0.137
			96.8	2600	0.255
			100.0	2800	0.275
		25F/25R	7.9	700	0.069

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
19	Firestone Radial ATXX	25F/25R	6.0	700	0.069
	LT255/85R16		11.7	750	0.074
			15.4	1525	0.150
			21.1	1700	0.167
			28.6	1725	0.169
			34.2	1625	0.159
			39.9	1575	0.154
			47.4	1500	0.147
			55.6	1500	0.147
			66.2	1225	0.120
			77.4	1350	0.132
			85.6	1500	0.147
			92.2	1600	0.157
			97.3	2575	0.252
			100.0	3100	0.304
		20F/20R	6.0	1025	0.100
			13.5	1550	0.152
			17.4	1925	0.189
			24.8	1900	0.186
			29.3	1825	0.179
			34.2	1725	0.169
			38.0	1775	0.174
			45.5	1750	0.172
			53.0	1725	0.169
			58.7	1625	0.159
			68.1	1550	0.152
			75.6	1450	0.142
			81.2	1450	0.142

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
19	Firestone Radial ATX	20F/20R	86.6	1400	0.137
	LT255/85R16		97.7	2100	0.206
			100.0	3100	0.304
21	Goodyear Wrangler LT	35F/35R	5.8	500	0.049
	LT255/85R16		10.4	700	0.069
			15.7	1000	0.098
			21.2	1150	0.113
			28.6	1150	0.113
			31.5	1200	0.118
			38.5	1200	0.118
			44.6	1225	0.120
			49.7	1225	0.120
			55.7	1200	0.118
			59.0	1050	0.103
			65.1	1100	0.108
			77.1	1400	0.137
			86.3	1450	0.142
			90.7	1500	0.147
			97.6	1675	0.164
			98.3	2500	0.245
			100.0	2700	0.265
		30F/30R	4.4	950	0.093
			8.1	1000	0.098
			8.1	1100	0.108
			11.8	1400	0.137
			18.0	1600	0.157
			22.8	1725	0.169

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
21	Goodyear Wrangler LT	30F/30R	26.5	1775	0.174
	LT255/85R16		32.0	1575	0.154
			38.2	1500	0.147
			45.6	1425	0.140
			54.0	1325	0.130
			64.0	1325	0.130
			74.3	1250	0.123
			84.7	1200	0.118
			88.5	1225	0.120
			95.4	1625	0.159
			100.0	2800	0.275
		25F/25R	8.1	625	0.061
			13.6	1325	0.130
			17.3	1700	0.167
			22.8	1700	0.167
			26.5	1525	0.150
			35.7	1550	0.152
			39.3	1775	0.174
			48.5	1775	0.174
			54.0	1600	0.157
			64.0	1375	0.135
			72.4	1350	0.132
			81.6	1400	0.137
			85.9	1400	0.137
			96.1	1675	0.164
			100.0	2850	0.279
		20F/20R	5.2	550	0.054
			8.1	600	0.059

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16 in. Rims (Continued)					
21	Goodyear Wrangler LT	20F/20R	10.0	1150	0.113
	LT255/85R16		12.5	1675	0.164
			17.3	1975	0.194
			21.7	1925	0.189
			26.5	1900	0.186
			35.7	1850	0.181
			44.9	1725	0.169
			54.8	1725	0.169
			63.2	1650	0.162
			72.4	1550	0.152
			82.9	1625	0.159
			91.8	1700	0.167
			95.6	2300	0.225
			100.0	2900	0.284
M1028 Shelter Carrier With 16.5 in. Split Rims					
6	Firestone Radial ATX	30F/30R	3.8	350	0.034
	33x12.50R16.5LT		6.7	800	0.078
			8.4	900	0.088
			9.9	600	0.059
			13.2	950	0.093
			17.3	1050	0.103
			20.7	1100	0.108
			27.9	975	0.096
			29.0	950	0.093
			36.9	1000	0.098
			45.3	825	0.081
			47.1	575	0.056
			51.9	600	0.059

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
6	Firestone Radial ATX	30F/30R	61.5	650	0.064
	33x12.50R16.5LT		65.1	700	0.069
			69.4	750	0.074
			78.5	800	0.078
			90.1	950	0.093
			87.6	1000	0.098
			95.0	2475	0.243
			100.0	3100	0.304
		25F/25R	3.3	875	0.086
			3.8	1375	0.135
			5.1	1400	0.137
			6.0	1325	0.130
			7.2	1175	0.115
			10.3	1200	0.118
			17.8	1450	0.142
			23.1	1425	0.140
			27.7	1675	0.164
			28.8	1750	0.172
			34.1	1775	0.174
			35.9	1500	0.147
			44.9	1450	0.142
			47.7	1200	0.118
			49.9	1400	0.137
			56.0	1200	0.118
			58.0	1500	0.147
			65.1	950	0.093
			66.8	1175	0.115
			71.7	1025	0.100

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
6	Firestone Radial ATX	25F/25R	80.8	1025	0.100
	33x12.50R16.5LT		88.6	1100	0.108
			93.9	1425	0.140
			95.1	2450	0.240
			100.0	3475	0.341
		20F/20R	5.3	1175	0.115
			9.5	1225	0.120
			14.2	1700	0.167
			23.1	1875	0.184
			27.6	1800	0.176
			32.1	1850	0.181
			41.4	2050	0.201
			50.5	1725	0.169
			51.9	1400	0.137
			57.1	975	0.096
			76.0	975	0.096
			85.4	1200	0.118
			94.7	1800	0.176
			100.0	2400	0.235
10	Cooper Discoverer LT	30F/30R	6.3	475	0.047
	33x12.50R16.5LT		10.9	875	0.086
			16.7	1000	0.098
			23.7	900	0.088
			27.8	800	0.078
			32.9	725	0.071
			41.2	725	0.071
			52.3	600	0.059
			53.9	500	0.049

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
10	Cooper Discoverer LT	30F/30R	60.0	450	0.044
	33x12.50R16.5LT		70.5	375	0.037
			81.8	475	0.047
			91.9	850	0.083
			96.3	1475	0.145
			100.0	3000	0.294
		25F/25R	2.3	775	0.076
			8.0	1000	0.098
			9.1	900	0.088
			14.1	1050	0.103
			19.4	1075	0.105
			23.7	1150	0.113
			30.2	1125	0.110
			34.7	1175	0.115
			36.8	1200	0.118
			39.8	1100	0.108
			43.4	875	0.086
			52.3	900	0.088
			58.5	800	0.078
			61.8	750	0.074
			66.1	825	0.081
			78.8	900	0.088
			89.8	1025	0.100
			93.8	1300	0.127
			97.3	2450	0.240
			100.0	3500	0.343
		20F/20R	4.6	875	0.086
			4.6	975	0.096

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
10	Cooper Discoverer LT	20F/20R	7.2	1375	0.135
	33x12.50R16.5LT		8.7	1100	0.108
			9.6	900	0.088
			12.2	1525	0.150
			15.4	1500	0.147
			16.0	1025	0.100
			19.4	1600	0.157
			26.1	1575	0.154
			27.1	1675	0.164
			35.2	1500	0.147
			42.7	1400	0.137
			48.6	1300	0.127
			54.2	1200	0.118
			46.9	1175	0.115
			60.9	1200	0.118
			70.8	1525	0.150
			82.6	1675	0.164
			93.3	1700	0.167
			97.4	1750	0.172
			100.0	3200	0.314
		15F/15R	6.6	1450	0.142
			9.4	1925	0.189
			11.8	2100	0.206
			17.2	2200	0.216
			21.0	2375	0.233
			29.9	2500	0.245
			40.9	2325	0.228
			45.3	2375	0.233

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
10	Cooper Discoverer LT	15F/15R	55.5	1850	0.181
	33x12.50R16.5LT		58.5	1700	0.167
			61.8	1825	0.179
			69.1	1925	0.189
			78.4	2000	0.196
			89.4	1875	0.184
			94.9	2400	0.235
			96.7	3000	0.294
			100.0	3700	0.363
14	Goodyear Wrangler HT	30F/30R	4.6	725	0.071
	33x12.50R16.5LT		10.3	825	0.081
			14.1	750	0.074
			14.1	750	0.074
			18.7	875	0.086
			23.7	900	0.088
			25.6	875	0.086
			27.5	750	0.074
			33.2	800	0.078
			42.8	825	0.081
			48.5	800	0.078
			58.0	700	0.069
			68.8	600	0.059
			80.9	550	0.054
			82.6	550	0.054
			91.7	950	0.093
			100.0	1575	0.154
		25F/25R	4.6	625	0.061
			4.6	925	0.091

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
14	Goodyear Wrangler HT	25F/25R	12.2	975	0.096
	33x12.50R16.5LT		14.1	1150	0.113
			16.0	1325	0.130
			19.9	1425	0.140
			23.7	1500	0.147
			33.2	1475	0.145
			37.0	1400	0.137
			46.6	1325	0.130
			54.2	1275	0.125
			67.6	1200	0.118
			78.8	1000	0.098
			82.6	925	0.091
			90.9	950	0.093
			95.0	1150	0.113
			100.0	2450	0.240
		20F/20R	6.5	900	0.088
			14.1	1325	0.130
			21.8	1650	0.162
			23.7	1725	0.169
			31.3	1900	0.186
			37.0	1750	0.172
			46.6	1650	0.162
			54.2	1550	0.152
			65.7	1425	0.140
			77.1	1325	0.130
			85.3	1200	0.118
			94.7	1275	0.125
			96.7	1600	0.157

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
14	Goodyear Wrangler HT	20F/20R	100.0	2325	0.228
	33x12.50R16.5LT	15F/15R	4.6	750	0.074
			10.3	875	0.086
			12.2	1175	0.115
			14.1	2225	0.218
			18.7	2500	0.245
			25.6	2500	0.245
			33.2	2550	0.250
			42.8	2450	0.240
			46.6	2450	0.240
			46.6	2325	0.228
			58.0	2550	0.250
			71.0	2325	0.228
			77.1	2300	0.225
			90.0	2400	0.235
			97.2	2675	0.262
			100.0	3200	0.314
18	Goodyear Wrangler MT	30F/30R	7.5	900	0.088
	33x12.50R16.5LT		11.7	1100	0.108
			19.2	1325	0.130
			25.5	1325	0.130
			29.7	1475	0.145
			34.6	1275	0.125
			44.1	1200	0.118
			49.9	1075	0.105
			58.8	900	0.088
			61.4	725	0.071
			67.1	625	0.061

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
18	Goodyear Wrangler MT	30F/30R	71.9	575	0.056
	33x12.50R16.5LT		80.1	700	0.069
			87.0	975	0.096
			94.7	1975	0.194
			97.5	3300	0.324
			100.0	3400	0.333
		25F/25R	4.6	1050	0.103
			9.2	1475	0.145
			16.3	1775	0.174
			20.9	2050	0.201
			22.9	2000	0.196
			28.4	1950	0.191
			32.3	1850	0.181
			39.6	1700	0.167
			49.1	1575	0.154
			52.7	1475	0.145
			53.4	1400	0.137
			57.3	1500	0.147
			59.7	1500	0.147
			64.7	1525	0.150
			70.9	1500	0.147
			82.7	1550	0.152
			89.8	1725	0.169
			97.2	3425	0.336
			100.0	3600	0.353
		20F/20R	6.7	1200	0.118
			11.1	1475	0.145
			14.5	1700	0.167

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
18	Goodyear Wrangler MT	20F/20R	22.5	1575	0.154
	33x12.50R16.5LT		31.9	1500	0.147
			40.2	1400	0.137
			47.2	1525	0.150
			47.5	1225	0.120
			57.5	1400	0.137
			64.5	1225	0.120
			71.3	1175	0.115
			84.6	1200	0.118
			93.9	1900	0.186
			97.7	3150	0.309
			100.0	3500	0.343
		15F/15R	7.7	1750	0.172
			11.6	2275	0.223
			18.4	2275	0.223
			23.6	2300	0.225
			28.2	2475	0.243
			30.0	2500	0.245
			37.9	2475	0.243
			42.8	2400	0.235
			50.6	2350	0.230
			58.5	2325	0.228
			69.0	2225	0.218
			79.9	2300	0.225
			90.6	2500	0.245
			94.5	2800	0.275
			98.0	3600	0.353
			100.0	3800	0.373

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
20	Goodyear Wrangler AT	30F/30R	5.3	475	0.047
	33x12.50R16.5LT		7.4	575	0.056
			11.7	925	0.091
			19.1	1000	0.098
			24.2	1100	0.108
			26.5	1100	0.108
			36.2	1175	0.115
			36.7	1200	0.118
			44.6	1100	0.108
			51.7	975	0.096
			54.8	1000	0.098
			61.5	1025	0.100
			66.5	1075	0.105
			75.3	1200	0.118
			84.2	1300	0.127
			93.9	1550	0.152
			98.6	2950	0.289
			100.0	3100	0.304
		25F/25R	5.8	600	0.059
			7.7	875	0.086
			11.3	1225	0.120
			16.4	1425	0.140
			22.7	1500	0.147
			29.0	1500	0.147
			31.8	1575	0.154
			38.5	1475	0.145
			47.5	1325	0.130
			54.2	1075	0.105

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
20	Goodyear Wrangler AT	25F/25R	59.8	1000	0.098
	33x12.50R16.5LT		67.1	900	0.088
			72.8	800	0.078
			78.7	800	0.078
			86.8	1100	0.108
			97.3	2400	0.235
			100.0	3300	0.324
		20F/20R	5.3	600	0.059
			9.1	1200	0.118
			16.4	1550	0.152
			21.1	1650	0.162
			26.3	1750	0.172
			34.3	1575	0.154
			40.2	1500	0.147
			47.0	1400	0.137
			53.7	1275	0.125
			59.7	1250	0.123
			66.7	1250	0.123
			72.7	1000	0.098
			77.5	800	0.078
			81.6	1000	0.098
			92.9	1400	0.137
			97.2	1675	0.164
			100.0	3350	0.328
		15F/15R	8.4	950	0.093
			14.0	1525	0.150
			16.4	2150	0.211
			18.8	2300	0.225

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1028 Shelter Carrier With 16.5 in. Split Rims (Continued)					
20	Goodyear Wrangler AT	15F/15R	25.6	2525	0.248
	33x12.50R16.5LT		29.5	2500	0.245
			40.0	2350	0.230
			45.5	2225	0.218
			54.6	2000	0.196
			61.3	1875	0.184
			69.9	1650	0.162
			78.4	1525	0.150
			84.1	1425	0.140
			85.1	1350	0.132
			89.2	1600	0.157
			96.8	2650	0.260
			100.0	3500	0.343
M54 5-Ton					
22	Goodyear G286 Radials	60/30	7.3	2050	0.067
	11.00R20		9.5	2000	0.065
			7.3	2200	0.071
			9.5	2400	0.078
			13.8	2500	0.081
			13.8	2500	0.081
			20.3	2500	0.081
			26.7	2050	0.067
			35.3	2000	0.065
			39.7	2000	0.065
			48.3	1950	0.063
			52.6	1900	0.062
			61.2	2100	0.068
			71.3	2250	0.073

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M54 5-Ton (Continued)					
22	Goodyear G286 Radials	60/30	75.5	2400	0.078
	11.00R20		78.5	2850	0.093
			86.8	3000	0.097
		25F/25R	5.2	2400	0.078
			9.5	3250	0.106
			13.8	4050	0.131
			16.0	4400	0.143
			24.6	4500	0.146
			35.3	4750	0.154
			44.0	4550	0.148
			52.6	4450	0.144
			61.2	4550	0.148
			74.1	4650	0.151
			80.9	5050	0.164
			89.2	5500	0.179
			96.3	7450	0.242
			100.0	8800	0.286
		25F/20R	3.0	2500	0.081
			3.0	2900	0.094
			4.0	3500	0.114
			5.2	4200	0.136
			6.0	4800	0.156
			13.8	5700	0.185
			22.4	6200	0.201
			26.7	6200	0.201
			37.1	6200	0.201
			44.0	6100	0.198
			48.3	6000	0.195

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M54 5-Ton (Continued)					
22	Goodyear G286 Radials	25F/20R	61.2	5900	0.192
	11.00R20	15F/15R	3.0	2300	0.075
			3.0	2850	0.093
			9.5	5850	0.190
			9.5	6600	0.214
			13.8	7150	0.232
			13.8	7950	0.258
			22.4	8800	0.286
			31.0	8950	0.291
			39.7	9200	0.299
			52.6	9150	0.297
			65.5	8750	0.284
			76.7	8200	0.266
			89.9	8000	0.260
25	Michelin XL	70F/70R	0.7	822	0.026
	11.00R20		3.6	1286	0.041
			14.4	1694	0.054
			24.9	1902	0.061
			33.4	1767	0.057
			40.6	1414	0.045
			47.3	1218	0.039
			52.8	1197	0.038
			56.4	1361	0.044
			57.7	1723	0.055
		35F/35R	3.2	1877	0.060
			6.0	2079	0.067
			7.9	2577	0.083
			8.7	2996	0.096

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M54 5-Ton (Continued)					
25	Michelin XL	35F/35R	16.8	3281	0.105
	11.00R20		31.1	3221	0.104
			48.4	2932	0.094
			67.0	3502	0.113
			81.8	4499	0.145
			88.4	5303	0.170
		15F/15R	2.5	1352	0.043
			3.0	3102	0.100
			3.5	3049	0.098
			5.1	3145	0.101
			7.3	3468	0.111
			9.1	3944	0.127
			9.5	5316	0.171
			11.3	5743	0.185
			14.6	5989	0.193
			19.3	5982	0.192
			25.9	5754	0.185
			36.0	5784	0.186
			49.2	6061	0.195
			65.1	6497	0.209
			83.4	6999	0.225
27	Goodyear Unisteel G188	70F/70R	2.6	374	0.012
	11.00R20		8.3	1159	0.037
			26.6	1896	0.061
			44.6	1995	0.064
			61.6	1254	0.040
			77.2	1484	0.048
			87.0	2362	0.076

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M54 5-Ton (Continued)					
27	Goodyear Unisteel G188	35F/35R	0.3	469	0.015
	11.00R20		1.0	1071	0.034
			3.0	1459	0.047
			4.9	2862	0.092
			13.4	3358	0.108
			26.1	3623	0.116
			41.3	3568	0.115
			57.7	3368	0.108
			72.6	3196	0.103
			82.1	3227	0.104
		15F/15R	2.1	3580	0.115
			3.4	4050	0.130
			8.1	5142	0.165
			16.5	6075	0.195
			25.8	6383	0.205
			35.6	5940	0.191
			45.8	5185	0.167
			56.3	4519	0.145
			66.7	4342	0.140
			76.5	5056	0.163
			84.6	7060	0.227
			85.2	7317	0.235
31	Firestone UT-2000	70F/70R	19.3	481	0.015
	11.00R20		39.3	792	0.025
			54.7	592	0.019
			64.0	134	0.004
			72.0	576	0.019
			79.7	1680	0.054

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M54 5-Ton (Continued)					
31	Firestone UT-2000	70F/70R	89.7	2491	0.080
	11.00R20	35F/35R	5.6	824	0.026
			7.2	2263	0.073
			9.6	1744	0.056
			13.1	1610	0.052
			14.7	1841	0.059
			18.2	1539	0.049
			27.2	1215	0.039
			39.1	1051	0.034
			52.2	1220	0.039
			66.9	1901	0.061
		15F/15R	0.1	2268	0.073
			0.4	2905	0.093
			1.4	3546	0.114
			2.9	4137	0.133
			4.6	4620	0.149
			5.9	4940	0.159
			6.0	5263	0.169
			6.5	5453	0.175
			8.1	5652	0.182
			11.0	5830	0.187
			14.8	5954	0.191
			15.6	5776	0.186
			16.9	5763	0.185
			21.7	5871	0.189
			32.9	6091	0.196
			53.5	6415	0.206
			75.3	6834	0.220

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M54 5-Ton (Continued)					
33	Michelin XS	70F/70R	4.8	366	0.012
	12.00R20		10.9	467	0.015
			13.9	503	0.016
			15.3	453	0.015
			16.5	417	0.013
			20.1	405	0.013
			26.8	415	0.013
			36.1	443	0.014
			47.2	488	0.016
			58.7	559	0.018
			68.2	814	0.026
			75.6	1264	0.041
			80.6	1865	0.060
			82.3	2574	0.083
		35F/35R	2.9	1425	0.046
			5.3	1808	0.058
			8.2	2089	0.067
			10.8	2228	0.072
			11.6	1986	0.064
			14.8	1820	0.058
			21.3	1659	0.053
			30.0	1558	0.050
			39.0	1601	0.051
			48.1	1782	0.057
			57.2	2094	0.067
			66.2	2526	0.081
			75.1	3071	0.099
			84.0	3718	0.120

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M54 5-Ton (Continued)					
33	Michelin XS	15F/15R	0.3	2495	0.080
	12.00R20		1.0	2859	0.092
			3.3	4744	0.153
			4.7	5201	0.167
			9.9	5534	0.178
			19.8	5716	0.184
			28.0	5718	0.184
			33.6	5511	0.177
			37.3	5067	0.163
			40.0	4355	0.140
			42.4	3536	0.114
			44.7	3242	0.104
			47.9	3421	0.110
			52.9	3952	0.127
			60.8	4713	0.152
			72.7	5583	0.179
			89.4	6438	0.207
M35A2					
24	NDCC Retreads	50F/50R	6.6	301	0.016
	9.00R20		12.7	443	0.023
			19.7	516	0.027
			22.7	526	0.028
			24.0	479	0.025
			27.6	385	0.020
			32.5	334	0.018
			37.7	332	0.018
			42.4	344	0.018
			45.5	336	0.018

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 (Continued)					
24	NDCC Retreads	50F/50R	47.0	271	0.014
	9.00R20		48.0	115	0.006
			49.6	32	0.002
			52.7	209	0.011
			58.6	572	0.030
			68.3	1044	0.055
			83.3	1548	0.082
		35F/35R	9.0	733	0.039
			17.2	962	0.051
			23.6	861	0.046
			28.0	615	0.033
			29.2	408	0.022
			29.4	281	0.015
			31.1	227	0.012
			36.0	265	0.014
			41.7	415	0.022
			48.2	522	0.028
			56.5	521	0.028
			67.6	776	0.041
			82.7	1656	0.088
		15F/15R	2.3	485	0.026
			3.8	954	0.050
			7.4	1546	0.082
			12.6	2187	0.116
			18.7	2483	0.131
			25.3	2460	0.130
			31.4	2216	0.117
			35.4	1851	0.098

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 (Continued)					
24	NDCC Retreads	15F/15R	37.7	1462	0.077
	9.00R20		39.1	1150	0.061
			40.4	1013	0.054
			42.7	1136	0.060
			46.7	1439	0.076
			53.3	1850	0.098
			63.4	2327	0.123
			77.6	2824	0.149
			97.0	3298	0.174
26	Goodyear Unisteel G186	50F/50R	1.9	96	0.005
	9.00R20		5.3	421	0.022
			9.3	859	0.045
			11.4	950	0.050
			20.6	974	0.052
			28.5	872	0.046
			31.9	604	0.032
			33.5	324	0.017
			35.5	135	0.007
			40.3	104	0.006
			50.2	301	0.016
			67.9	794	0.042
			90.9	1652	0.087
		35F/35R	10.0	1517	0.080
			15.2	1263	0.067
			22.4	1069	0.057
			24.3	734	0.039
			30.2	534	0.028
			39.3	284	0.015

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 (Continued)					
26	Goodyear Unisteel G186	35F/35R	49.6	150	0.008
	9.00R20		57.7	145	0.008
			63.4	207	0.011
			67.4	276	0.015
			70.2	290	0.015
			72.9	293	0.016
			77.8	730	0.039
			84.2	1431	0.076
			92.1	2129	0.113
		15F/15R	1.9	2099	0.111
			7.2	2674	0.141
			10.2	3064	0.162
			10.5	3282	0.174
			11.5	3342	0.177
			14.0	3259	0.172
			17.9	3080	0.163
			23.9	2834	0.150
			32.7	2548	0.135
			39.3	1468	0.078
			41.2	1630	0.086
			48.0	2015	0.107
			62.0	2540	0.134
			85.4	3126	0.165
29	Michelin XL	50F/50R	2.1	54	0.003
	9.00R20		11.2	978	0.052
			19.1	1448	0.077
			28.6	377	0.020
			32.1	695	0.037

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 (Continued)					
29	Michelin XL	50F/50R	41.2	1028	0.054
	9.00R20		52.5	960	0.051
			64.6	826	0.044
			76.2	1302	0.069
			84.1	2230	0.118
		35F/35R	2.7	1206	0.064
			7.4	1503	0.080
			14.3	1923	0.102
			31.0	2195	0.116
			42.0	1965	0.104
			50.2	1281	0.068
			60.4	1222	0.065
			71.6	1828	0.097
			84.3	3041	0.161
		15F/15R	1.8	2208	0.117
			6.1	2861	0.151
			12.0	3410	0.180
			13.2	3765	0.199
			13.4	3801	0.201
			16.6	3577	0.189
			26.2	3197	0.169
			36.0	2765	0.146
			39.5	2385	0.126
			40.1	2130	0.113
			41.3	1998	0.106
			46.0	2130	0.113
			57.2	2680	0.142

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 (Continued)					
29	Michelin XL	15F/15R	78.8	3805	0.201
	9.00R20		99.3	5177	0.274
M35A2 With Singles					
28	Michelin XL	50F/50R	4.6	800	0.042
	11.00R20		4.7	400	0.021
			5.3	571	0.030
			6.7	1052	0.056
			9.8	1582	0.084
			12.8	1901	0.101
			13.3	1870	0.099
			15.7	1950	0.103
			20.4	2006	0.106
			26.5	1986	0.105
			33.3	1905	0.101
			41.2	1855	0.098
			51.7	1905	0.101
			66.3	2125	0.112
		35F/35R	2.1	888	0.047
			2.6	697	0.037
			6.2	967	0.051
			7.9	2096	0.111
			12.7	2253	0.119
			19.9	2229	0.118
			24.4	2087	0.110
			28.1	2148	0.114
			33.7	2355	0.125
			44.8	2611	0.138
			66.7	2821	0.149

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 With Singles (Continued)					
28	Michelin XL	15F/15R	2.4	2536	0.134
	11.00R20		7.3	4237	0.224
			16.6	4532	0.240
			26.6	4678	0.248
			33.0	4608	0.244
			37.3	4326	0.229
			41.3	4085	0.216
			46.5	4005	0.212
			54.0	4190	0.222
			65.6	4741	0.251
			82.5	5763	0.305
30	Firestone UT-2000	50F/50R	5.3	811	0.043
	11.00R20		8.5	1055	0.056
			15.3	1067	0.056
			18.9	954	0.050
			20.2	993	0.053
			24.8	1164	0.062
			29.2	1085	0.057
			30.7	804	0.043
			33.1	794	0.042
			38.8	1152	0.061
			48.7	1357	0.072
			62.5	1222	0.065
			78.7	1201	0.064
			96.7	1747	0.092
		35F/35R	4.3	944	0.050
			4.4	1042	0.055
			4.8	1145	0.061

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 With Singles (Continued)					
30	Firestone UT-2000	35F/35R	5.5	1275	0.067
	11.00R20		6.8	1455	0.077
			8.3	1608	0.085
			10.1	1661	0.088
			11.8	1638	0.087
			13.4	1564	0.083
			14.7	1462	0.077
			17.0	1358	0.072
			20.8	1275	0.067
			25.8	1242	0.066
			31.6	1272	0.067
			38.4	1359	0.072
			46.5	1496	0.079
			56.6	1677	0.089
			69.7	1894	0.100
			87.7	2142	0.113
		15F/15R	0.1	339	0.018
			0.9	2353	0.124
			2.0	2420	0.128
			3.8	2639	0.140
			5.3	2992	0.158
			6.5	3413	0.181
			7.6	3833	0.203
			9.4	4184	0.221
			13.7	4391	0.232
			20.3	4344	0.230
			28.8	4118	0.218
			39.4	3830	0.203

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 With Singles (Continued)					
30	Firestone UT-2000	15F/15R	52.1	3598	0.190
	11.00R20		67.8	3539	0.187
			87.8	3720	0.197
32	Goodyear Unisteel G286	50F/50R	3.4	636	0.034
	11.00R20		5.8	739	0.039
			9.4	878	0.046
			11.0	1241	0.066
			15.2	1262	0.067
			21.4	1244	0.066
			27.4	1199	0.063
			30.7	1137	0.060
			31.6	1067	0.056
			33.5	1001	0.053
			36.7	948	0.050
			41.1	915	0.048
			47.8	909	0.048
			57.9	933	0.049
			72.3	993	0.053
		35F/35R	2.5	270	0.014
			5.3	843	0.045
			8.8	1484	0.078
			10.7	2200	0.116
			14.2	2193	0.116
			22.7	2169	0.115
			29.3	1025	0.054
			32.0	1119	0.059
			42.0	1576	0.083
			61.9	2343	0.124

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 With Singles (Continued)					
32	Goodyear Unisteel G286	15F/15R	1.6	1161	0.061
	11.00R20		3.3	1499	0.079
			3.6	1997	0.106
			3.9	2591	0.137
			5.4	3218	0.170
			9.5	3814	0.202
			15.7	4316	0.228
			19.3	4661	0.247
			21.1	4789	0.253
			22.4	4791	0.253
			24.2	4745	0.251
			27.5	4676	0.247
			29.4	4604	0.244
			33.7	4720	0.250
			46.4	4872	0.258
			70.2	5039	0.267
34	Goodyear Unisteel G188	50F/50R	2.5	614	0.032
	11.00R20		4.6	1049	0.056
			14.5	1461	0.077
			23.8	1612	0.085
			28.9	1266	0.067
			33.0	796	0.042
			38.8	618	0.033
			45.7	655	0.035
			53.8	828	0.044
			63.3	1063	0.056
			75.6	1280	0.068
			87.5	1395	0.074

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 With Singles (Continued)					
34	Goodyear Unisteel G188	35F/35R	5.2	951	0.050
	11.00R20		10.8	1281	0.068
			17.3	1322	0.070
			20.1	944	0.050
			21.6	622	0.033
			23.6	555	0.029
			26.8	641	0.034
			31.1	779	0.041
			35.3	866	0.046
			39.1	801	0.042
			43.2	554	0.029
			49.1	343	0.018
			56.4	304	0.016
			64.9	561	0.030
			74.9	1238	0.065
			87.7	2460	0.130
			98.3	4219	0.223
		15F/15R	3.4	1823	0.096
			4.7	2034	0.108
			7.0	2269	0.120
			9.6	2563	0.136
			12.4	2947	0.156
			15.3	3266	0.173
			18.8	3387	0.179
			22.9	3353	0.177
			27.8	3209	0.170
			33.4	2996	0.159
			37.1	2761	0.146

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M35A2 With Singles (Continued)					
34	Goodyear Unisteel G188	15F/15R	38.7	2545	0.135
	11.00R20		39.1	2393	0.127
			39.2	2348	0.124
			40.1	2455	0.130
			40.9	2645	0.140
			41.3	2817	0.149
			42.8	3007	0.159
			47.3	3253	0.172
			56.8	3593	0.190
			72.8	4065	0.215
			95.2	4706	0.249
M813					
23	Goodyear AT-2A	60F/60R	8.9	2107	0.067
	14.00R20		13.4	2938	0.094
			19.1	2952	0.095
			32.6	2066	0.066
			42.3	187	0.006
			55.8	639	0.020
			68.8	2836	0.091
			77.6	5307	0.170
			90.6	5311	0.170
		36F/36R	5.2	3134	0.100
			8.0	4369	0.140
			11.9	5265	0.169
			20.5	5591	0.179
			34.5	5244	0.168
			50.8	4253	0.136
			70.5	3734	0.120

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M813 (Continued)					
23	Goodyear AT-2A	36F/36R	87.7	4803	0.154
	14.00R20		89.3	5946	0.190
		28F/28R	1.8	2349	0.075
			3.3	2995	0.096
			4.7	3639	0.117
			5.6	6330	0.203
			7.7	6434	0.206
			8.6	7440	0.238
			19.2	8599	0.275
			62.7	8550	0.274
			81.9	7926	0.254
		15F/15R	0.6	3021	0.097
			0.8	4147	0.133
			1.7	5008	0.160
			7.6	6361	0.204
			12.3	8343	0.267
			12.9	10468	0.335
			16.4	11386	0.365
			23.9	11465	0.367
			36.9	11167	0.358
			59.4	10952	0.351
			80.7	11182	0.358
37	Bridgestone V-Steel Jamal	60F/60R	4.3	695	0.022
	14.00R20		5.0	1188	0.038
			5.6	1386	0.044
			6.1	1403	0.045
			6.2	1507	0.048
			6.3	1942	0.062

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M813 (Continued)					
37	Bridgestone V-Steel Jamal	60F/60R	7.1	2358	0.075
	14.00R20		7.8	2495	0.080
			8.4	2463	0.079
			9.1	2375	0.076
			10.1	2341	0.075
			11.6	2471	0.079
			13.4	2876	0.092
			15.2	3032	0.097
			17.4	2634	0.084
			20.5	1928	0.062
			25.3	1162	0.037
			32.6	585	0.019
			43.8	443	0.014
			60.2	983	0.031
		36F/36R	0.8	1234	0.040
			1.9	1671	0.054
			4.3	2117	0.068
			5.5	2526	0.081
			6.1	2933	0.094
			6.2	3675	0.118
			6.3	3971	0.127
			6.7	4192	0.134
			7.8	4318	0.138
			7.9	4685	0.150
			9.1	5051	0.162
			12.6	5344	0.171
			19.7	5460	0.175
			31.7	5294	0.170

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M813 (Continued)					
37	Bridgestone V-Steel Jamal	36F/36R	50.7	4740	0.152
	14.00R20		79.6	3695	0.118
		28F/28R	2.8	1398	0.045
			3.5	1832	0.059
			5.2	2402	0.077
			5.8	4391	0.141
			6.9	5060	0.162
			10.9	5927	0.190
			15.6	6532	0.209
			21.0	6859	0.220
			27.4	7017	0.225
			35.3	7114	0.228
			45.0	7257	0.232
			56.6	7556	0.242
			69.9	8118	0.260
			84.4	9051	0.290
		15F/15R	0.6	1296	0.041
			2.4	1547	0.050
			4.5	1842	0.059
			4.9	4642	0.149
			5.0	5599	0.179
			5.5	6717	0.215
			7.5	7699	0.247
			11.2	8459	0.271
			16.6	9031	0.289
			23.3	9449	0.303
			31.1	9747	0.312
			39.6	9961	0.319

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M813 (Continued)					
37	Bridgestone V-Steel Jamal	15F/15R	48.7	10124	0.324
	14.00R20		57.9	10271	0.329
			67.0	10436	0.334
			73.3	10655	0.341
M1009 Stormer					
35	Goodyear Wrangler HT	30F/30R	0.8	256	0.037
	33x12.50R15		1.9	259	0.037
			4.0	280	0.040
			4.7	494	0.071
			5.1	521	0.074
			9.6	534	0.076
			18.1	533	0.076
			30.0	520	0.074
			43.9	494	0.071
			57.9	457	0.065
			70.3	410	0.059
			80.4	355	0.051
			87.8	292	0.042
			92.3	256	0.037
			94.7	295	0.042
			95.7	431	0.062
		25F/25R	2.1	230	0.033
			2.7	357	0.051
			5.4	460	0.066
			11.0	535	0.076
			19.0	578	0.083
			25.7	586	0.084
			31.3	554	0.079

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 Stormer (Continued)					
35	Goodyear Wrangler HT	25F/25R	36.0	480	0.069
	33x12.50R15		40.3	380	0.054
			44.7	294	0.042
			49.9	229	0.033
			55.6	191	0.027
			61.8	184	0.026
			68.3	216	0.031
			74.7	277	0.040
			80.9	279	0.040
			86.5	270	0.039
			91.4	336	0.048
			95.2	561	0.080
			97.5	907	0.130
		20F/20R	1.0	248	0.035
			1.5	328	0.047
			3.4	436	0.062
			5.8	559	0.080
			8.1	687	0.098
			10.3	806	0.115
			13.5	901	0.129
			18.1	917	0.131
			24.3	865	0.124
			31.8	769	0.110
			38.4	655	0.094
			44.1	551	0.079
			48.8	481	0.069
			52.9	473	0.068
			57.0	469	0.067

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1009 Stormer (Continued)					
35	Goodyear Wrangler HT	20F/20R	62.6	400	0.057
	33x12.50R15		69.9	332	0.047
			78.3	333	0.048
			86.5	470	0.067
			92.2	812	0.116
		15F/15R	4.5	528	0.075
			6.8	844	0.121
			7.7	962	0.137
			10.8	1075	0.154
			14.7	1174	0.168
			16.0	1249	0.178
			16.3	1292	0.185
			17.4	1291	0.184
			19.5	1276	0.182
			23.3	1262	0.180
			29.4	1241	0.177
			35.8	1204	0.172
			42.4	1142	0.163
			48.8	1046	0.149
			55.2	907	0.130
			61.3	716	0.102
			67.6	566	0.081
			73.7	516	0.074
			79.3	567	0.081
			84.0	718	0.103
			86.9	969	0.138

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
		M1008			
36 w/trailer	Goodyear Wrangler LT	30F/30R	5.7	201	0.022
	LT255/85R16		8.7	445	0.048
			8.9	440	0.048
			11.5	418	0.045
			14.2	349	0.038
			15.7	352	0.038
			20.4	343	0.037
			24.7	306	0.033
			28.5	232	0.025
			33.2	151	0.016
			39.1	81	0.009
			47.1	27	0.003
			98.1	3	0.000
		25F/25R	0.7	246	0.027
			4.8	294	0.032
			5.3	527	0.057
			6.4	638	0.069
			9.3	756	0.082
			13.8	873	0.094
			18.5	980	0.106
			23.2	1067	0.115
			27.9	1126	0.122
			32.3	1149	0.124
			36.6	1129	0.122
			41.6	1090	0.118
			47.4	1040	0.112
			53.6	986	0.107
			59.8	933	0.101

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1008 (Continued)					
36 w/ trailer	Goodyear Wrangler LT	25F/25R	65.7	889	0.096
	LT255/85R16		71.1	859	0.093
			75.7	849	0.092
			79.3	867	0.094
			81.7	917	0.099
			82.8	1006	0.109
		20F/20R	1.4	415	0.045
			2.2	479	0.052
			4.4	570	0.062
			5.9	694	0.075
			6.7	845	0.091
			8.3	984	0.106
			10.7	1103	0.119
			14.3	1199	0.130
			18.7	1268	0.137
			23.3	1304	0.141
			28.3	1303	0.141
			34.2	1262	0.136
			40.3	1189	0.129
			46.2	1109	0.120
			53.1	1041	0.113
			62.1	1005	0.109
			74.2	1021	0.110
			90.6	1109	0.120
		15F/15R	0.6	618	0.067
			4.4	735	0.080
			6.5	828	0.089
			7.0	976	0.106

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1008 (Continued)					
36 w/ trailer	Goodyear Wrangler LT	15F/15R	7.7	999	0.108
	LT255/85R16		9.6	1022	0.110
			12.9	1044	0.113
			16.4	1065	0.115
			19.7	1086	0.117
			22.6	1106	0.120
			25.0	1125	0.122
			27.2	1133	0.123
			30.5	1110	0.120
			34.8	1061	0.115
			39.6	995	0.108
			44.9	920	0.099
			50.2	844	0.091
			55.3	775	0.084
			59.9	720	0.078
			64.0	689	0.074
			67.3	689	0.074
			69.7	727	0.079
36	Goodyear Wrangler LT	30F/30R	9.3	1097	0.091
	LT255/85R16		9.6	1225	0.101
			12.3	1361	0.113
			18.8	1453	0.120
			28.3	1446	0.120
			37.3	1290	0.107
			42.8	1077	0.089
			47.4	944	0.078
			53.5	860	0.071
			61.0	791	0.065

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1008 (Continued)					
36	Goodyear Wrangler LT	30F/30R	69.8	704	0.058
	LT255/85R16		79.7	659	0.054
			90.4	924	0.076
			98.0	1368	0.113
		25F/25R	1.4	925	0.076
			3.4	1094	0.090
			5.3	1252	0.103
			7.3	1390	0.115
			10.0	1515	0.125
			13.3	1628	0.135
			17.0	1724	0.142
			20.9	1798	0.149
			25.0	1845	0.153
			28.9	1861	0.154
			32.5	1839	0.152
			35.8	1776	0.147
			38.8	1666	0.138
			41.5	1512	0.125
			44.5	1351	0.112
			48.0	1196	0.099
			51.8	1059	0.088
			56.2	952	0.079
			61.0	885	0.073
			66.5	869	0.072
			72.5	917	0.076
			79.3	1038	0.086
			87.0	1243	0.103
			91.4	1545	0.128

Table 4 (Continued)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1008 (Continued)					
36	Goodyear Wrangler LT	20F/20R	3.2	820	0.068
	LT255/85R16		6.6	1018	0.084
			6.9	1454	0.120
			7.0	1618	0.134
			7.7	1739	0.144
			8.6	1824	0.151
			9.6	1880	0.155
			10.8	1913	0.158
			13.2	1929	0.159
			16.5	1936	0.160
			20.4	1939	0.160
			24.4	1946	0.161
			28.6	1950	0.161
			33.4	1920	0.159
			39.0	1865	0.154
			45.4	1794	0.148
			52.6	1717	0.142
			60.3	1647	0.136
			68.5	1592	0.132
			76.7	1563	0.129
			84.6	1571	0.130
			91.5	1626	0.134
			94.9	1738	0.144
		15F/15R	0.8	622	0.051
			1.0	726	0.060
			1.1	1359	0.112
			2.2	1753	0.145
			5.1	2099	0.173

Table 4 (Concluded)

Configuration	Tire	Tire Pressure psi	Percent Slip	Load lb	DBP Coefficient
M1008 (Continued)					
36	Goodyear Wrangler LT	15F/15R	9.3	2393	0.198
	LT255/85R16		14.2	2631	0.217
			19.2	2806	0.232
			24.4	2916	0.241
			29.7	2953	0.244
			35.0	2915	0.241
			40.4	2795	0.231
			45.6	2630	0.217
			50.6	2486	0.205
			55.4	2376	0.196
			60.4	2310	0.191
			65.7	2300	0.190
			71.6	2358	0.195
			78.2	2495	0.206
			85.6	2723	0.225
			89.7	3053	0.252

Table 5
Drawbar Pull Performance Data

Configuration	Percent slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
1	26	0.04486	0.06062	35F/35R	15	18.6	16.8	0.003608	0.0045
	23	0.06031	0.07833	30F/30R	17.7	22.1	19.9	0.003936	
	20	0.10475	0.13094	20F/20R	23.2	29.2	26.2	0.004998	
	15	0.15445	0.18171	15F/15R	29.5	37.1	33.3	0.005457	
4	20	0.0487	0.06088	30F/30R	13	16.3	14.65	0.004156	0.006592
	14	0.11722	0.1363	20F/20R	18.9	25	21.95	0.00621	
	19	0.15923	0.19658	15F/15R	22.2	26.6	24.4	0.008057	
	19	0.20404	0.2519	10F/10R	28.1	35.3	31.7	0.007946	
5	17	0.0532	0.0641	30F/30R	14	16.9	15.45	0.004149	0.006354
	19	0.12457	0.1538	20F/20R	18.8	23	20.9	0.007359	
	20	0.15104	0.1888	15F/15R	22.8	28.7	25.75	0.007332	
	16	0.19417	0.23116	10F/10R	30.5	39.8	35.15	0.006576	
7	16	0.06848	0.08153	30F/30R	12.5	16.5	14.5	0.005623	0.007259
	17	0.1277	0.15385	20F/20R	17.3	21.6	19.45	0.00791	
	20	0.11733	0.14666	15F/15R	20.1	25.5	22.8	0.006432	
	15	0.21122	0.24849	10F/10R	26.8	28	27.4	0.009069	
8	22	0.06072	0.07785	30F/30R	14.6	18.2	16.4	0.004747	0.006112
	20	0.10531	0.13163	20F/20R	19	23.1	21.05	0.006253	

Table 5 (Continued)

Configuration	Percent Slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
8	20	0.15228	0.19035	15F/15R	23.5	28.4	25.95	0.007335	
	21	0.17335	0.21943	10F/10R	32.3	39.5	35.9	0.006112	
9	19	0.07087	0.08749	20F/20R	14.9	17.2	16.05	0.005451	0.005815
	15	0.09813	0.11545	15F/15R	17.4	21.7	19.55	0.005905	
	13	0.12763	0.1467	10F/10R	19.9	28.3	24.1	0.006087	
11	19	0.06196	0.0765	30F/30R	14.5	17.2	15.85	0.004826	0.0072
	28	0.1411	0.19598	20F/20R	19.1	23.4	21.25	0.009223	
	22	0.15417	0.19765	15F/15R	24.4	30.8	27.6	0.007161	
	20	0.22136	0.2767	10F/10R	32.4	40.5	36.45	0.007591	
13	18	0.06116	0.07458	30F/30R	14.2	16.9	15.55	0.004796	0.005998
	18	0.09321	0.11366	20F/20R	17.5	22.2	19.85	0.005726	
	19	0.13955	0.17229	15F/15R	22.9	28.7	25.8	0.006678	
	17	0.18602	0.22412	10F/10R	30	36	33	0.006792	
15	18	0.0471	0.05744	30F/30R	11.2	15.4	13.3	0.004319	0.007212
	14	0.12729	0.14801	20F/20R	14.8	21.5	18.15	0.008155	
	18	0.15834	0.1931	15F/15R	19.7	27.8	23.75	0.008131	
	19	0.21031	0.25965	10F/10R	23.4	39.6	31.5	0.008243	
17	22	0.05421	0.0695	30F/30R	13.2	17.5	15.35	0.004528	0.006283

Table 5 (Continued)

Configuration	Percent Slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
17	20	0.10715	0.13394	20F/20R	19.1	24	21.55	0.006215	
	23	0.14898	0.19349	15R/15R	23.5	30.2	26.85	0.007206	
	19	0.21638	0.26713	10F/10R	34.3	40.1	37.2	0.007181	
2	33	0.06681	0.09971	35F/50R	20.2	24.8	22.5	0.004432	0.004961
	20	0.10455	0.13069	35F/35R	20.2	32.8	26.5	0.004932	
	20	0.12629	0.15786	25F/25R	23.5	41.2	32.35	0.00488	
	20	0.17316	0.21646	20F/20R	27.5	49.8	38.65	0.005601	
3(Duals)	15	0.04349	0.05116	35F/35R	20.2	19.3	19.75	0.00259	0.004804
	25	0.07475	0.09966	20F/20R	27.5	28	27.75	0.003591	
	23	0.1492	0.19376	20F/15R	27.5	30.9	29.2	0.006636	
	27	0.15901	0.21782	20F/10R	27.5	40.6	34.05	0.006397	
12	16	0.08724	0.10385	35F/35R	16.2	29.8	23	0.004515	0.005002
	25	0.10915	0.14553	25F/25R	20.9	36.4	28.65	0.00508	
	24	0.13194	0.17361	20F/20R	23.7	45.2	34.45	0.005039	
	19	0.18259	0.22542	15F/15R	30.8	53.1	41.95	0.005374	
16	21	0.06565	0.0831	35F/35R	18.1	29.5	23.8	0.003492	0.004678
	22	0.09638	0.12356	30F/30R	20	35.8	27.9	0.004429	
	26	0.14747	0.19928	25F/25R	21.6	43.6	32.6	0.006113	
19	21	0.09611	0.12166	35F/35R	18.2	30.6	24.4	0.004986	0.004688

Table 5 (Continued)

Configuration	Percent Slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
19	27	0.07653	0.10484	30F/30R	20.4	33.3	26.85	0.003905	
	22	0.12325	0.15801	25F/25R	22.5	41.3	31.9	0.004953	
	17	0.14909	0.17963	20F/20R	28.7	44.5	36.6	0.004908	
21	20	0.087	0.10875	35F/35R	Not Taken	Not Taken	Not Taken	N/A	
	19	0.13214	0.16314	30F/30R	Not Taken	Not Taken	Not Taken	N/A	
	21	0.12768	0.16161	25F/25R	Not Taken	Not Taken	Not Taken	N/A	
	21	0.1521	0.19253	20F/20R	Not Taken	Not Taken	Not Taken	N/A	
6	16	0.08525	0.10149	30F/30R	18.2	29.6	23.9	0.004246	0.005046
	15	0.12257	0.1442	25F/25R	20.2	36.1	28.15	0.005123	
	24	0.13966	0.18376	20F/20R	23.3	40.4	31.85	0.00577	
10	15	0.08407	0.09891	30F/30R	16.8	29.8	23.3	0.004245	0.004967
	15	0.09256	0.1089	25F/25R	18.8	33.2	26	0.004188	
	22	0.12695	0.16275	20F/20R	22	39.7	30.85	0.005276	
	18	0.19265	0.23493	15F/15R	28	48.3	38.15	0.006158	
14	9	0.06888	0.0757	30F/30R	18.2	30.6	24.4	0.003102	0.004871
	19	0.10801	0.13335	25F/25R	19.8	32.5	26.15	0.005099	
	20	0.13086	0.16358	20F/20R	23.9	39.7	31.8	0.005144	
	24	0.17751	0.23357	15F/15R	27.3	48.8	38.05	0.006139	
18	19	0.1047	0.12926	30F/30R	16.3	30.6	23.45	0.005512	0.005869

Table 5 (Continued)

Configuration	Percent Slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
18	16	0.15604	0.18576	25F/25R	18.6	33.9	26.25	0.007077	
	15	0.1378	0.16212	20F/20R	22.8	41.1	31.95	0.005074	
	17	0.18815	0.22668	15F/15R	26.9	51.1	39	0.005812	
20	20	0.0863	0.10787	30F/30R	16.9	29.3	23.1	0.00467	0.005687
	19	0.11992	0.14805	25F/25R	18.5	32.2	25.35	0.00584	
	18	0.13561	0.16538	20F/20R	21.5	39.2	30.35	0.005449	
	23	0.18349	0.2383	15F/15R	24.8	45.4	35.1	0.006789	
22	17	0.05448	0.06564	60F/30R	17.7	17.7	17.7	0.003708	0.006307
	19	0.11709	0.14455	25F/25R	28.5	21.7	25.1	0.005759	
	13	0.16919	0.19447	25F/20R	28.5	26.4	27.45	0.007085	
	20	0.22279	0.27848	15F/15R	36.7	27.5	32.1	0.008675	
25	15	0.04792	0.05637	70F/70R	15.3	10.5	12.9	0.00437	0.004847
	16	0.0893	0.10631	35F/35R	27.1	16.3	21.7	0.004899	
	16	0.15895	0.18923	15F/15R	47.3	24.5	35.9	0.005271	
27	25	0.04654	0.06205	70F/70R	13.2	9.2	11.2	0.00554	0.006077
	14	0.10028	0.11661	35F/35R	22.6	13.9	18.25	0.00639	
	16	0.1649	0.19631	15F/15R	39.1	23.2	31.15	0.006302	
31	30	0.02205	0.0315	70F/70R	15.2	8.6	11.9	0.002647	0.004007
	11	0.05292	0.05946	35F/35R	22.1	12.2	17.15	0.003467	

Table 5 (Continued)

Configuration	Percent Slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
31	10	0.16852	0.18724	15F/15R	39	24.4	31.7	0.005907	
33	15	0.01331	0.01565	70F/70R	16	8.1	12.05	0.001299	0.003712
	9	0.05864	0.06444	35F/35R	24.3	13	18.65	0.003455	
	13	0.1763	0.20265	15F/15R	40	23.5	31.75	0.006383	
24	18	0.02089	0.02547	50F/50R	14.8	13.6	14.2	0.001794	0.003766
	14	0.04569	0.05313	35F/35R	17.5	8.4	12.95	0.004103	
	14	0.11171	0.1299	15F/15R	34	14.1	24.05	0.005401	
26	15	0.04784	0.05629	50F/50R	20.6	7.5	14.05	0.004006	0.005051
	10	0.07332	0.08147	35F/35R	21.6	9.1	15.35	0.005307	
	12	0.14929	0.16964	15F/15R	41.4	16.7	29.05	0.00584	
29	12	0.05376	0.0611	50F/50R	14.6	7.3	10.95	0.00558	0.005777
	21	0.09249	0.11708	35F/35R	23.4	10.4	16.9	0.006928	
	25	0.10638	0.14184	15F/15R	39.3	19.5	29.4	0.004824	
28	16	0.0886	0.10548	50F/50R	15.3	14.7	15	0.007032	0.007319
	15	0.09862	0.11603	35F/35R	18.6	17.2	17.9	0.006482	
	14	0.21525	0.25029	15F/15R	31.7	27.6	29.65	0.008441	
30	11	0.04934	0.05544	50F/50R	15.3	13.9	14.6	0.003797	0.005284
	11	0.07333	0.0824	35F/35R	19.6	17.9	18.75	0.004395	
	13	0.20156	0.23168	15F/15R	31	29.5	30.25	0.007659	

Table 5 (Continued)

Configuration	Percent Slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
32	17	0.05724	0.06896	50F/50R	14.7	12.7	13.7	0.005034	0.006651
	13	0.09817	0.11283	35F/35R	18.1	16.4	17.25	0.006541	
	16	0.20336	0.24209	15F/15R	30.4	27.4	28.9	0.008377	
34	15	0.0727	0.08553	50F/50R	13.3	12.5	12.9	0.00663	0.00524
	7	0.05376	0.05781	35F/35R	16.9	16.1	16.5	0.003504	
	14	0.1453	0.16895	15F/15R	30.6	29.9	30.25	0.005585	
23	17	0.08194	0.09872	60F/60R	14.6	13.6	14.1	0.007001	0.010137
	16	0.15362	0.18288	36F/36R	18.6	18.2	18.4	0.009939	
	14	0.24402	0.28375	28F/28R	23	22.2	22.6	0.012555	
	21	0.29557	0.37414	15F/15R	34.2	33.5	33.85	0.011053	
37	12	0.07948	0.09032	60F/60R	14.3	13.7	14	0.006451	0.008692
	16	0.15354	0.18279	36F/36R	18.7	17.9	18.3	0.009989	
	16	0.18291	0.21775	28F/28R	22.8	21.3	22.05	0.009875	
	16	0.25279	0.30095	15F/15R	36.7	34.5	35.6	0.008454	
35	12	0.07086	0.08053	30F/30R	14	16.9	15.45	0.005212	0.00587
	13	0.07746	0.08904	25F/25R	15.7	19.6	17.65	0.005045	
	16	0.10871	0.12942	20F/20R	18.8	23	20.9	0.006192	
	17	0.15026	0.18104	15F/15R	22.8	28.7	25.75	0.007031	

Table 5 (Concluded)

Configuration	Percent Slip	Work Index	Optimum DBP Coefficient	Tire Pressure	Tire Deflection			Optimum DBP Coefficient/Avg Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
					Front	Rear	Average		
36 w/ trailer	12	0.03821	0.04342	30F/30R	20.7	29.7	25.2	0.001723	0.003837
	22	0.08926	0.11444	25F/25R	15.7	19.6	17.65	0.006484	
	18	0.11347	0.13837	20F/20R	27.1	38.2	32.65	0.004238	
	14	0.09953	0.11573	15F/15R	30.7	49	39.85	0.002904	
36	17	0.10069	0.12131	30F/30R	20.7	29.7	25.2	0.004814	0.006070
	18	0.12204	0.14882	25F/25R	15.7	19.6	17.65	0.008432	
	15	0.14089	0.16575	20F/20R	27.1	38.2	32.65	0.005077	
	17	0.19711	0.23748	15F/15R	30.7	49	39.85	0.005959	

Table 6
Drawbar Pull Performance Ranking

Configuration	Tire	Average Configuration Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
M1009 CUCV with 15 in. Rims			
7	Goodyear Wrangler MT 33x12.50R15LT	21.0375	0.007259
15	Armstrong Norsemen Tredlok 33x12.50R15LT	21.675	0.007212
11	Firestone ATX 33x12.5R15LT	25.2875	0.0072
4	Goodyear Wrangler AT 33x12.50R15LT	23.175	0.006592
5	Goodyear Wrangler HT 33x12.50R15LT	24.3125	0.006354
17	Armstrong Desert Dog 33x12.50R15LT	25.2375	0.006283
8	Michelin XCH4 33x12.5R15LT	24.825	0.006112
13	Cooper Discoverer LT 33x12.50R15LT	23.55	0.005998
9	Firestone All Terrain Bias-Ply 33x12.5R15LT	19.9	0.005815
1	Uniroyal Laredo A/T 31x10.50R15LT	24.05	0.0045
M1028 Shelter Carrier with 16 in. Rims			
12	Goodyear Wrangler AT LT255/85R16	32.0125	0.005046
2	B.F. Goodrich Trailedge LT235/85R16	30	0.004961
3(Duals)	B.F. Goodrich Trailedge LT235/85R16	27.6875	0.004804
19	Firestone Radial ATX LT235/85R16	29.9375	0.004678
16	Goodyear Wrangler TD LT265/75R16	28.1	0.004678
21	Goodyear Wrangler LT LT255/85R16		

Table 6 (Continued)

Configuration	Tire	Average Configuration Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
M1028 Shelter Carrier with 16.5 in. Split Rims			
18	Goodyear Wrangler MT 33x12.50R16.5LT	30.1625	0.005869
20	Goodyear Wrangler AT 33x12.5R15LT	28.475	0.005687
6	Firestone Radial ATX 33x12.50R16.5LT	27.966666667	0.005046
10	Cooper Discoverer LT 33x12.50R16.5LT	29.575	0.004967
14	Goodyear Wrangler HT 33x12.50R16.5LT	30.1	0.004871
M54 5-Ton			
22	Goodyear G286 Radials 11.00R20	25.5875	0.006307
27	Goodyear Unisteel G188 11.00R20	20.2	0.006077
25	Michelin XL 11.00R20	23.5	0.004847
31	Firestone UT-2000 11.00R20	20.25	0.004007
33	Michelin XS 12.00R20	20.816666667	0.003712
M35A2			
29	Michelin XL 9.00R20	19.083333333	0.005777
26	Goodyear Unisteel G186 9.00R20	19.483333333	0.005051
24	NDCC Retreads 9.00R20	17.066666667	0.003766
M35A2 with Singles			
28	Michelin XL 11.00R20	20.85	0.007319
32	Goodyear Unisteel G286 11.00R20	19.95	0.006651
30	Firestone UT-2000 11.00R20	21.2	0.005284
34	Goodyear Unisteel G188 11.00R20	19.883333333	0.00524

Table 6 (Concluded)

Configuration	Tire	Average Configuration Tire Deflection	Avg (Optimum DBP Coefficient/Avg Tire Deflection)
M813			
23	Goodyear AT-2A 14.00R20	22.2375	0.010137
37	Bridgestone V-Steel Jamal 14.00R20	22.4875	0.008692
M1009 Stormer			
35	Goodyear Wrangler HT 22x12.50R15	19.9375	0.00587
M1008			
36	Goodyear Wrangler LT LT255/85R16	28.8375	0.006070
36 w/trailer	Goodyear Wrangler LT LT255/85R16	28.8375	0.003837

Table 7
Results of Motion Resistance Tests

Configuration	Tire	Tire Inflation Pressure, psi		Motion Resistance, lbs	Motion Resistance Coefficient
		Front	Rear		
M1009					
1	Uniroyal Laredo A/T 31X10.5R15	35	35	2500	0.34
		25	25	2500	0.34
		20	20	1700	0.23
		15	15	1200	0.17
4	Goodyear Wrangler AT 33X12.5R15	30	30	2600	0.36
		20	20	2100	0.29
		15	15	1100	0.15
		10	10	800	0.11
5	Goodyear Wrangler HT 33X12.5R15	30	30	2650	0.37
		20	20	1500	0.21
		15	15	1000	0.14
		10	10	800	0.11
7	Goodyear Wrangler MT 33X12.5R15	30	30	2000	0.28
		20	20	2225	0.31
		15	15	1700	0.23
		10	10	1000	0.14
8	Michelin XCH4 33X12.5R15	30	30	2500	0.34
		20	20	2200	0.30
		15	15	1300	0.18
		10	10	800	0.11
9	Firestone Bias-ply 33X12.5R15	30	30	2500	0.34
		20	20	2200	0.30
		15	15	1400	0.19
11	Firestone ATX 33X12.5R15	30	30	2200	0.30
		20	20	2100	0.29
		15	15	1250	0.17
		10	10	850	0.12

Table 7 (Continued)

Configuration	Tire	Tire Inflation Pressure, psi		Motion Resistance, lbs	Motion Resistance Coefficient
		Front	Rear		
13	Cooper Discoverer LT 33X12.5R15	30	30	2500	0.34
		20	20	2000	0.28
		15	15	1100	0.15
		10	10	900	0.12
15	Armstrong Tredlock 33X12.5R15	30	30	2800	0.39
		20	20	1900	0.26
		15	15	1600	0.22
		10	10	1100	0.15
17	Armstron Desert Dog 33X12.5R15	30	30	2300	0.32
		20	20	2100	0.29
		15	15	1000	0.14
		10	10	650	0.09
M1009 Stormer					
35	Goodyear Wrangle LT 33X12.5R15	30	30	2500	0.34
		25	25	2100	0.29
		15	15	2250	0.31
		10	10	1500	0.21
M1028					
2	B. F. Goodrich Trailedge 235/85R16	35	50	3000	0.29
		35	35	2300	0.23
		35	25	1500	0.15
		20	20	1200	0.12
3	B. F. Goodrich Trailedge Duals in Rear 235/85R16	35	35	4500	0.44
		25	20	2400	0.24
		20	10	1350	0.13
6	Firestone ATX 33X12.5R16.5	30	30	2200	0.22
		25	25	1900	0.19
		20	20	2000	0.20

Table 7 (Continued)

Configuration	Tire	Tire Inflation Pressure, psi		Motion Resistance, lbs	Motion Resistance Coefficient
		Front	Rear		
M1028					
10	Cooper Discoverer LT 33X12.5R16.5	30	30	3000	0.29
		25	25	2700	0.26
		20	20	1800	0.18
		15	15	1200	0.12
12	Goodyear Wrangler AT 255/85R16	30	30	2700	0.26
		25	25	2000	0.20
		20	20	1500	0.15
		15	15	1400	0.14
14	Goodyear Wrangler HT 33X12.5R16.5	30	30	3100	0.30
		25	25	2800	0.27
		20	20	2100	0.21
		15	15	1300	0.13
16	Goodyear Wrangler TD 255/75R16	35	35	3400	0.33
		30	30	2850	0.28
		25	25	2700	0.26
18	Goodyear Wrangler HT 33X12.5R16.5	30	30	3050	0.30
		25	25	2550	0.25
		20	20	1550	0.15
		15	15	1150	0.11
19	Firestone ATX 255/85R16	35	35	2900	0.28
		30	30	2750	0.27
		25	25	2700	0.26
		20	20	1650	0.16
20	Goodyear Wrangler AT 33X12.5R16.5	30	30	3000	0.29
		25	25	2500	0.25
		20	20	1800	0.18
		15	15	1300	0.13

Table 7 (Continued)

Configuration	Tire	Tire Inflation Pressure, psi		Motion Resistance, lbs	Motion Resistance Coefficient
		Front	Rear		
M1028					
21	Goodyear Wrangler LT 255/85R16	35	35	2700	0.26
		30	30	2300	0.23
		25	25	2100	0.21
		20	20	1800	0.18
M54A2					
22	Goodyear G286 11.00R20	60	30	6000	0.19
		25	25	4000	0.13
		25	20	3900	0.13
		15	15	3300	0.11
25	Michelin XL 11.00R20	70	70	10000	0.32
		35	35	8200	0.27
		15	15	4000	0.13
27	Goodyear Unisteel G188 11.00R20	70	70	10200	0.33
		35	35	8200	0.27
		15	15	4000	0.13
31	Firestone UT-2000 11.00R20	70	70	10900	0.35
		35	35	7000	0.23
		15	15	4000	0.13
33	Michelin XS 11.00R20	70	70	9400	0.31
		35	35	8000	0.26
		15	15	4400	0.14
M35A2					
24	NDCC Bias-ply Retreads 9.00X20	50	50	6000	0.32
		35	35	5500	0.29
		15	15	2800	0.15
26	Goodyear Unisteel G186 9.00R20	50	50	5200	0.28
		35	35	5000	0.26
		15	15	2800	0.15

Table 7 (Continued)

Configuration	Tire	Tire Inflation Pressure, psi		Motion Resistance, lbs	Motion Resistance Coefficient
		Front	Rear		
M35A2					
29	Michelin XL 9.00R20	50	50	5200	0.28
		35	35	4000	0.21
		15	15	2400	0.13
M35A2 with Singles					
28	Michelin XL 11.00R20	50	50	4400	0.24
		35	35	3200	0.17
		15	15	2200	0.12
30	Firestone UT-2000 11.00R20	50	50	4400	0.24
		35	35	3600	0.20
		15	15	2200	0.12
32	Goodyear G286 11.00R20	50	50	4400	0.24
		35	35	3600	0.20
		15	15	2200	0.12
34	Goodyear Unisteel G188 11.00R20	50	50	4000	0.22
		35	35	3600	0.20
		15	15	2400	0.13
M813					
23	Goodyear AT-2A 14.00R20	60	60	5400	0.17
		36	36	4800	0.15
		28	28	3900	0.12
		15	15	3600	0.12
37	Bridgestone Vsteel Jamal 14.00R20	60	60	5200	0.17
		36	36	2900	0.09
		28	28	2500	0.08
		15	15	2000	0.06

Table 7 (Concluded)

Configuration	Tire	Tire Inflation Pressure, psi		Motion Resistance, lbs	Motion Resistance Coefficient
		Front	Rear		
M1008					
36	Goodyear Wrangler HT 255/85R16	30	30	3000	0.32
		25	25	2500	0.27
		20	20	1750	0.19
		15	15	1250	0.14
M1008 with Trailer					
36	Goodyear Wrangler HT 255/85R16 Bias-ply tires on trailer	30	30	3750	0.31
		25	25	2500	0.21
		20	20	2000	0.17
		15	15	1800	0.15

Table 8
Results of Slope Tests

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No.1	Slope No. 2	Slope No. 3
M1009 with 15 in. Rims				
1	35/35	11		
	30/30	42 25	29 25	17 16
	20/20	82 84	65 58	67 54
	15/15	137 197	87 107	83 123
4	30/30	64 82	51 74	29 44
	20/20	81 101	89 122	77 61
	15/15	130 GO	93 119	78 115
	10/10	GO GO	GO GO	GO GO
5	30/30	87 97	70 64	58 68
	20/20	122 130	119 113	97 125
	15/15	GO GO	137 193	158 113
	10/10	GO GO	GO GO	GO GO
7	30/30	60 82	54 48	34 47
	20/20	101 127	62 84	77 72
	15/15	154 GO	112 148	107 135
	10/10	GO GO	GO GO	GO GO
8	30/30	91 103	84 84	45 48 54
	20/20	GO GO	98 115	104 99

Table 8 (Continued)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No.1	Slope No. 2	Slope No. 3
M1009 with 15 in. Rims (continued)				
8 (continued)	15/15	GO GO	GO GO	143 164
	10/10	GO GO	GO GO	GO GO
9	20/20	71 101	90 92	66 70
	15/15	118 114	95 111	70 95
	10/10	GO GO	176 GO	156 157
11	30/30	85 54	44 60	43 66
	20/20	GO 141	146 141	91 127
	15/15	GO GO	GO GO	139 GO
	10/10	GO GO	GO GO	GO GO
13	30/30	54 100	57 72	29 63
	20/20	130 180 150	96 115	72 97
	15/15	GO GO	141 93	116 128
	10/10	GO GO	GO GO	GO GO
15	30/30	52 81	51 58	35 36
	20/20	106 99	102 104	72 85
	15/15	GO GO	GO GO	127 135
	10/10	GO GO	GO GO	GO GO
17	30/30	89 91	51 63	40 47

Table 8 (Continued)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No. 1	Slope No. 2	Slope No. 3
17 (continued)	20/20	GO GO	105 115	95 88
	15/15	GO GO	135 GO	109 128
	10/10	GO GO	GO GO	GO GO
M1028 with 16 in. Rims				
2	35/35	65		
	25/25	112 132 GO 99	119 73 61	65 68
	20/20	GO 113 GO	GO GO 111 147	GO GO 78 104 115
12	35/35	74 79	73 78	66 71
	25/25	GO GO	118 131	97 94
	20/20	GO GO	GO GO	GO GO
16	35/35	82 62	51 58	32 41
	30/30	126 104	79 76	91 62
	25/25	141 93 GO	GO 141	81 96
19	35/35	96 70	45 48	35 43
	30/30	126 126	62 57	50 49
	25/25	GO GO	92 80 GO	109 85
	20/20	GO GO	GO GO	GO GO

Table 8 (Continued)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No. 1	Slope No. 2	Slope No. 3
M1028 with 16 in. Rims (continued)				
21	35/35	91 79	51 56	38 46
	30/30	124 117	71 77	84 68
	25/25	GO GO	78 81	65 76
	20/20	GO GO	GO GO	122 105
M1028 (Dual Wheels in Rear) with 16 in. Rims				
3	35/50	50 32	11 22	
	35/35	67 37	32 18	12 14
	20/20	79 97		40 45
	20/15	99 99	62 71	55 63
	20/10	GO GO	GO GO	GO GO
M1028 with 16.5 in. Split Rims				
6	30/30	64 64 64	48 47 52	 44 50
	25/25	76 87 71	58 65	57 62
	20/20	120 GO GO	81 136	87 102
10	30/30	48 54	43 51	45 46
	25/25	90 91	65 96	59 80
	20/20	121 125 138	79 85	79 81

Table 8 (Continued)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No. 1	Slope No. 2	Slope No. 3
M1028 with 16.5 in. Split Rims (continued)				
10 (continued)	15/15	GO GO	135 GO	137 154
14	30/30	93 71	71 60	46 52
	25/25	109 114	93 75	74 113
	20/20	GO GO	GO 135	108 107
	15/15	GO GO	GO GO	GO GO
18	30/30	79 76	54 45	35 45
	25/25	92 115	74 97	78 101
	20/20	GO GO	GO GO	175 122
	15/15	GO GO	GO GO	GO GO
20	30/30	61 75	35 40	23 37
	25/25	122 80	67 79	75 61
	20/20	GO GO	GO GO	107 131
	15/15	GO GO	GO GO	GO GO
M54 5-Ton				
22	70/70	23 22	22 20	16 15
	60/30	23 26		
	35/35	58 67	37 42	33 32
	25/25	66	37 51	

Table 8 (Continued)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No. 1	Slope No. 2	Slope No. 3
M54 5-Ton (continued)				
22 (continued)	25/20	127	63 78	43 66 82
	15/15	GO GO	GO GO	139 GO
25	70/70	43 62	33 33	21 19
	35/35	99 120	55 71	35 42
	15/15	GO	GO	GO
27	70/70	* *	15 14	15 12
	35/35	44 37	27 29	26 27
	15/15	GO	131 113	113 110
31	70/70	10 10	* *	* *
	35/35	37 45	29 30	38 41
	15/15	GO	GO	GO
33	70/70	4 3	* *	* *
	35/35	30 23	27 31	27 25
	15/15	GO GO	82 84	75 72
M35A2 2-1/2 Ton				
24	50/50	25 18	28 21	25 27
	35/35	46 34	33 27	35 32
	15/15	96 101	59 55	57 57
26	50/50	46 33	30 30	25 22

Table 8 (Continued)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No. 1	Slope No. 2	Slope No. 3
M35A2 2-1/2 Ton (continued)				
26 (continued)	35/35	69 63	32 37	32 40
	15/15	GO GO	GO GO	84 111
29	50/50	32 28	23 24	21 23
	35/35	52 45	38 35	38 32
	15/15	GO GO	96 125	104 107
M35A2 2-1/2 Ton with Singles				
28	50/50	67 46	34 31	31 29
	35/35	107 97	50 47	53 52
	15/15	GO	GO	GO
30	50/50	40 36	33 32	35 33
	35/35	82 115	45 45	41 41
	15/15	GO	GO	GO
32	50/50	40 40	35 29	26 28
	35/35	74 67	43 44	47 48
	15/15	GO	GO	GO
34	50/50	25 23	31 27	32 29
	35/35	53 52	42 43	44 43
	15/15	GO GO	118 156	118 118

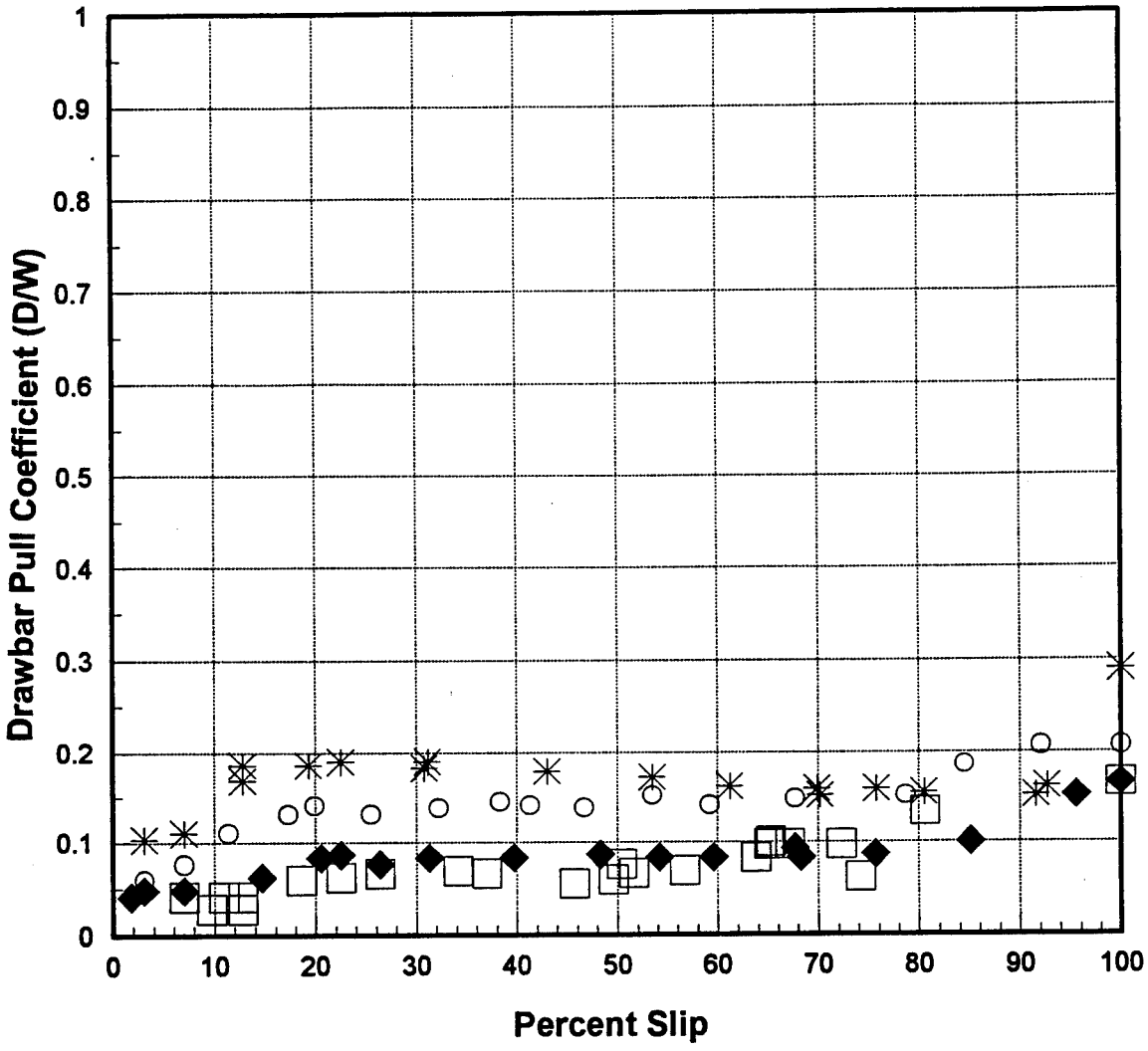
Table 8 (Continued)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No. 1	Slope No. 2	Slope No. 3
M813 5-Ton				
23	60/60	37 43	30 25	25 27
	36/36	96 98	63 62	65 64
	28/28	GO GO	110 GO	97 102
	15/15	GO	GO	GO
37	60/60	42 35	40 35	29 27
	36/36	146 115	92 92	87 92
	28/28	GO GO	GO GO	GO GO
	15/15	GO	GO	GO
M1009 Stormer				
35	30/30	50 43	51 39	59 44
	25/25	62 92	59 58	65 59
	20/20	114 142	88 91	88 87
	15/15	GO	GO	GO
M1008 with Singles				
36	30/30	100 150	70 72	56 65
	25/25	148 147	150 155	97 92
	20/20	GO GO	GO GO	135 GO
	15/15	GO	GO	GO
36 with trailer	30/30	* *	51 38	38 30
	25/25	60 58	62 55	65 55

Table 8 (Concluded)

Configuration	Tire Pressure, psi Front/Rear	Distance Up Slope, ft		
		Slope No. 1	Slope No. 2	Slope No. 3
M1008 with Singles (continued)				
36 with trailer (continued)	20/20	142 90	68 78	85 75
	15/15	153 190	112 105	81 86

CONFIGURATION 1



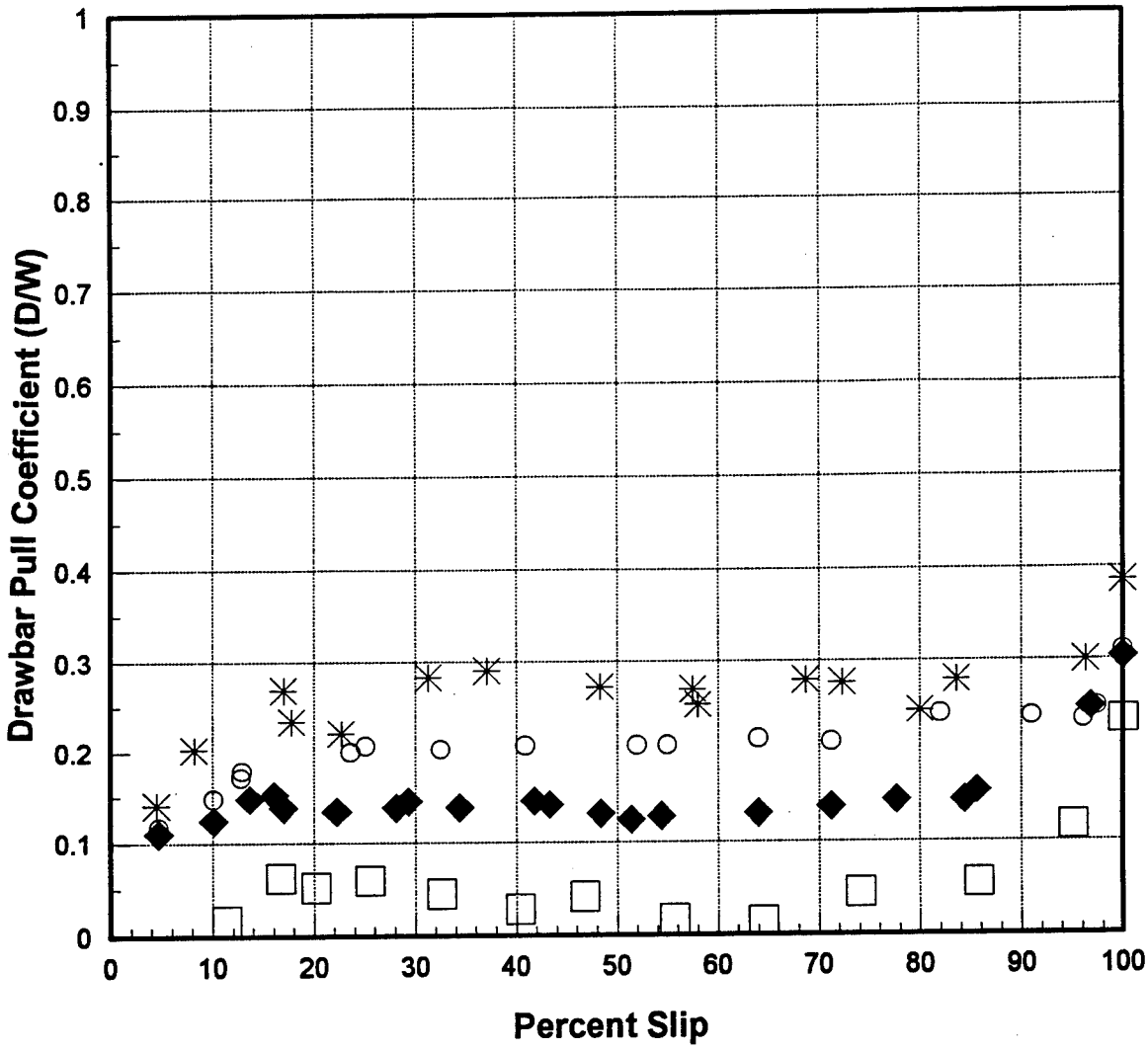
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	35	35	2500
◆	25	25	2500
○	20	20	1700
✳	15	15	1200

M1009
UNIROYAL LAREDO A/T
31X10.50R15LT

PLATE 1

CONFIGURATION 4



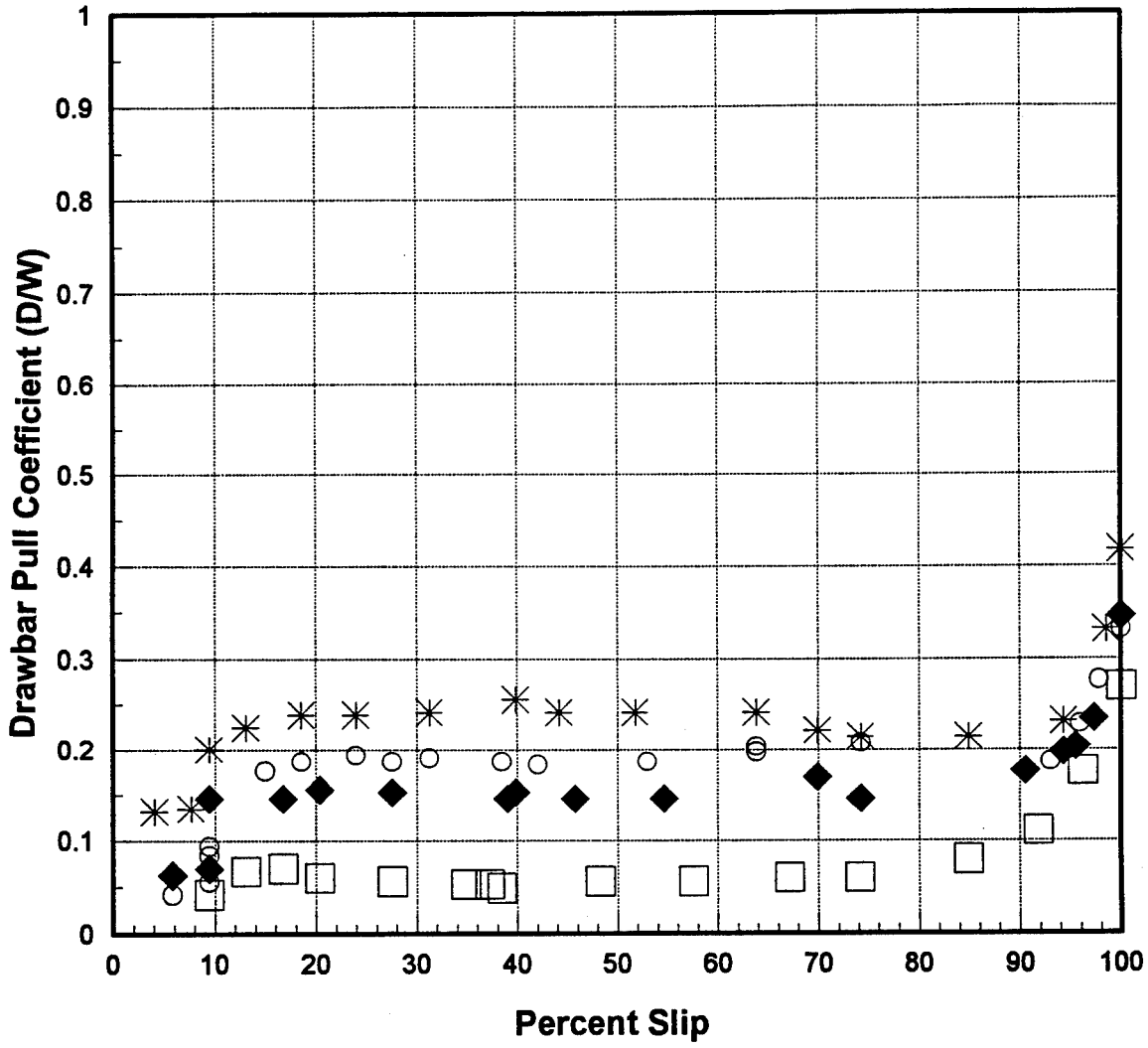
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2600
◆	20	20	2100
○	15	15	1100
✳	10	10	800

M1009
GOODYEAR WRANGLER AT
33X12.50R15LT

PLATE 2

CONFIGURATION 5



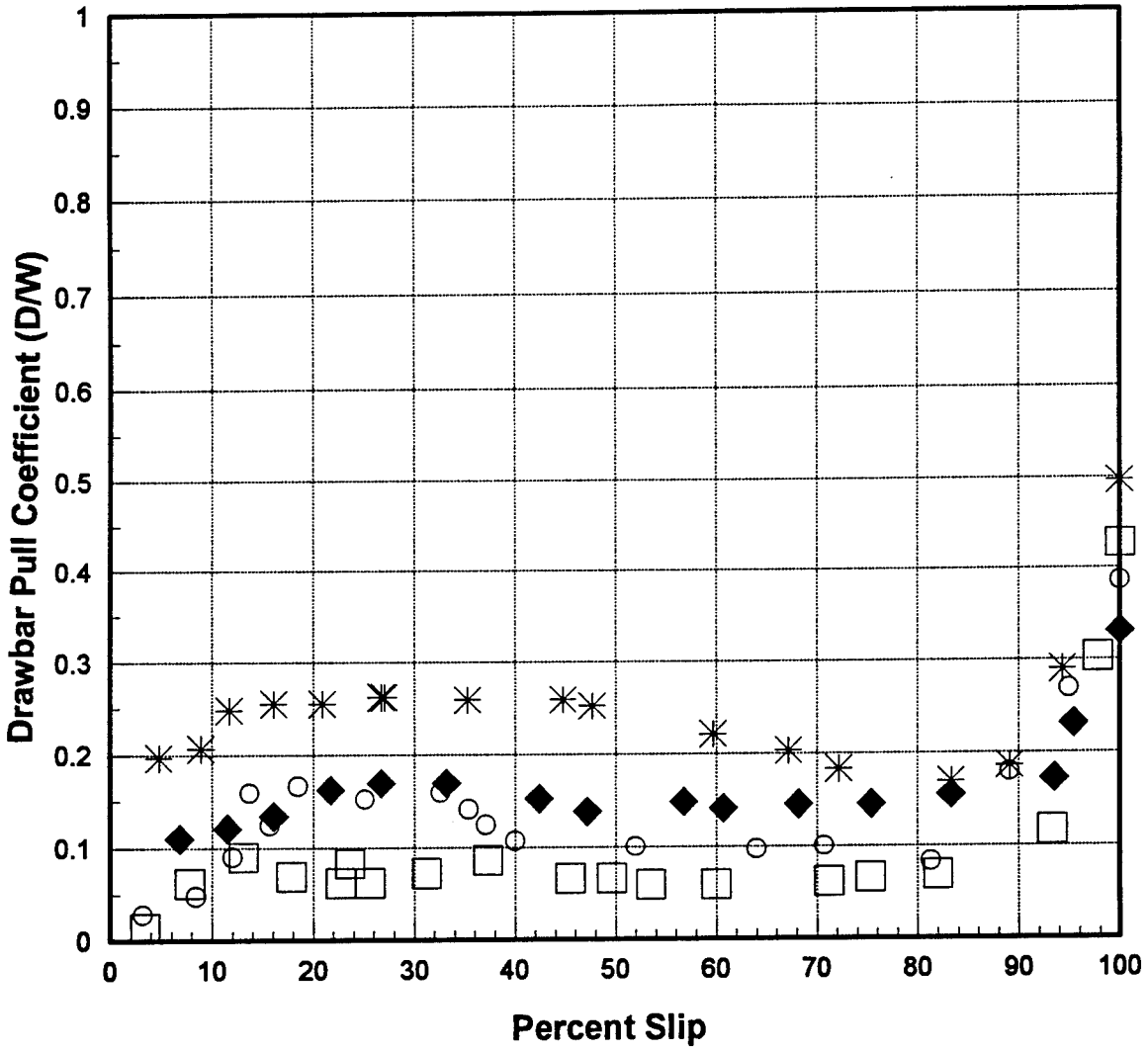
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2650
◆	20	20	1500
○	15	15	1000
✳	10	10	800

M1009
GOODYEAR WRANGLER HT
33X12.50R15LT

PLATE 3

CONFIGURATION 7



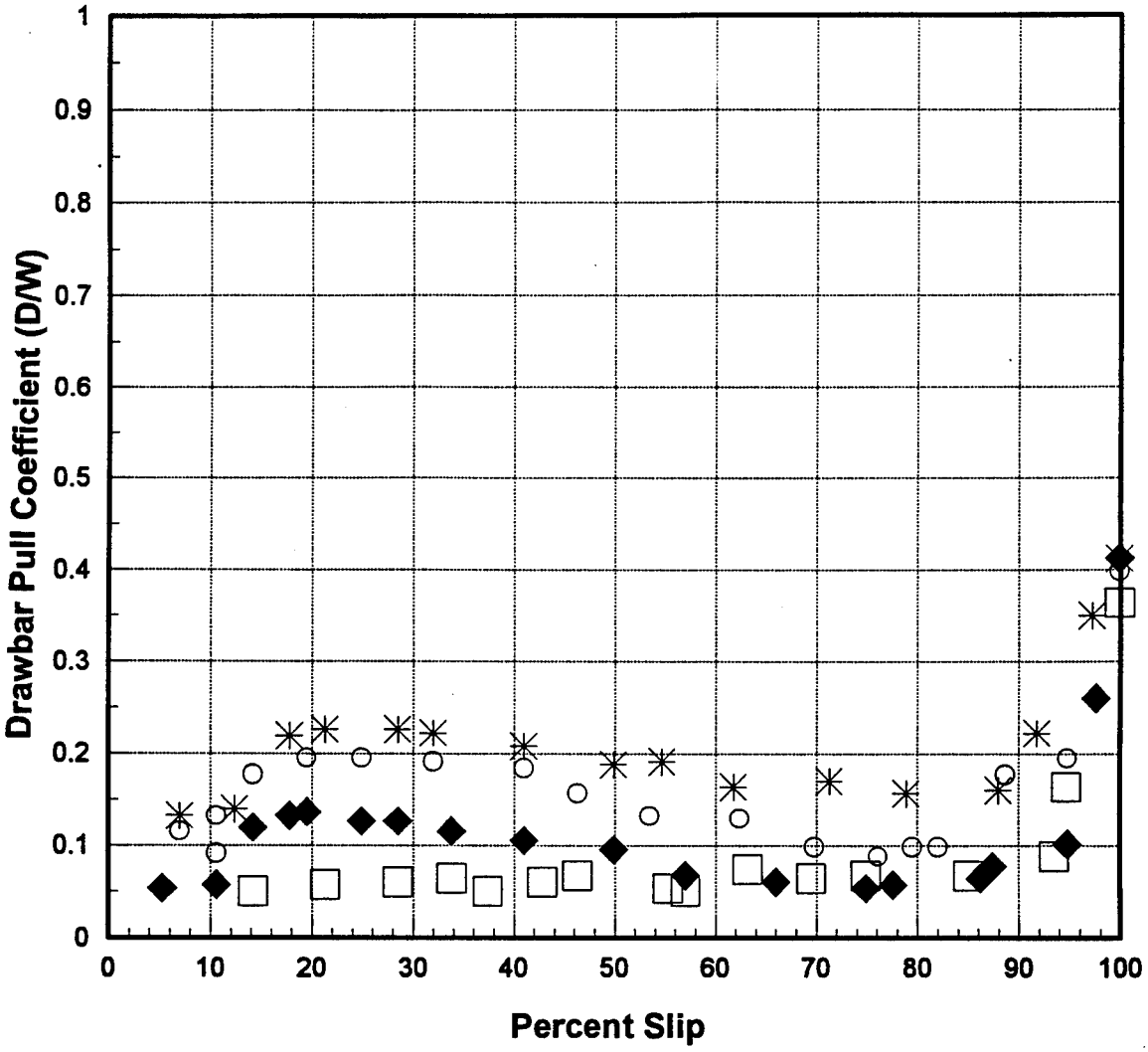
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2000
◆	20	20	2225
○	15	15	1700
✳	10	10	1000

M1009
GOODYEAR WRANGLER MT
33X12.50R15LT

PLATE 4

CONFIGURATION 8



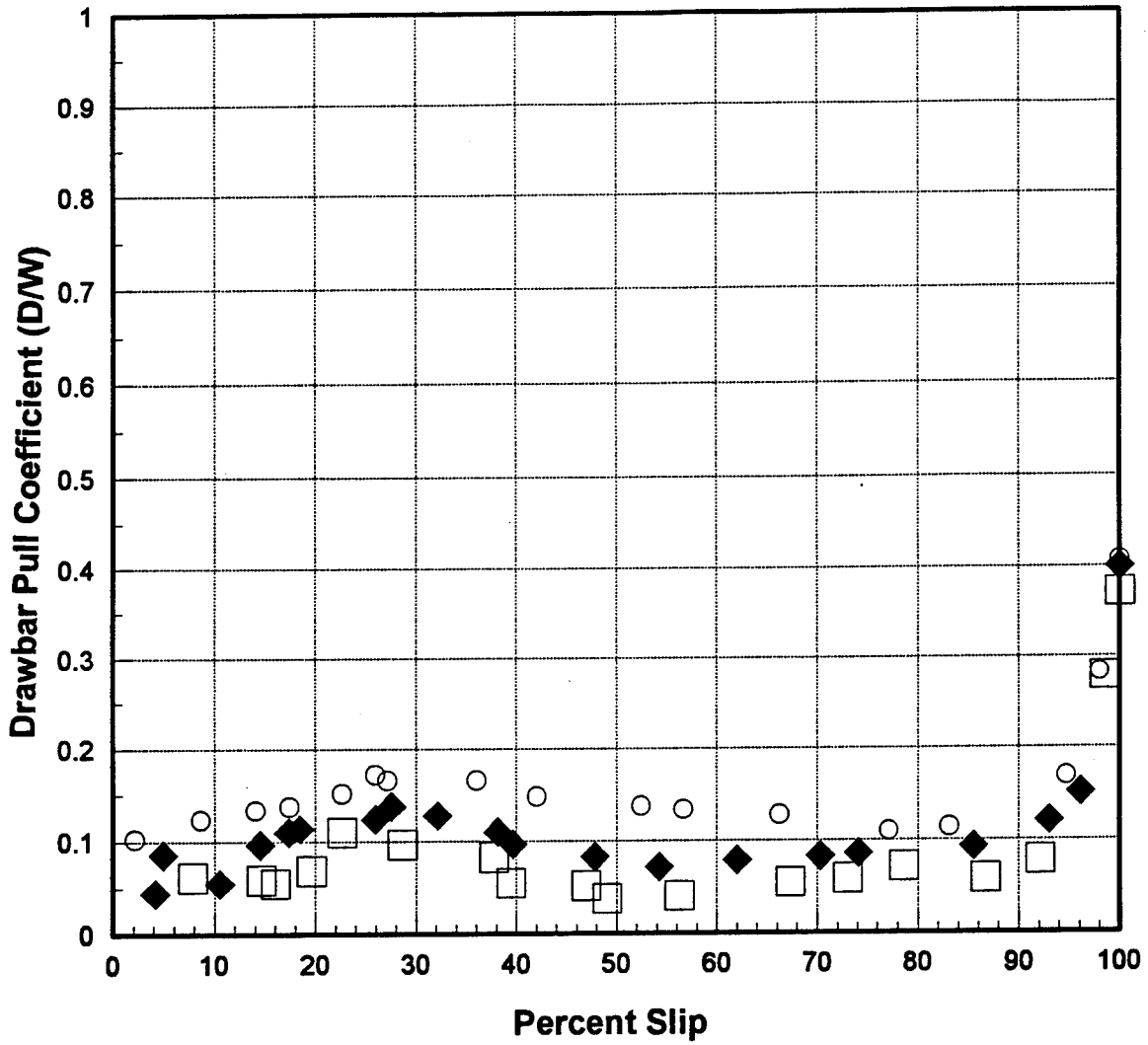
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2500
◆	20	20	2200
○	15	15	1300
✳	10	10	800

M1009
MICHELIN XCH4
33X12.50R15LT

PLATE 5

CONFIGURATION 9



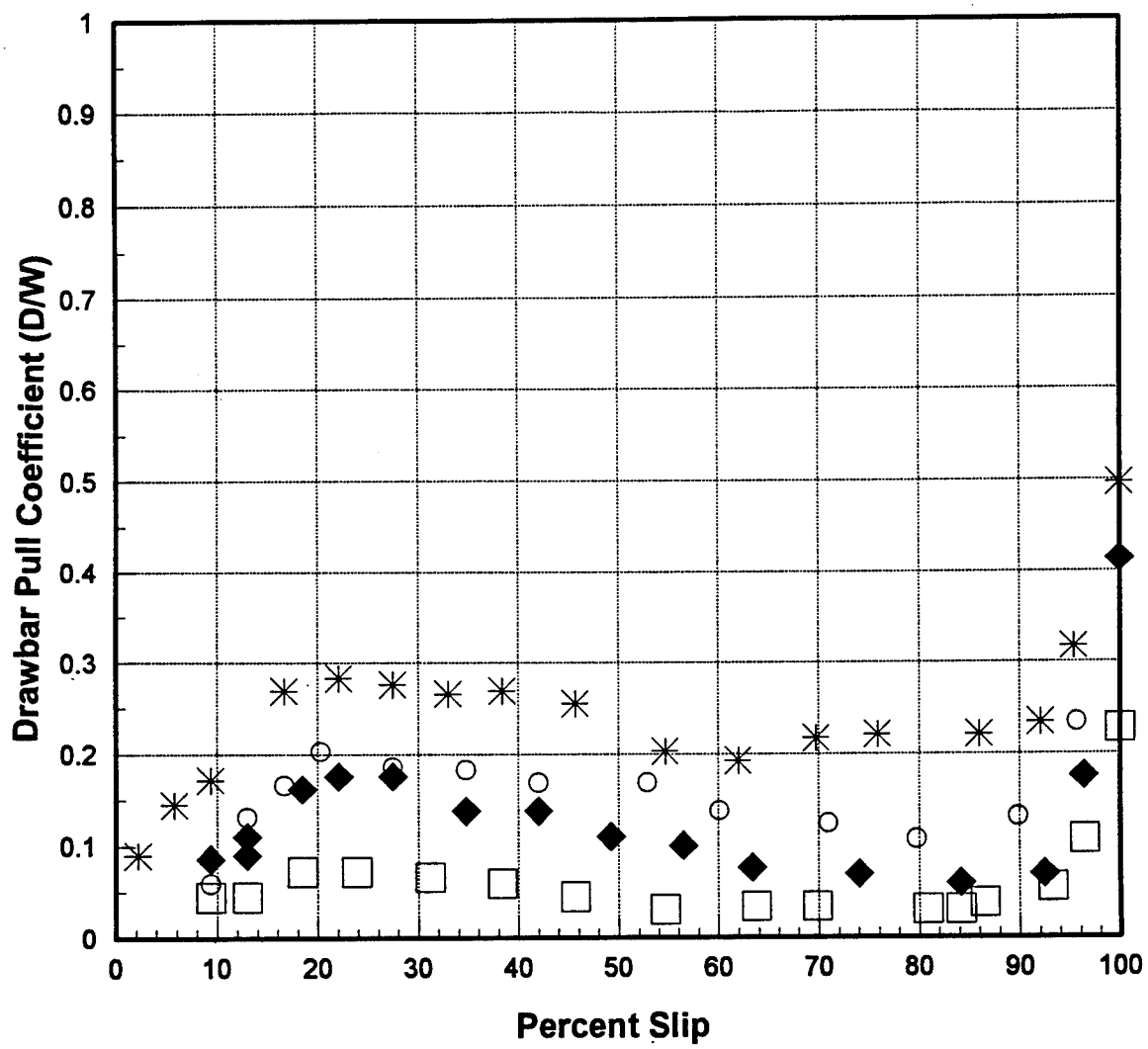
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2500
◆	20	20	2200
○	15	15	1400

M1009
FIRESTONE BIAS-PLY
33X12.50R15LT

PLATE 6

CONFIGURATION 11



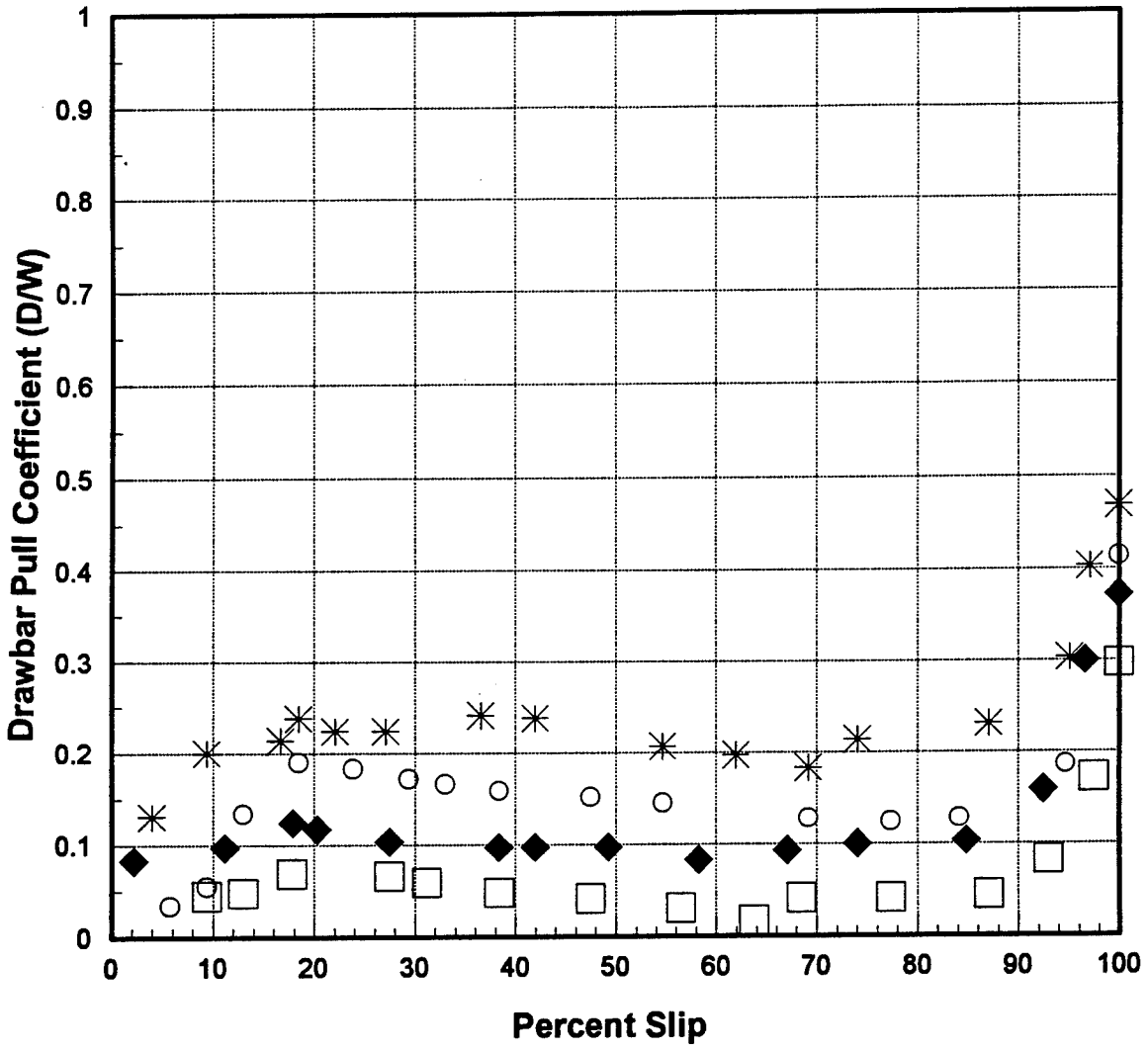
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2200
◆	20	20	2100
○	15	15	1250
✳	10	10	850

M1009
FIRESTONE ATX
33X12.50R15LT

PLATE 7

CONFIGURATION 13



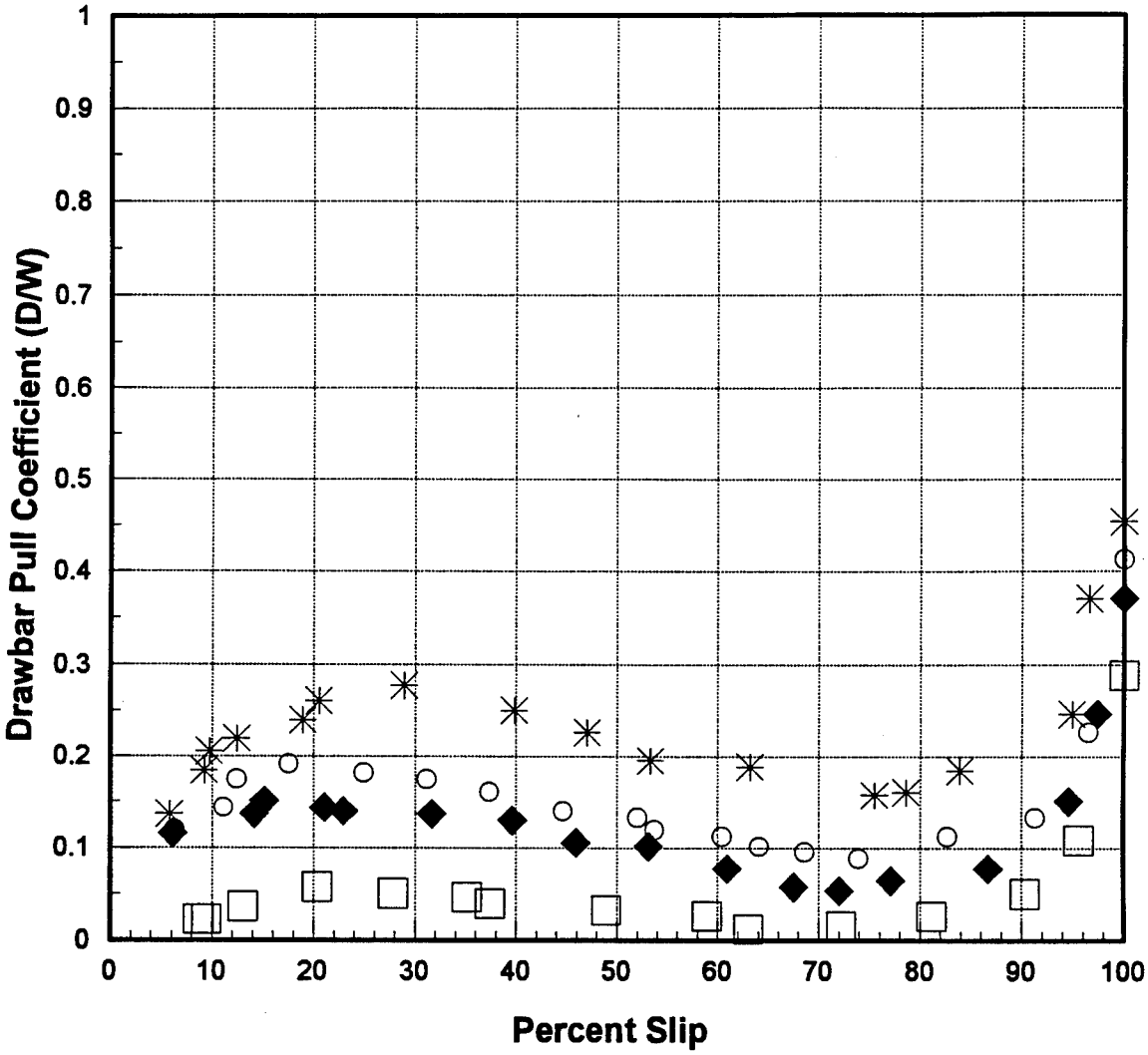
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2500
◆	20	20	2000
○	15	15	1100
✳	10	10	900

M1009
COOPER DISCOVERER
33X12.50R15LT

PLATE 8

CONFIGURATION 15



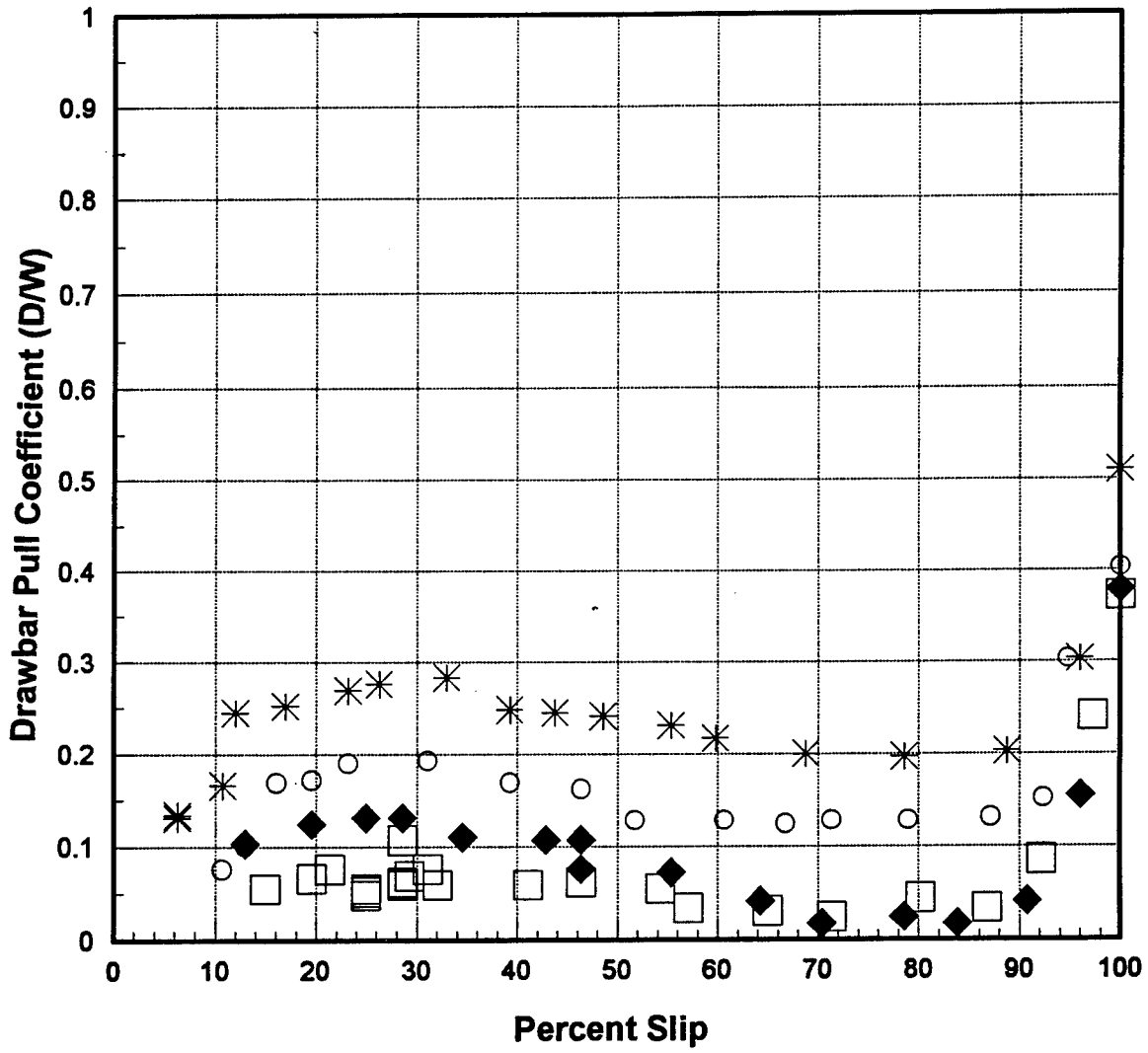
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2800
◆	20	20	1900
○	15	15	1600
✳	10	10	1100

M1009
ARMSTRONG TREDLOK
33X12.50R15LT

PLATE 9

CONFIGURATION 17

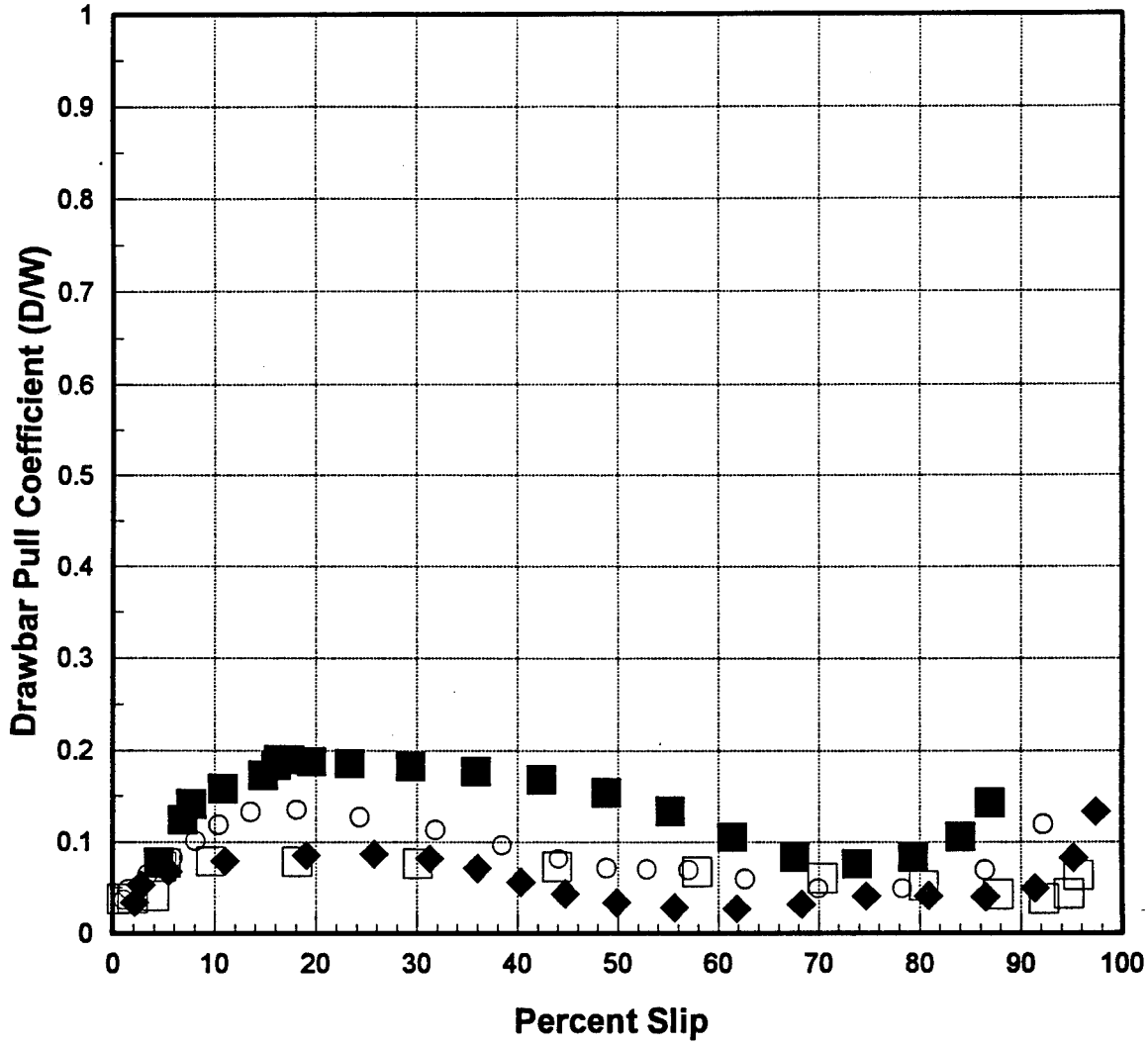


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2300
◆	20	20	2100
○	15	15	1000
✳	10	10	650

M1009
ARMSTONG DESERT DOG
33X12.50R15LT

CONFIGURATION 35



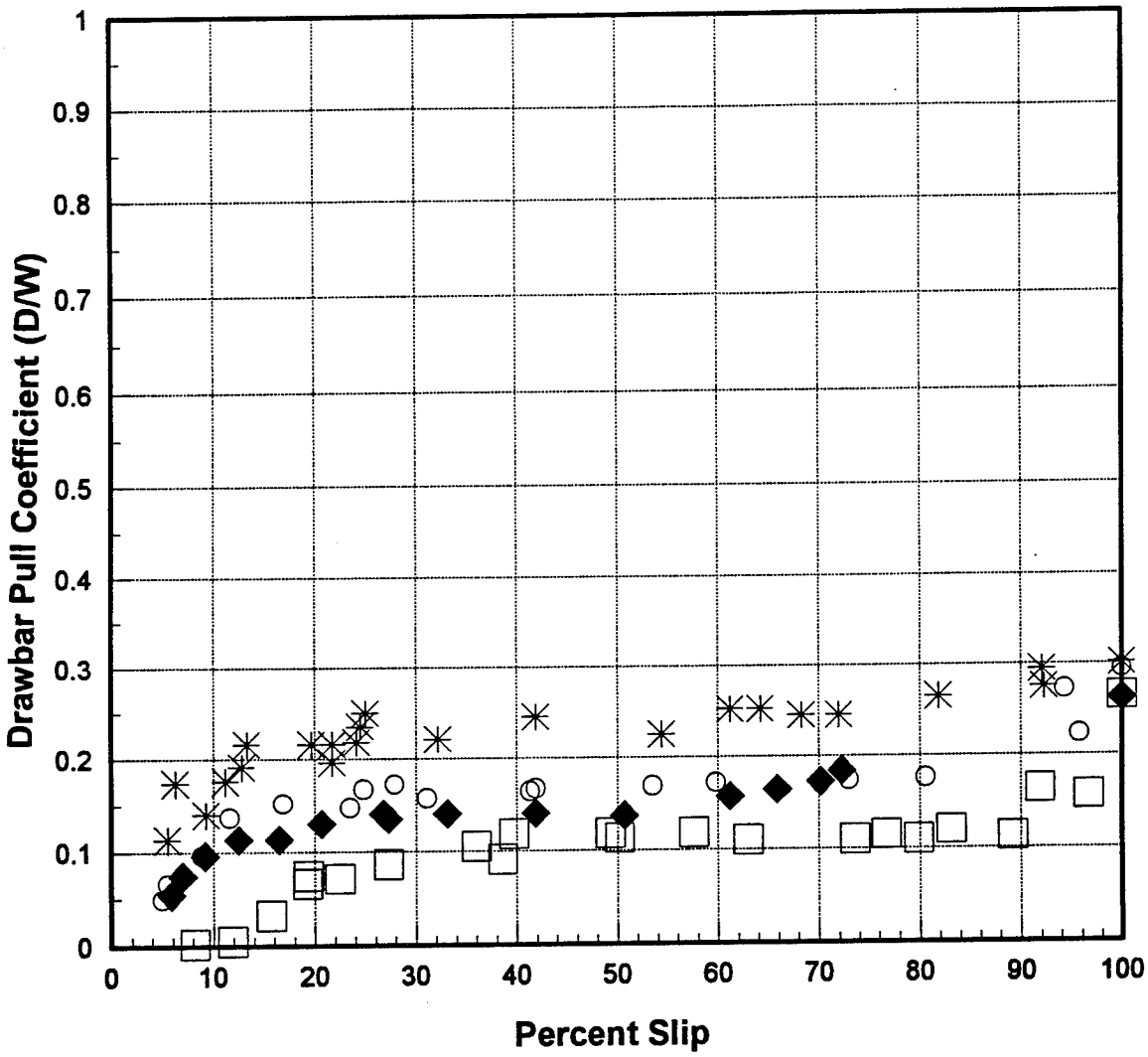
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2500
◆	25	25	2100
○	20	20	2250
■	15	15	1500

M1009 STORMER
GOODYEAR WRANGLER HT
33X12.50R15LT

PLATE 11

CONFIGURATION 2



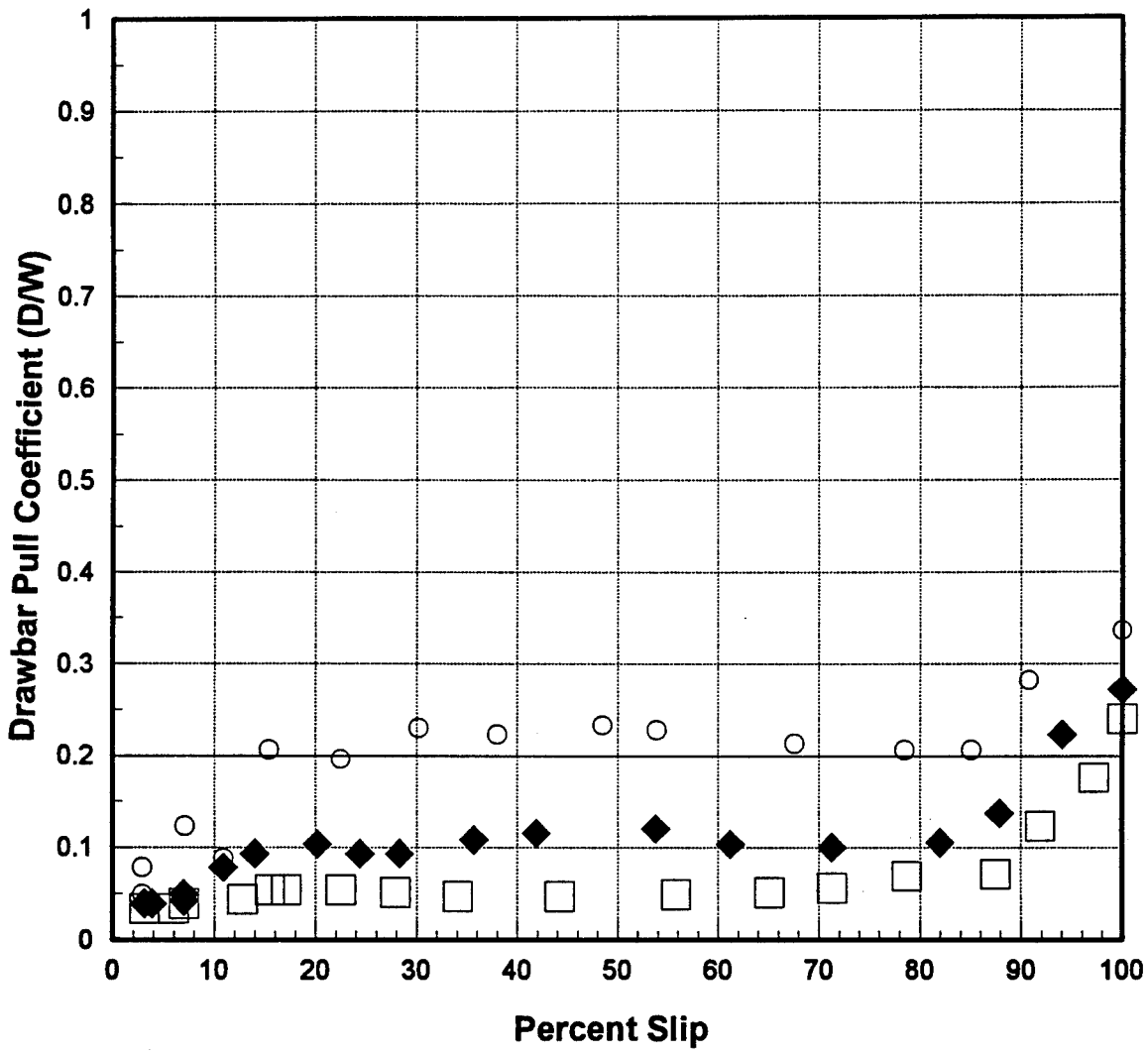
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	35	50	3000
◆	35	35	2300
○	25	25	1500
✳	20	20	1200

M1028
B. F. GOODRICH TRAILEDGE
LT235/85R16

PLATE 12

CONFIGURATION 3



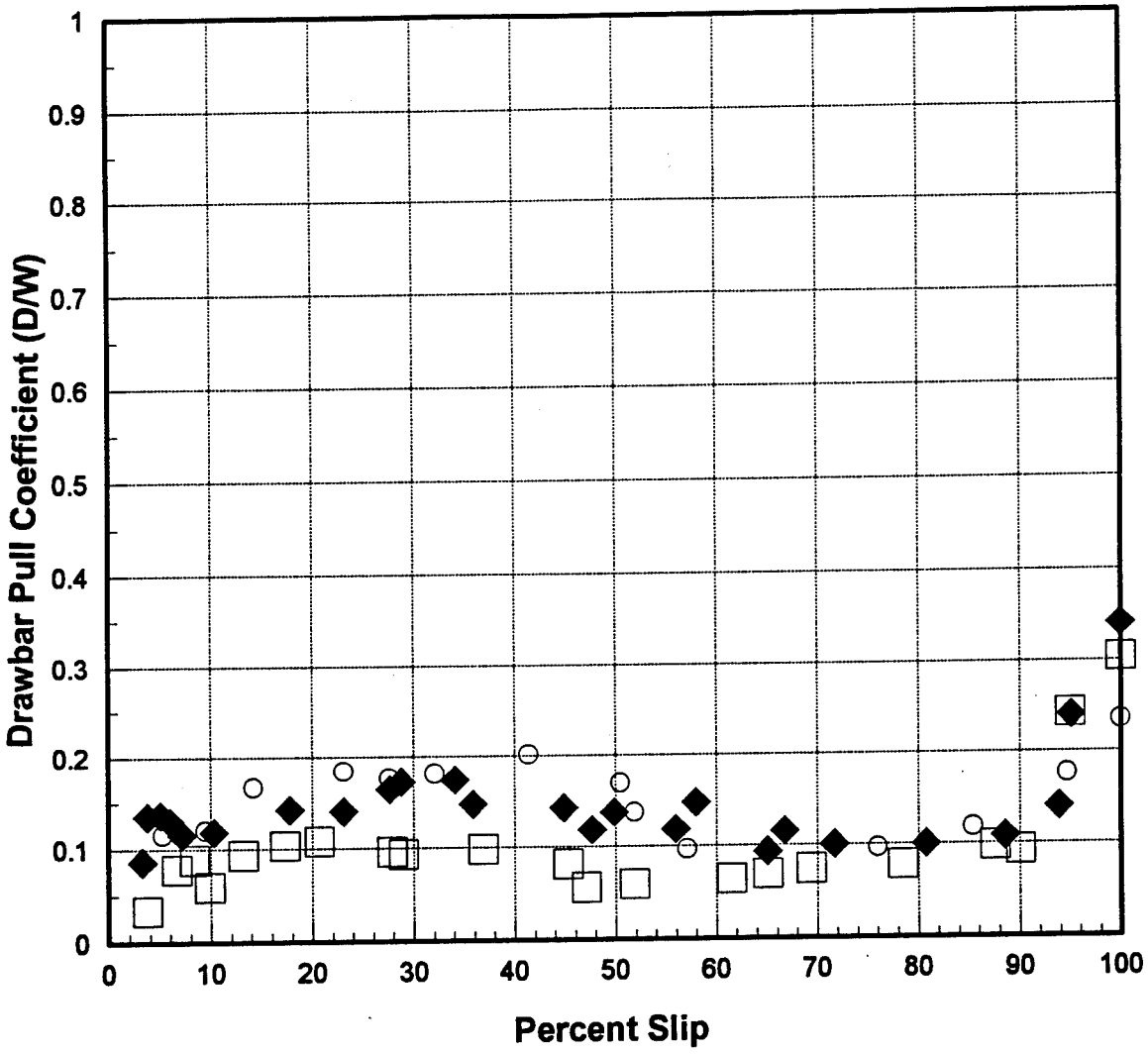
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	35	35	4500
◆	20	20	2400
○	20	10	1350

M1028 WITH REAR DUALS
B. F. GOODRICH TRAILEDGE
LT235/85R16

PLATE 13

CONFIGURATION 6

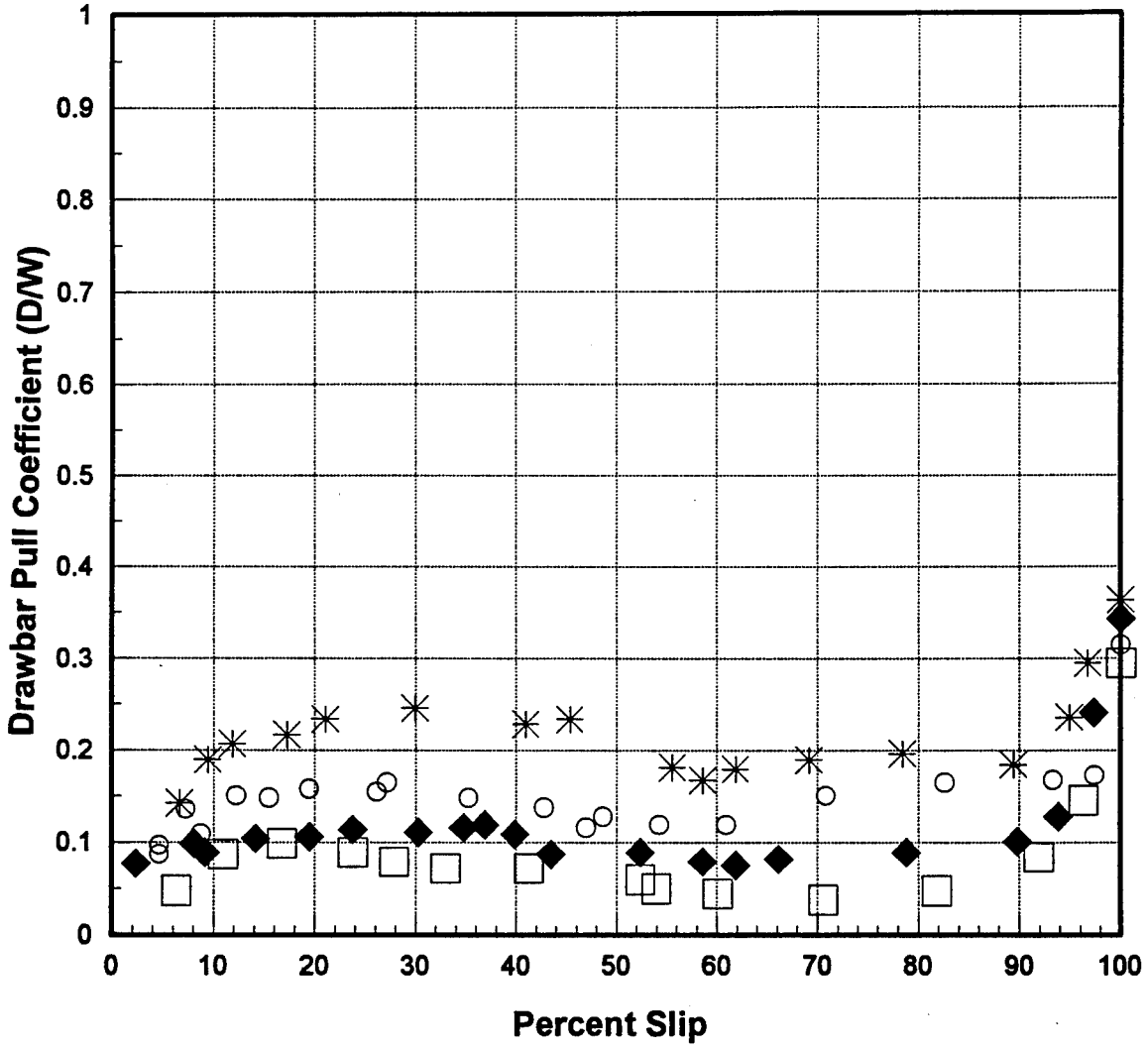


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	2200
◆	25	25	1900
○	20	20	2000

M1028
FIRESTONE RADIAL ATX
33X12.50R16.5LT

CONFIGURATION 10



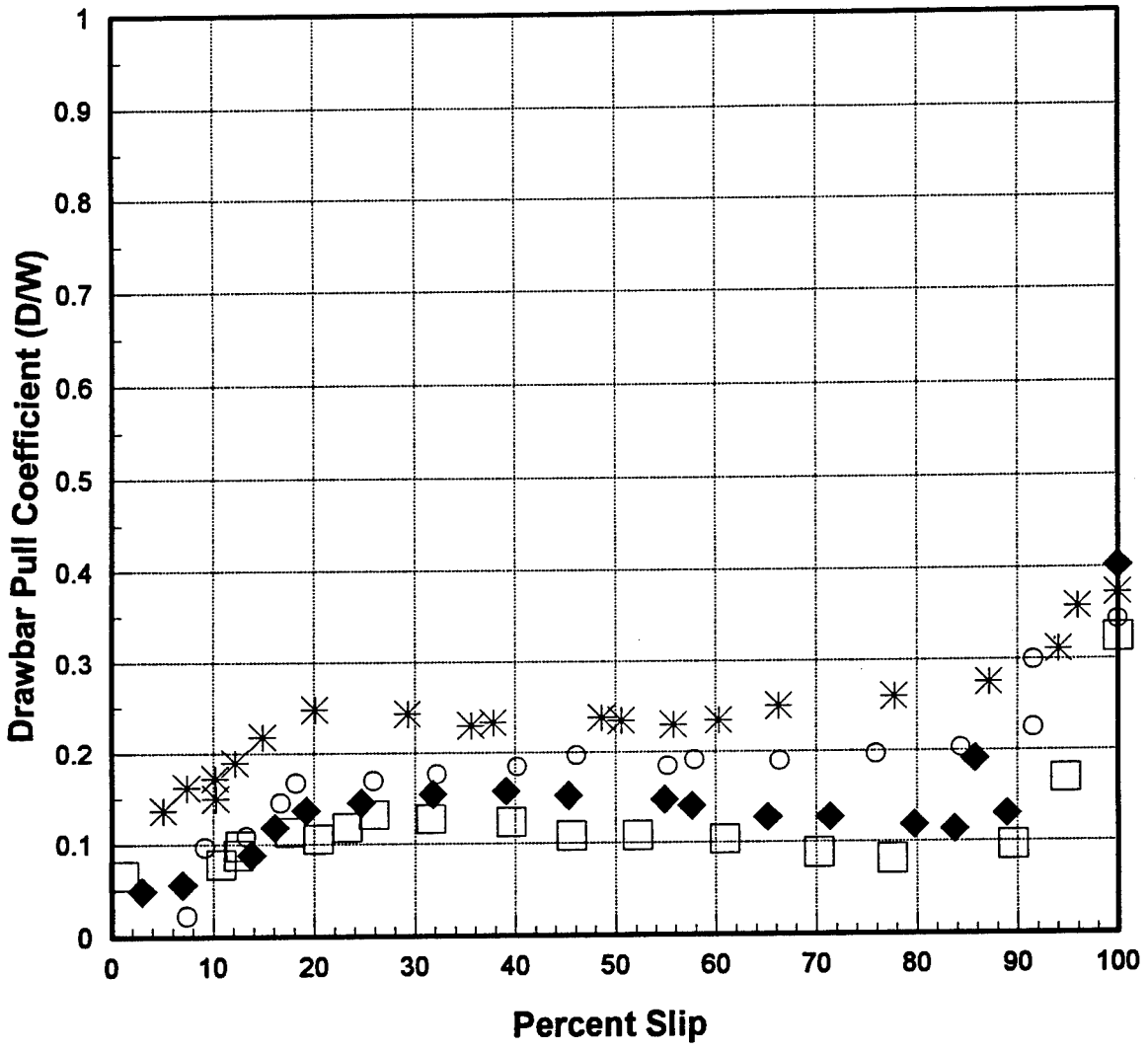
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	3000
◆	25	25	2700
○	20	20	1800
✳	15	15	1200

M1028
COOPER DISCOVERER LT
33X12.50R16.5LT

PLATE 15

CONFIGURATION 12

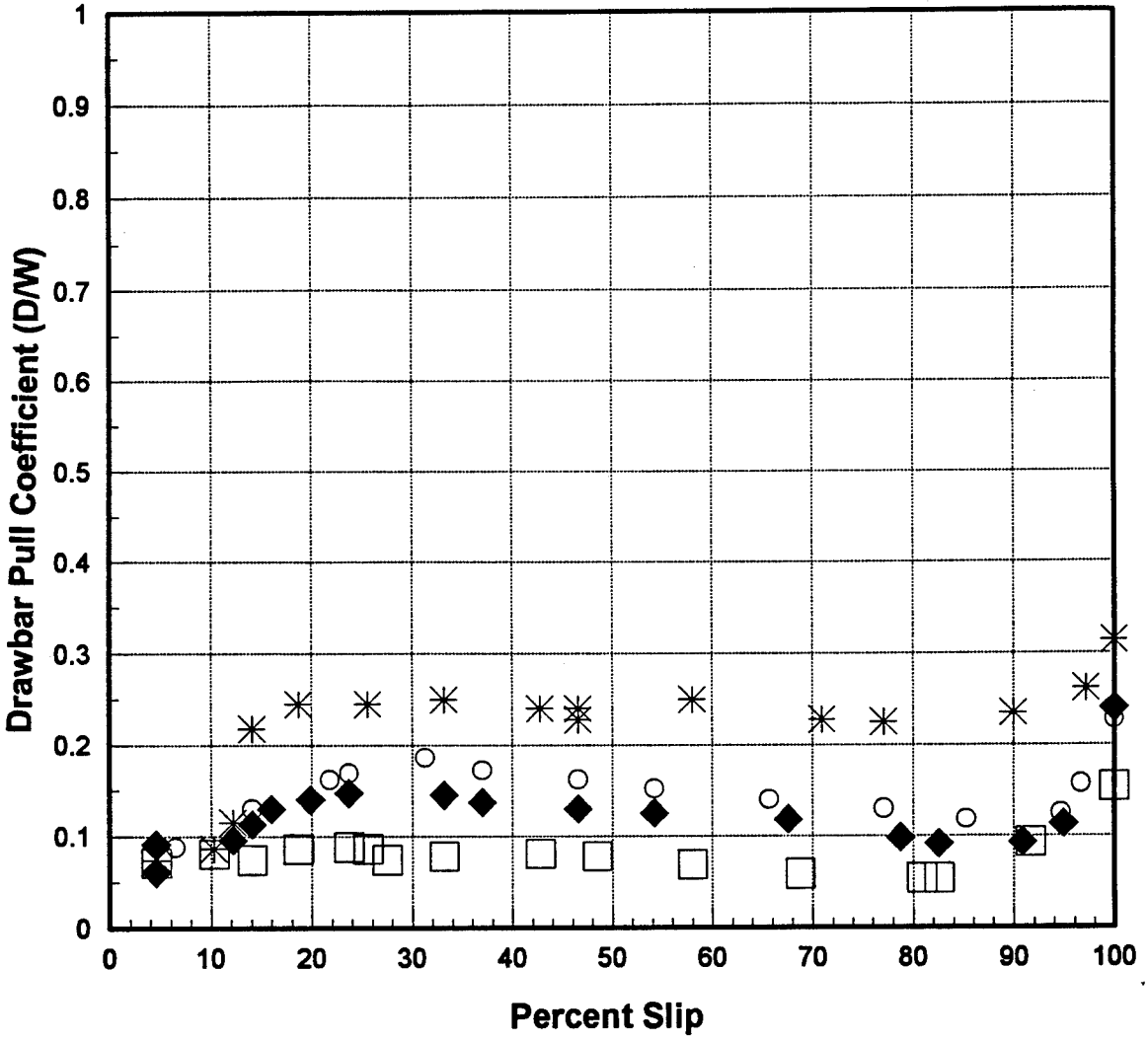


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	35	35	2700
◆	25	25	2000
○	20	20	1500
✳	15	15	1400

M1028
GOODYEAR WRANGLER AT
LT255/85R16

CONFIGURATION 14



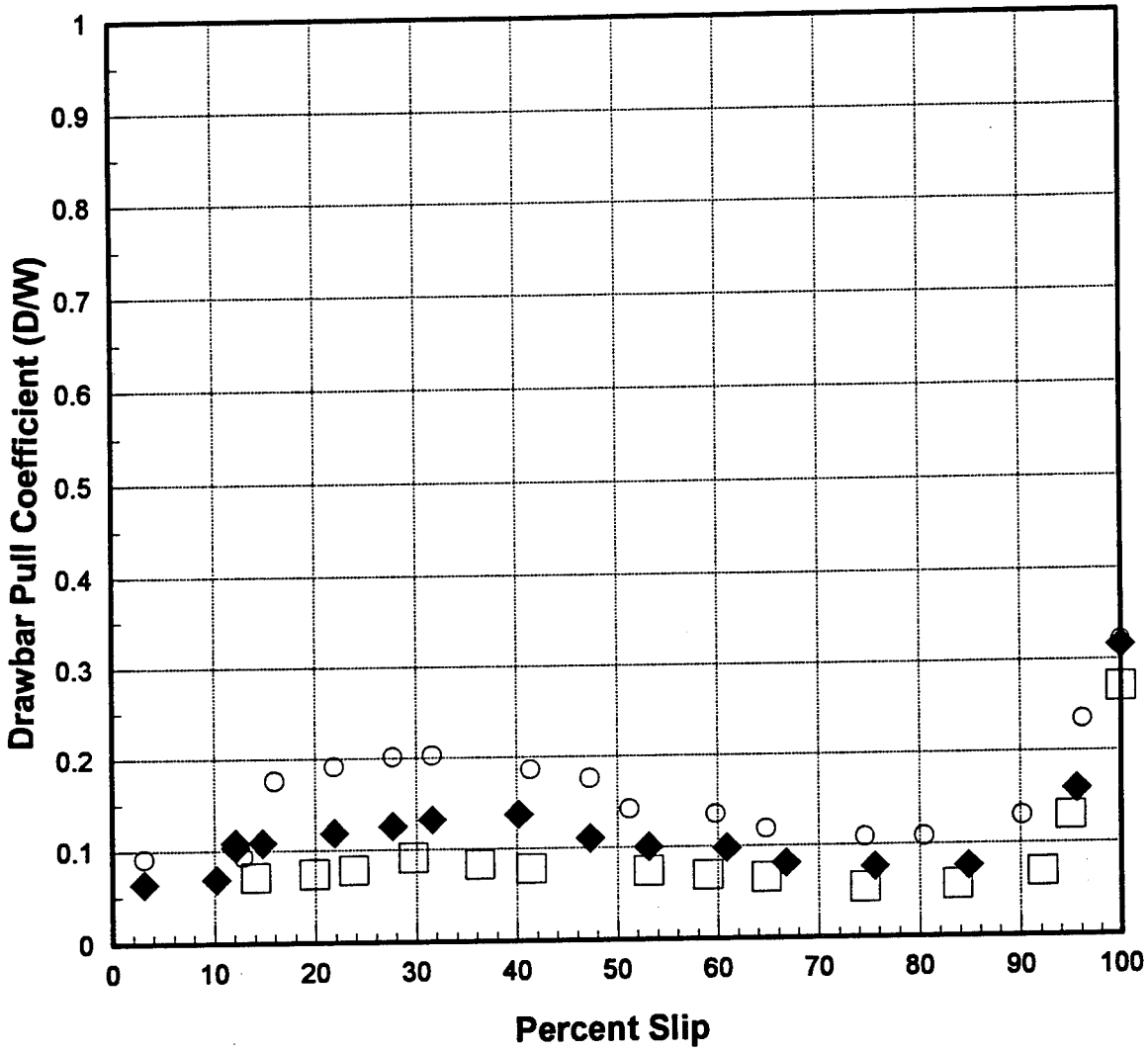
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	3100
◆	25	25	2800
○	20	20	2100
✳	15	15	1300

M1028
GOODYEAR WRANGLER HT
33X12.50R16.5LT

PLATE 17

CONFIGURATION 16

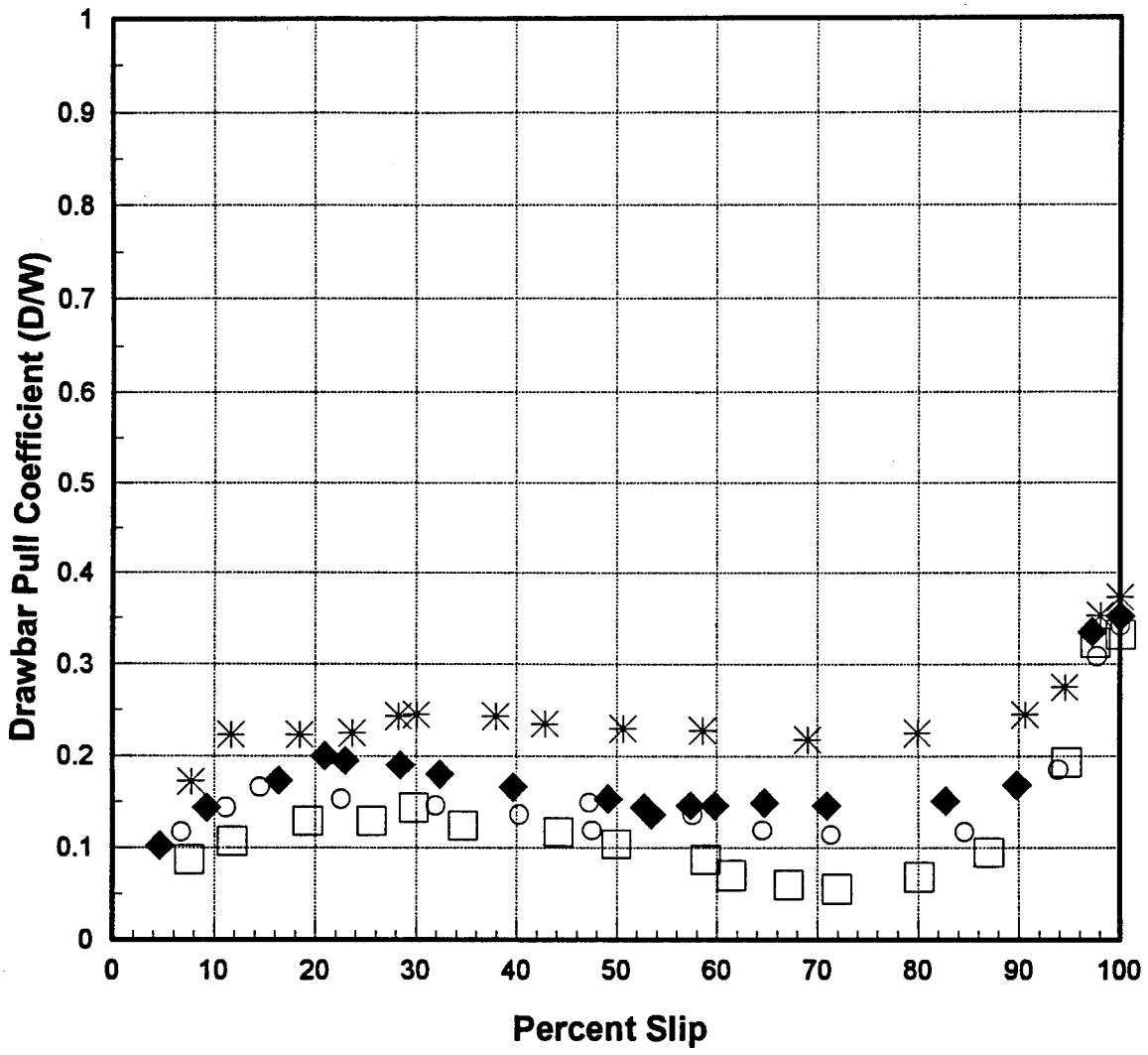


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	35	35	3400
◆	30	30	2850
○	25	25	2700

M1028
GOODYEAR WRANGLE TD
LT255/75R16

CONFIGURATION 18



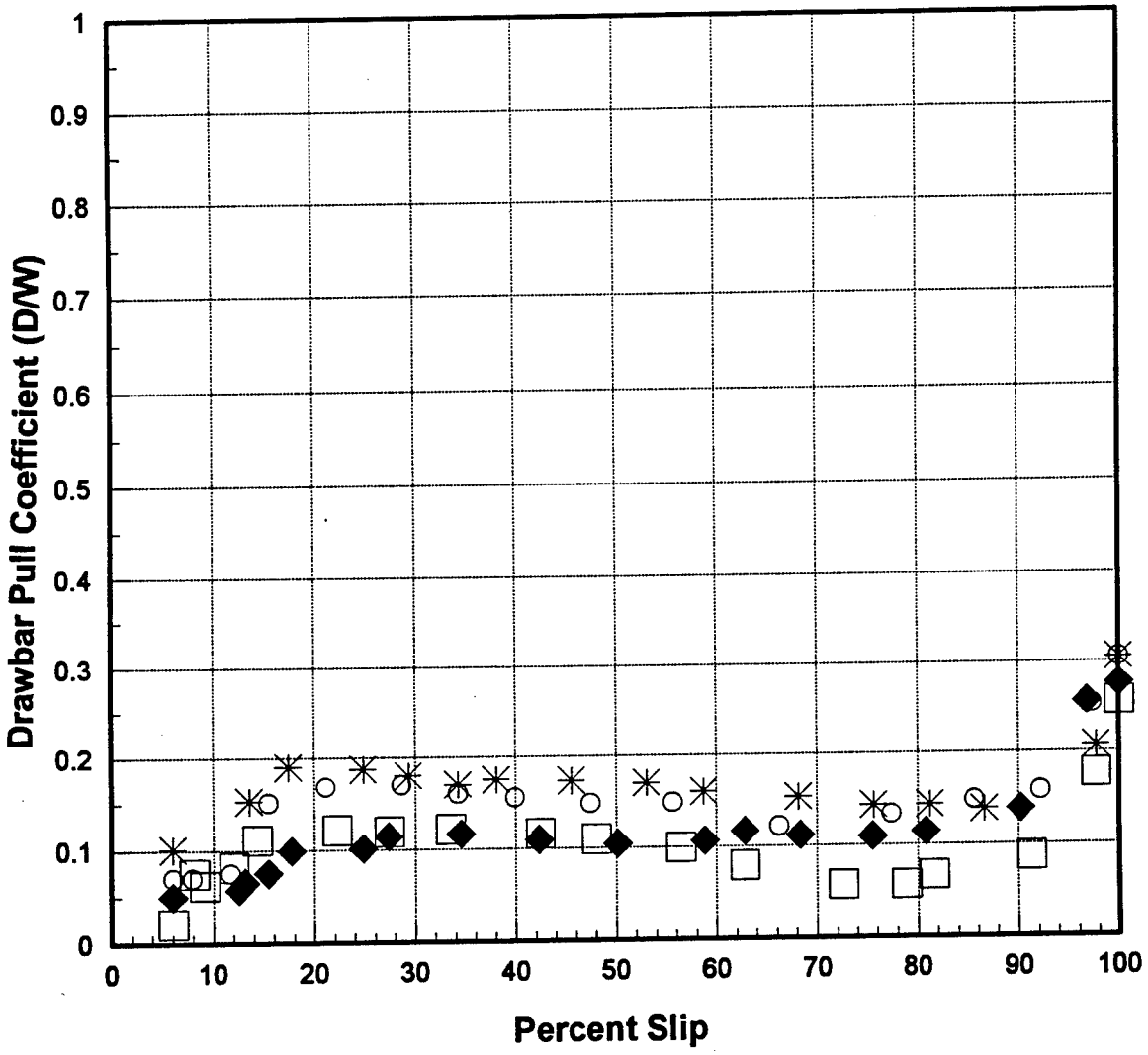
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	3050
◆	25	25	2550
○	20	20	1550
✳	15	15	1150

M1028
GOODYEAR WRANGLER MT
33X12.50R16.5LT

PLATE 19

CONFIGURATION 19

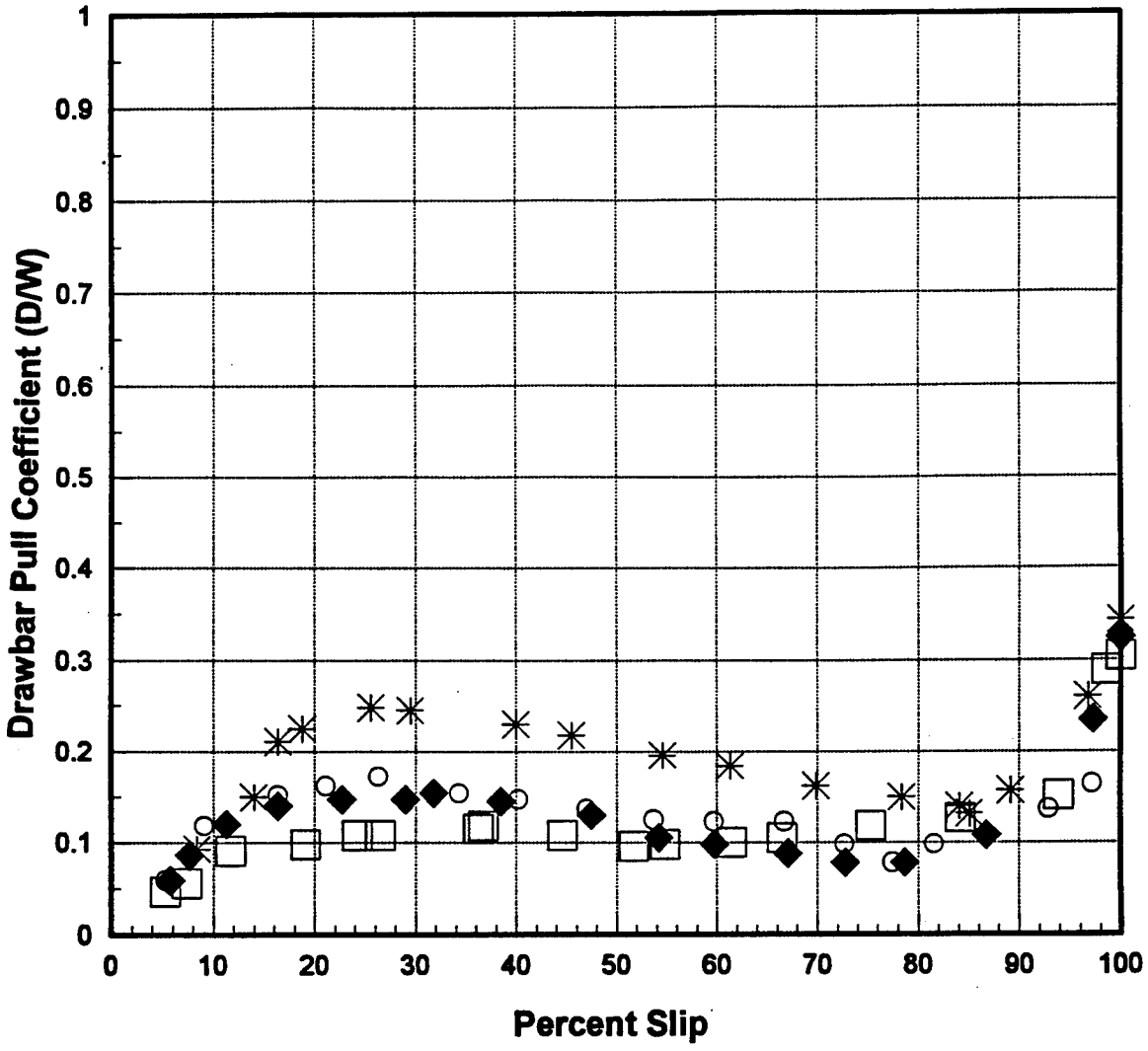


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	35	35	2900
◆	30	30	2750
○	25	25	2700
✳	20	20	1650

M1028
FIRESTONE RADIAL ATX
LT255/85R16

CONFIGURATION 20



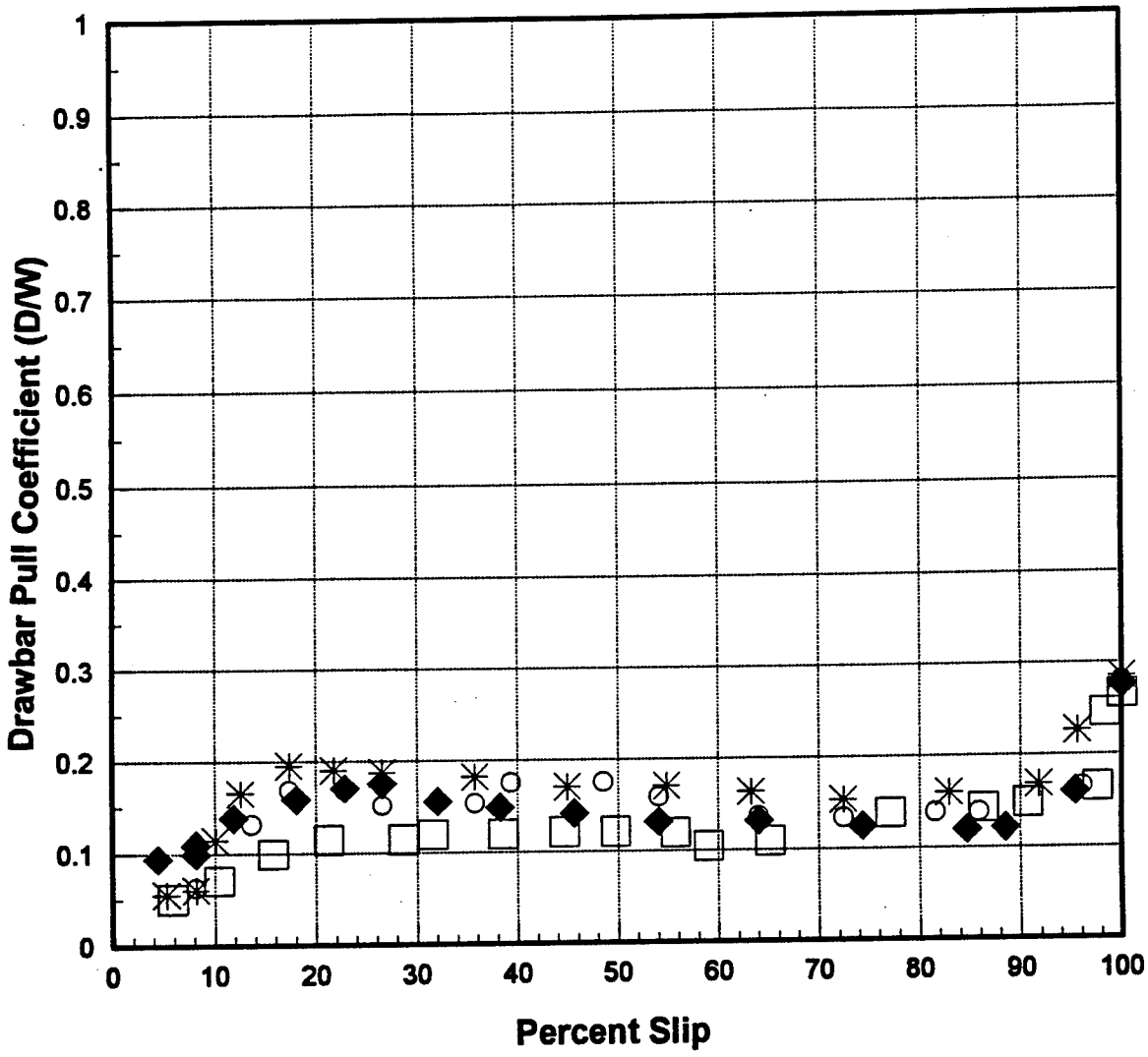
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	3000
◆	25	25	2500
○	20	20	1800
✳	15	15	1300

M1028
GOODYEAR WRANGLER AT
33X12.50R16.5LT

PLATE 21

CONFIGURATION 21

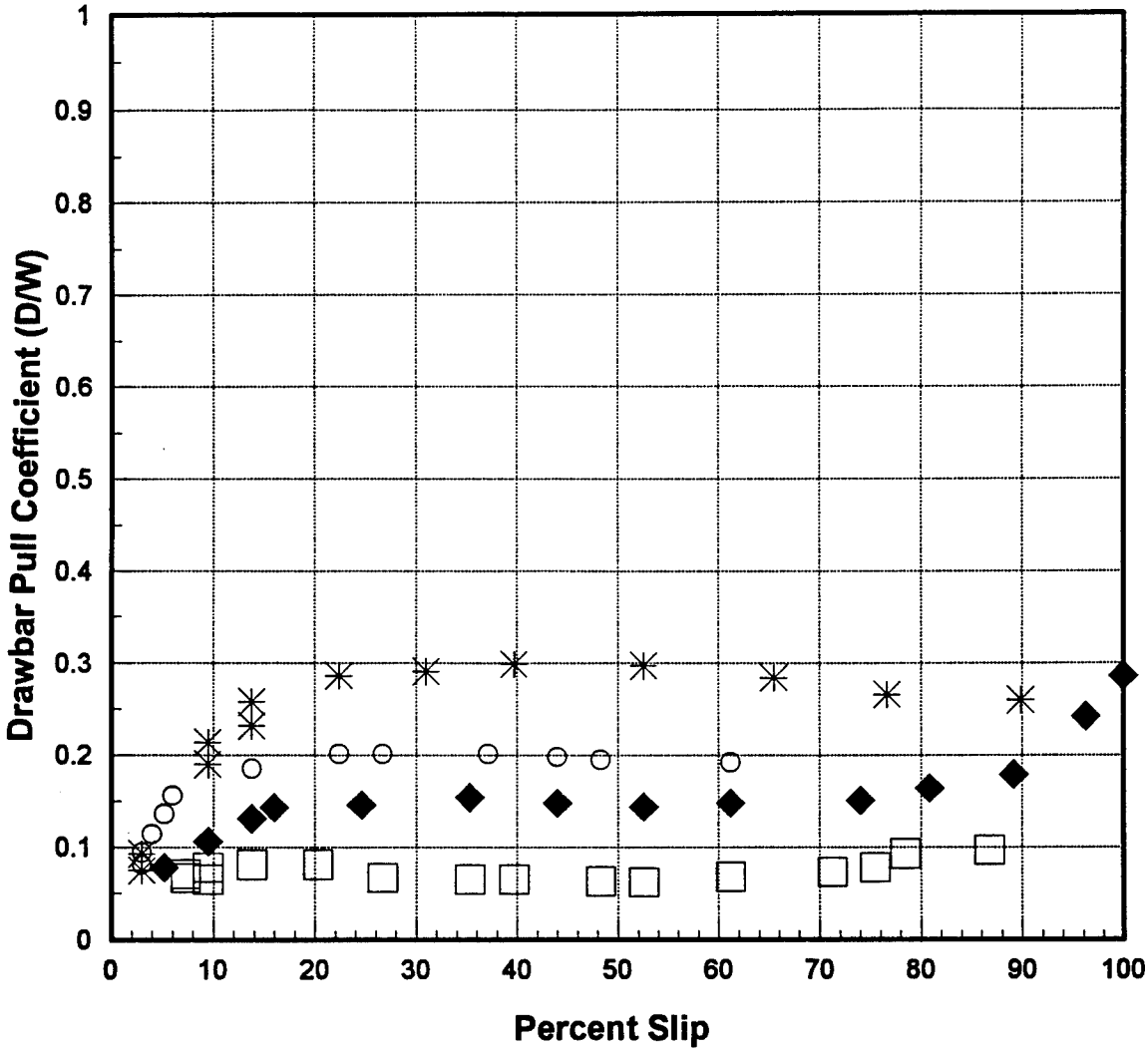


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	35	35	2700
◆	30	30	2300
○	25	25	2100
✳	20	20	1800

M1028
GOODYEAR WRANGLER LT
LT255/85R16

CONFIGURATION 22



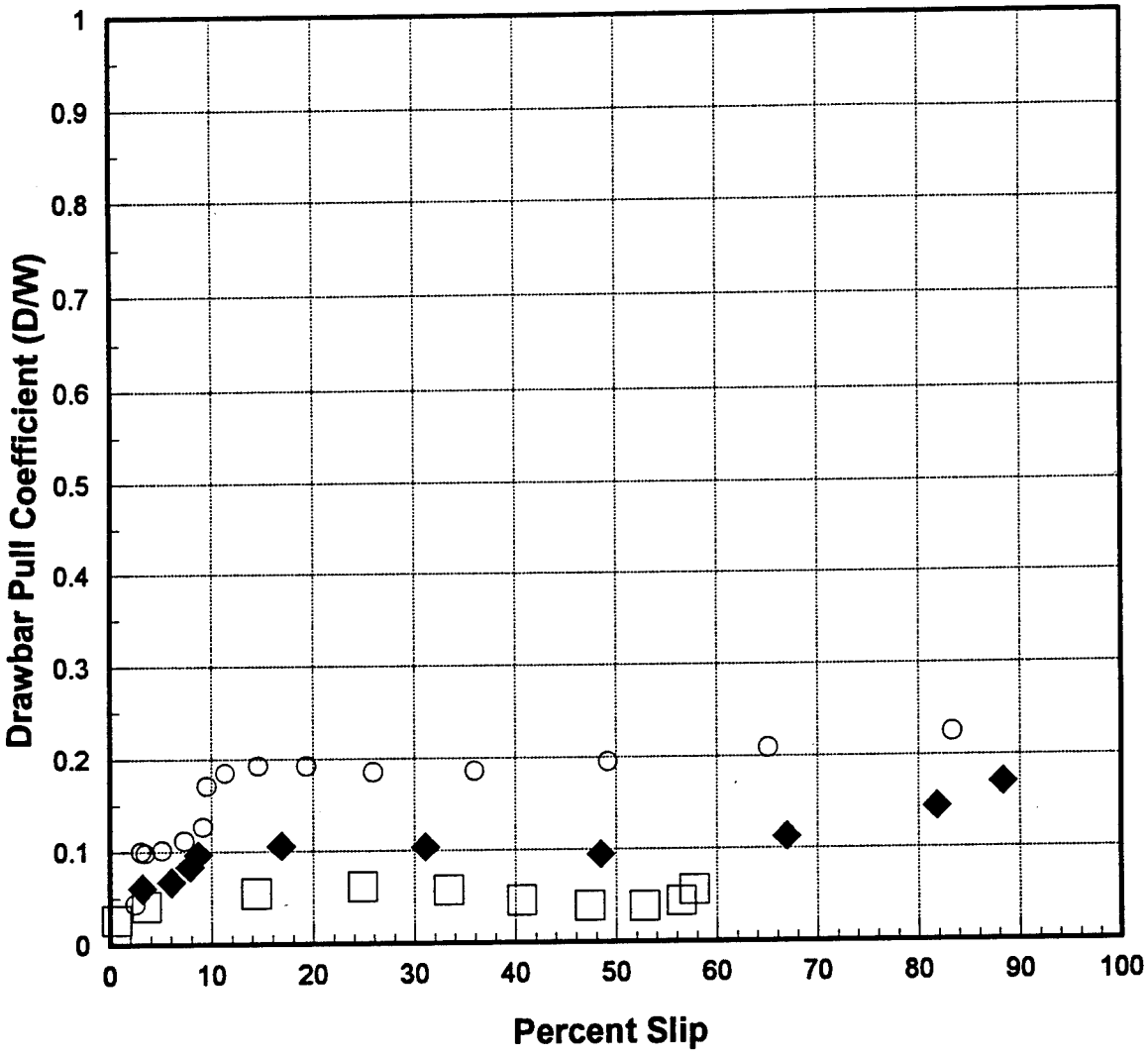
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	60	30	6000
◆	25	25	4000
○	25	20	3900
✳	15	15	3300

M54A2 W/ DUALS
GOODYEAR G286
11.OOR20

PLATE 23

CONFIGURATION 25

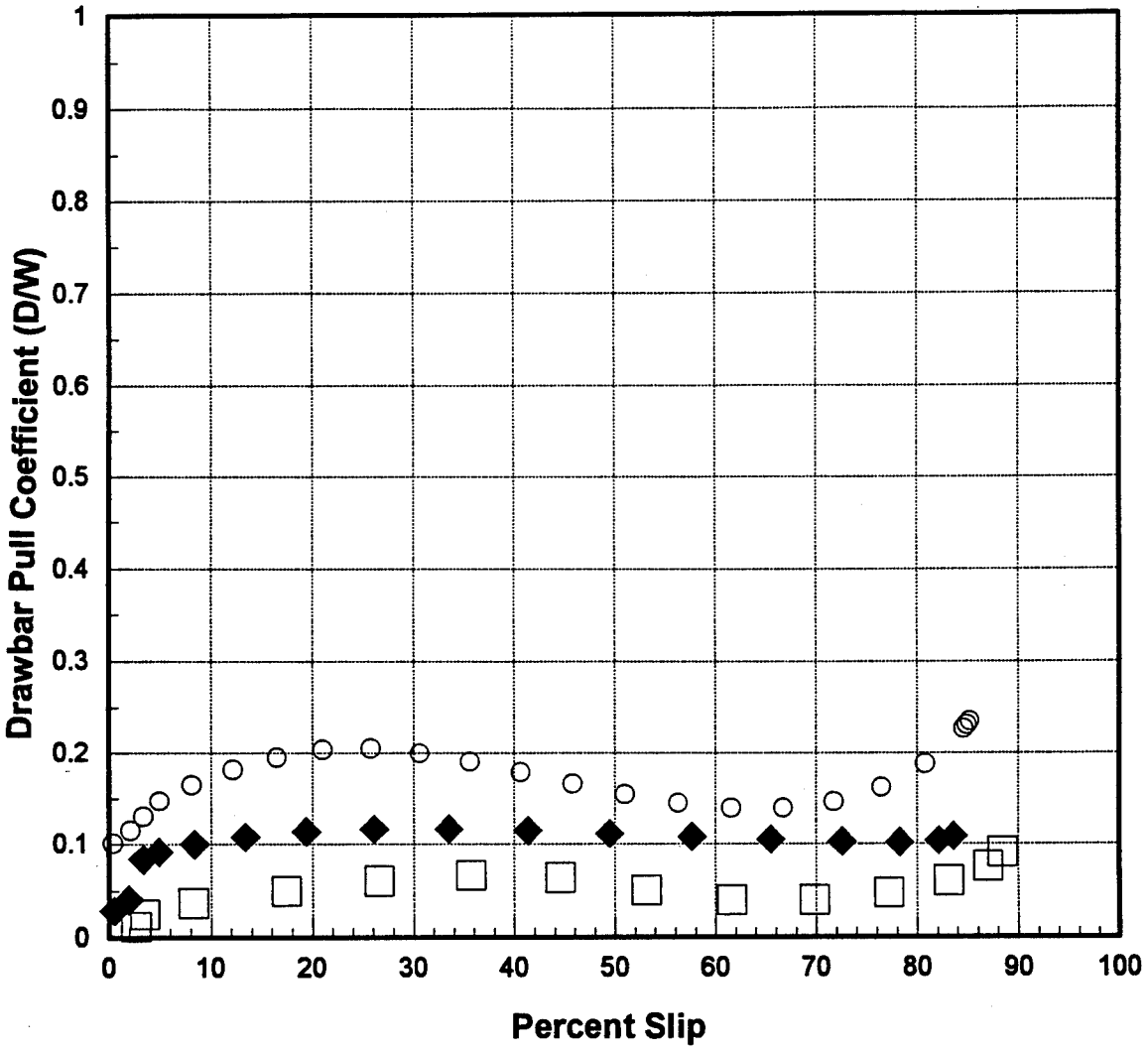


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	70	70	10000
◆	35	35	8200
○	15	15	4000

M54A2 W/ DUALS
MICHELIN XL
11.00R20

CONFIGURATION 27



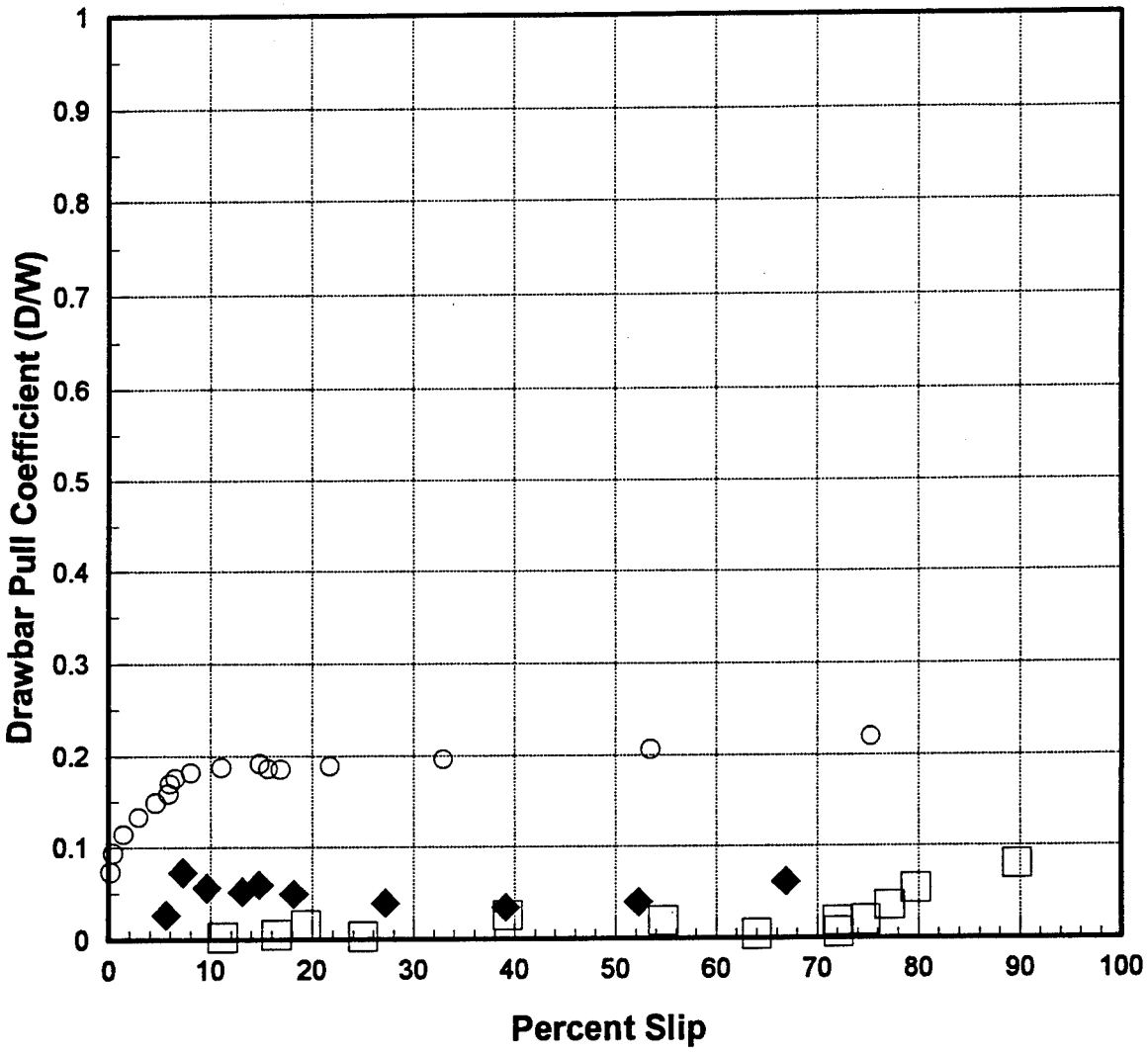
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	70	70	10200
◆	35	35	8200
○	15	15	4000

M54A2 W/ DUALS
GOODYEAR UNISTEEL G188
11.00R20

PLATE 25

CONFIGURATION 31

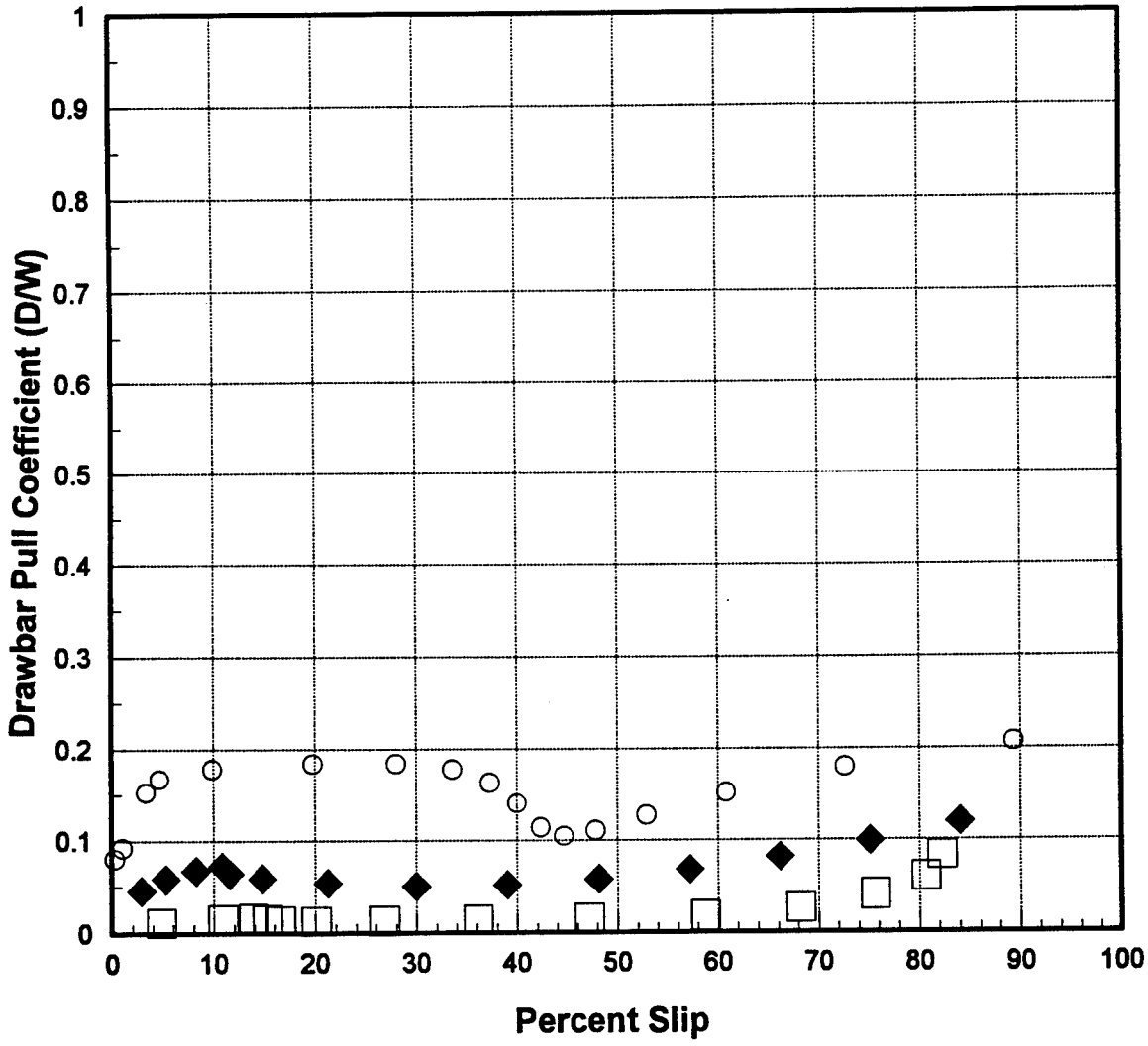


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	70	70	10900
◆	35	35	7000
○	15	15	4000

M54A2 W/ DUALS
FIRESTONE UT-2000
11.00R20

CONFIGURATION 33

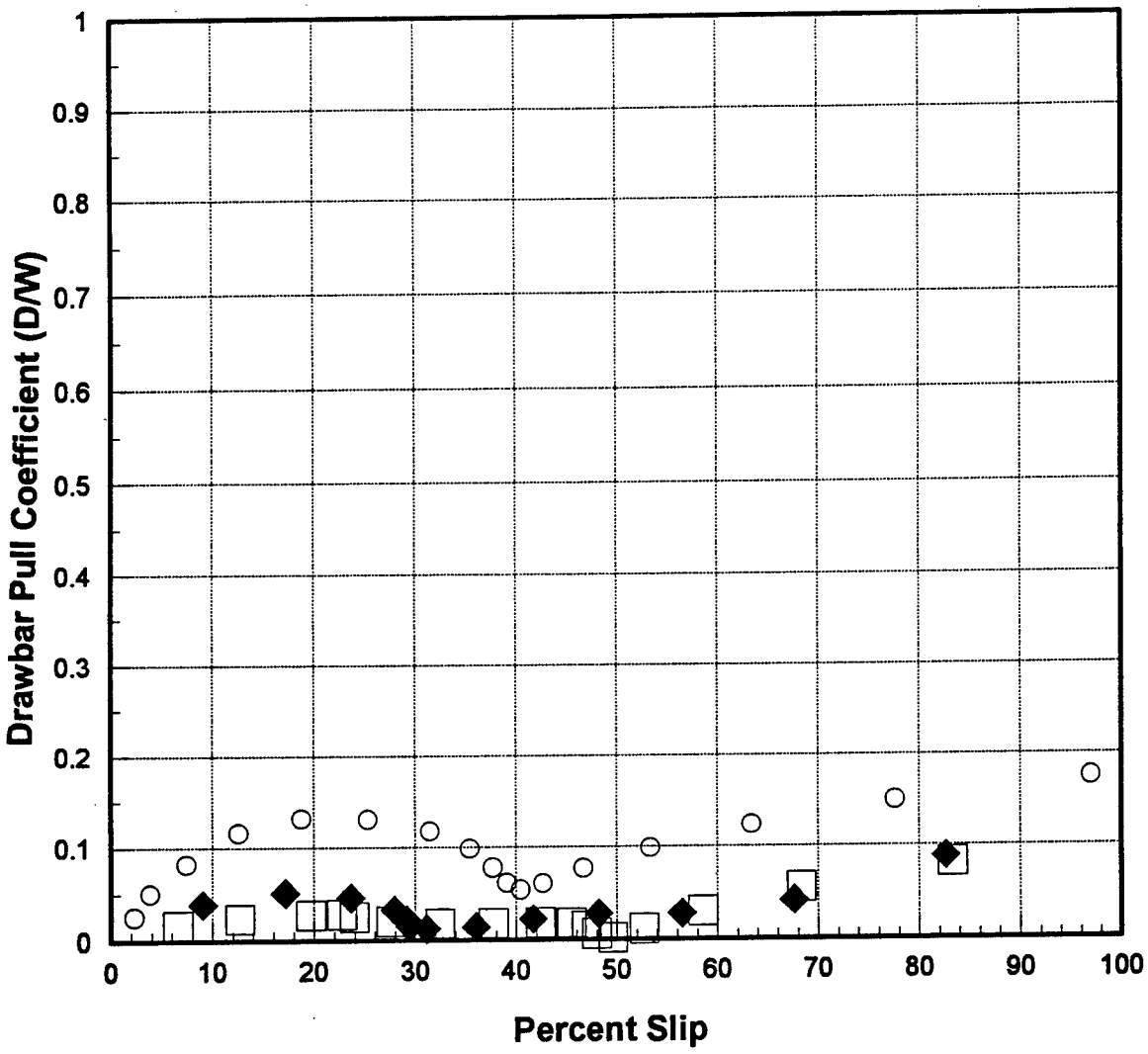


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	70	70	9400
◆	35	35	8000
○	15	15	4400

M54A2 W/ DUALS
MICHELIN XS
12.00R20

CONFIGURATION 24

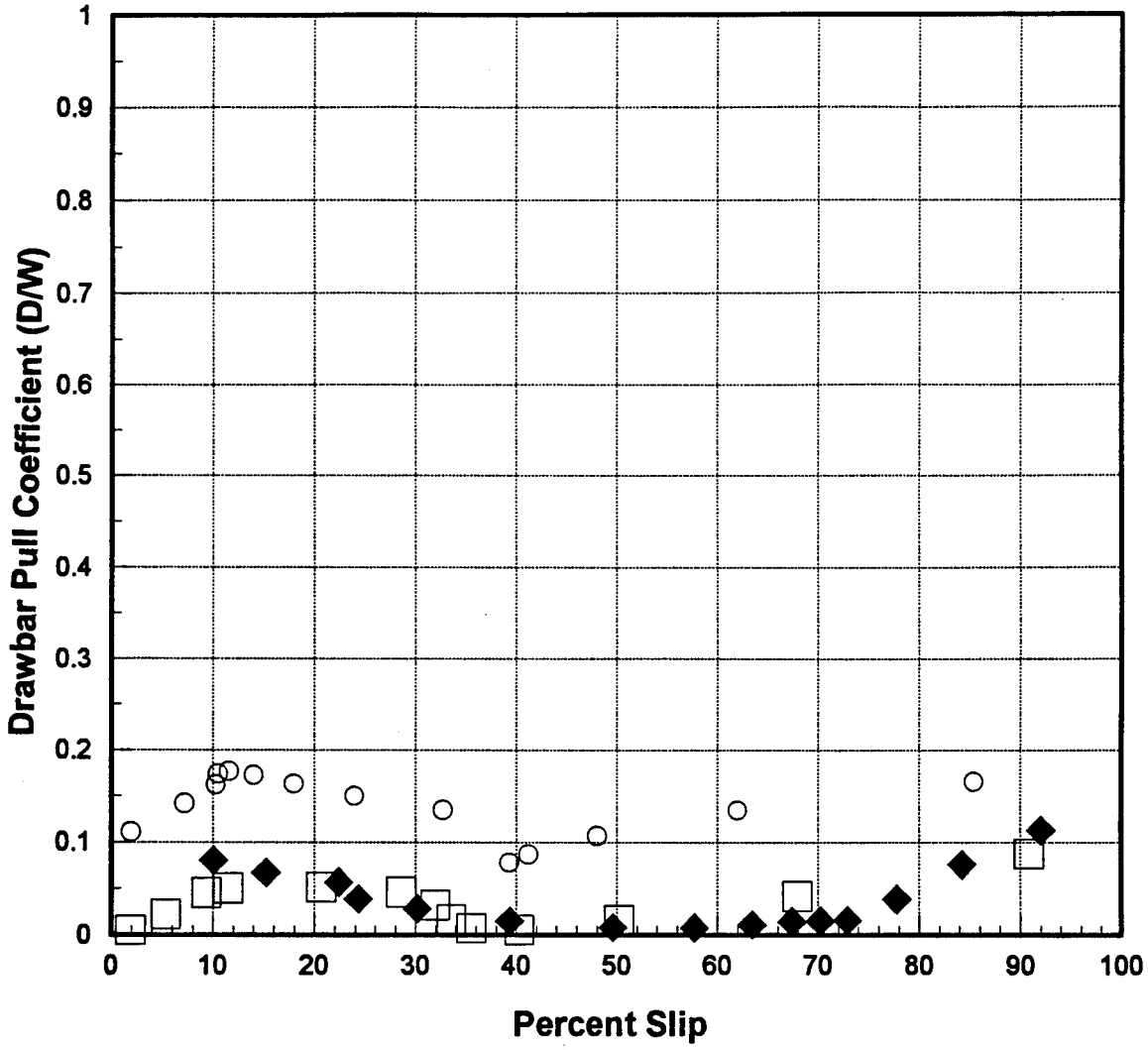


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	50	50	6000
◆	35	35	5500
○	15	15	2800

M35A2 W/ DUALS
NDCC BIAS PLY RECAPS
9.00X20

CONFIGURATION 26

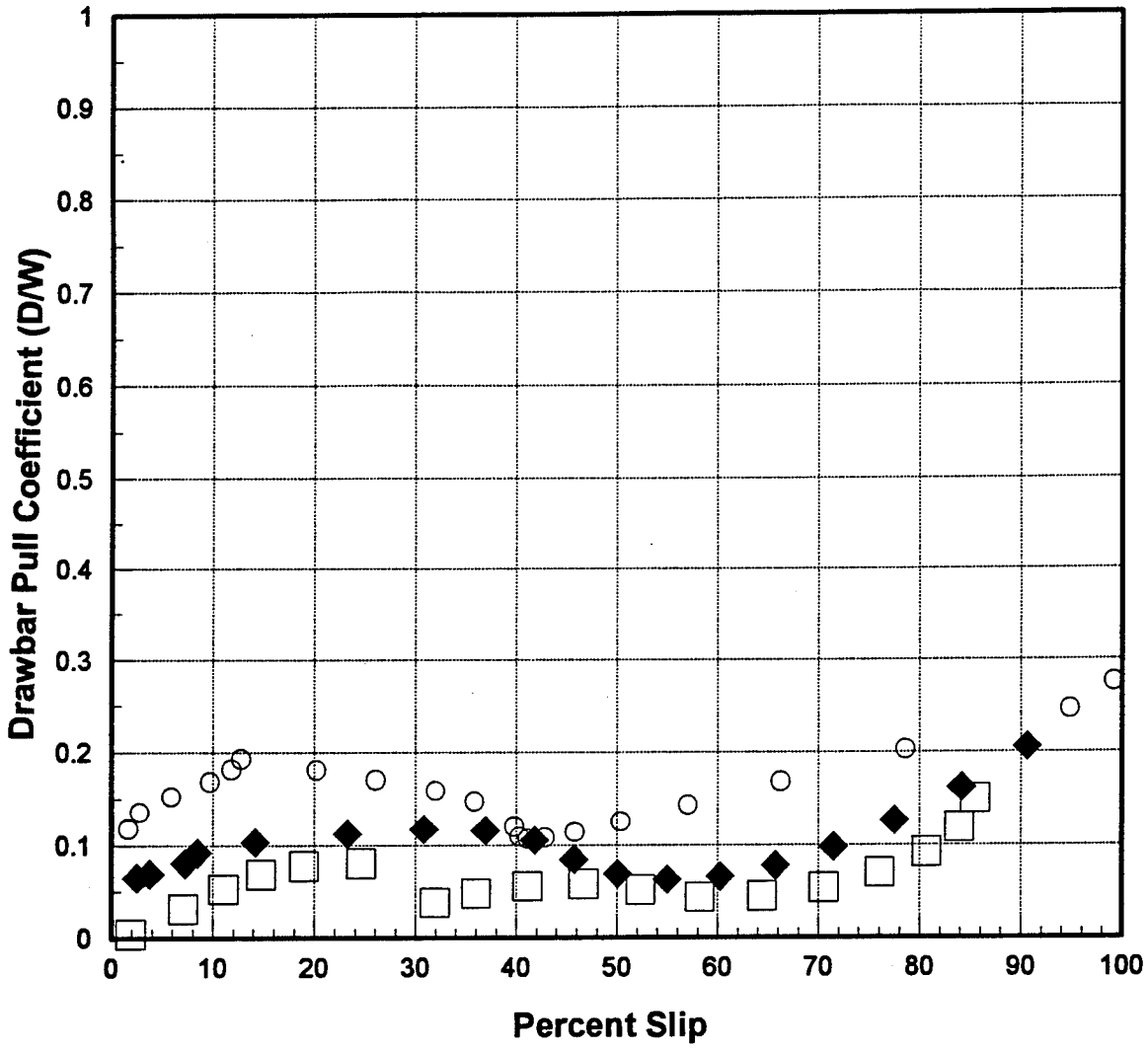


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	50	50	5200
◆	35	35	5000
○	15	15	2800

M35A2 W/ DUALS
GOODYEAR UNISTEEL G186
9.00R20

CONFIGURATION 29

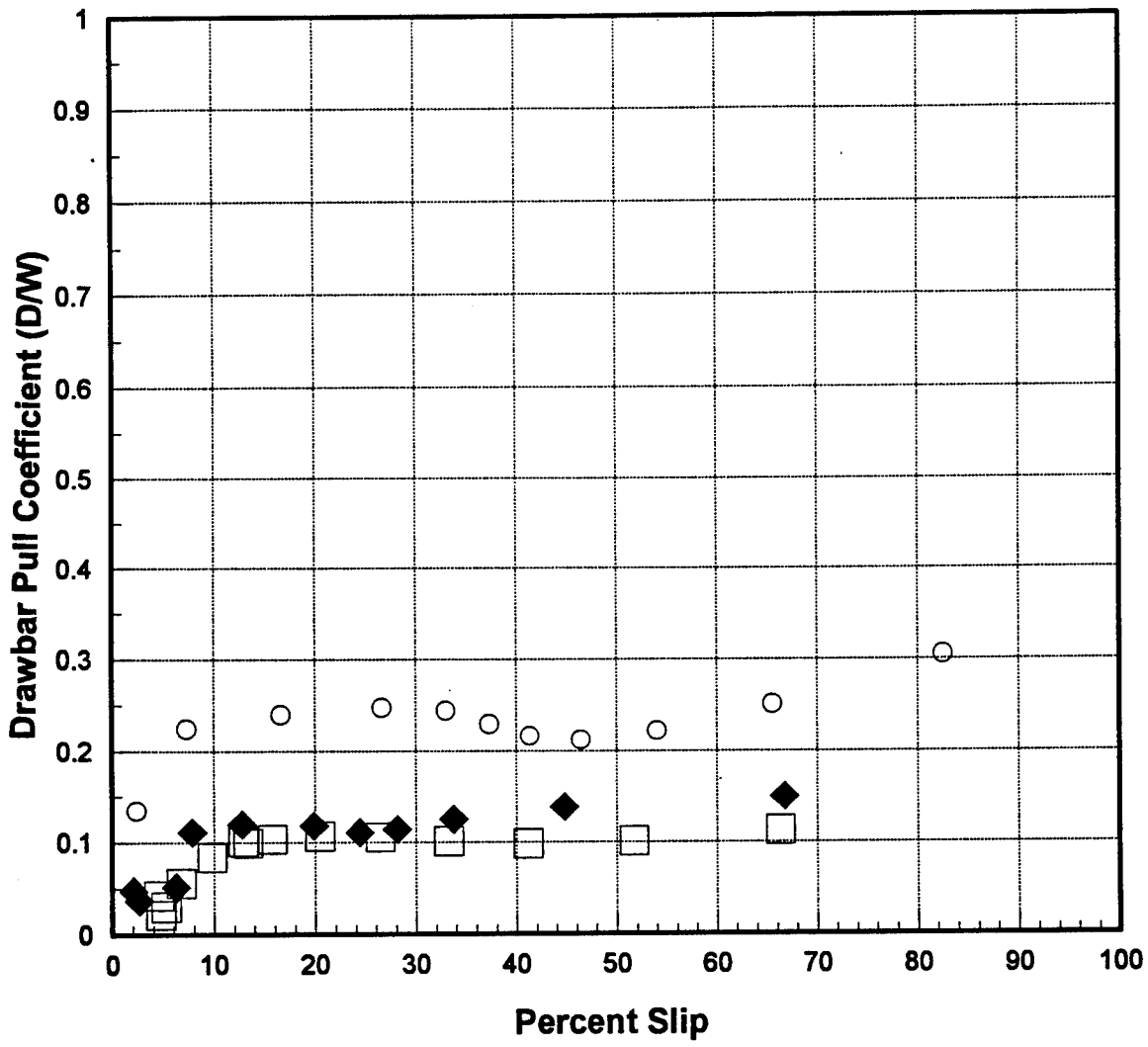


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	50	50	5200
◆	35	35	4000
○	15	15	2400

M35A2 W/ DUALS
MICHELIN XL
9.00R20

CONFIGURATION 28



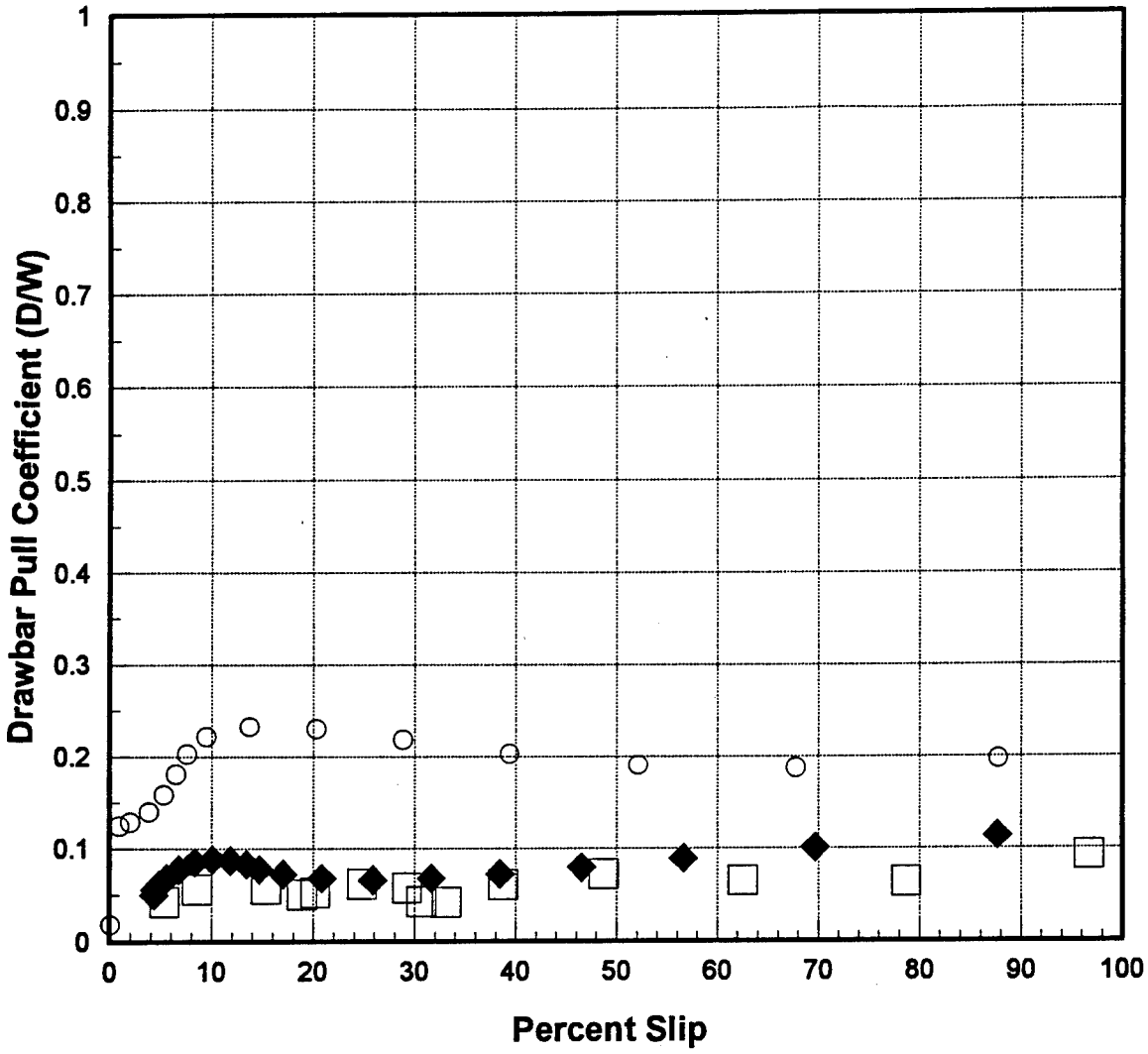
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	50	50	4400
◆	35	35	3200
○	15	15	2200

M35A2 W/ SINGLES
MICHELIN XL
11.00R20

PLATE 31

CONFIGURATION 30

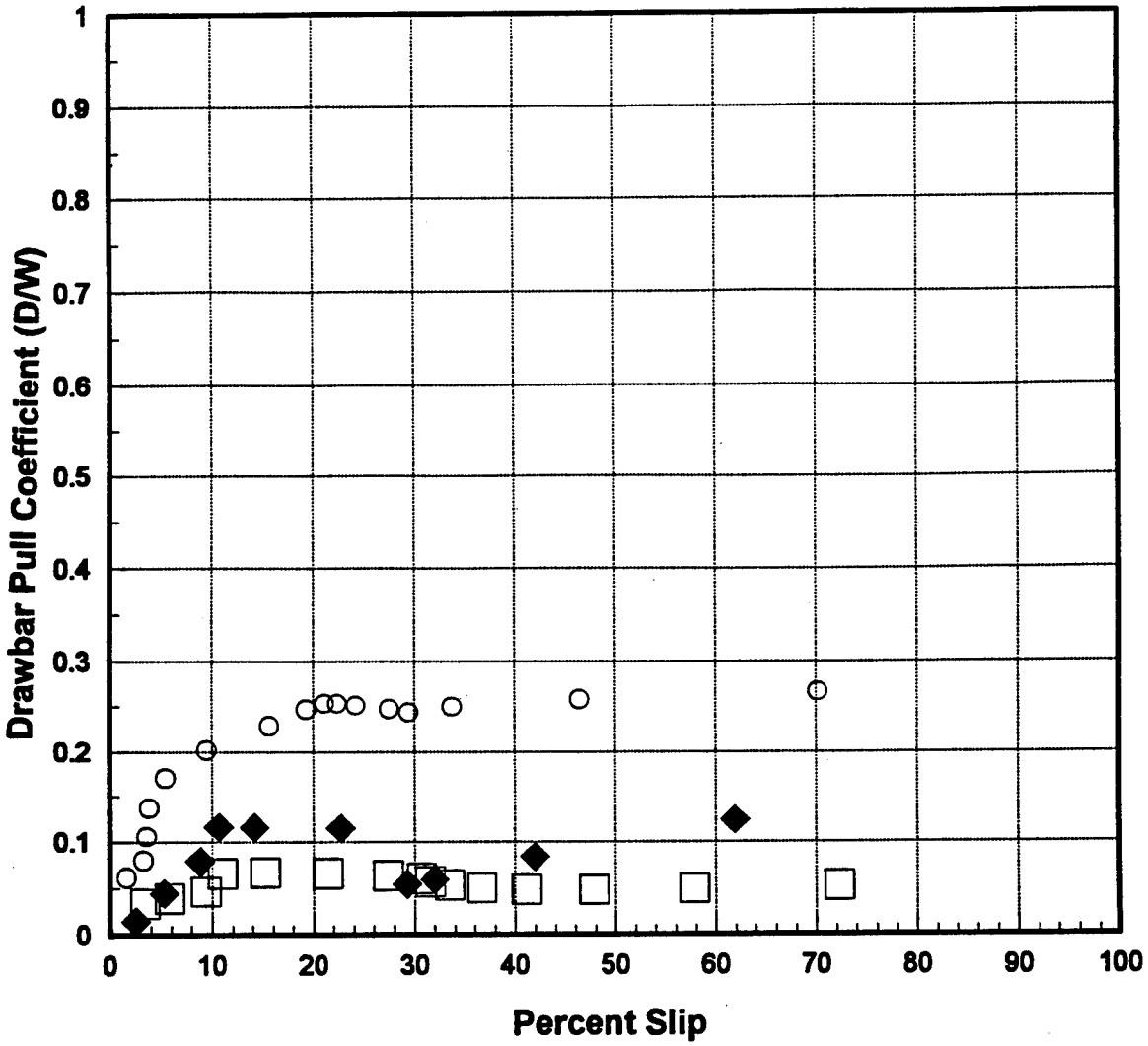


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	50	50	4400
◆	35	35	3600
○	15	15	2200

M35A2 W/ SINGLES
FIRESTONE UT-2000
11.00R20

CONFIGURATION 32

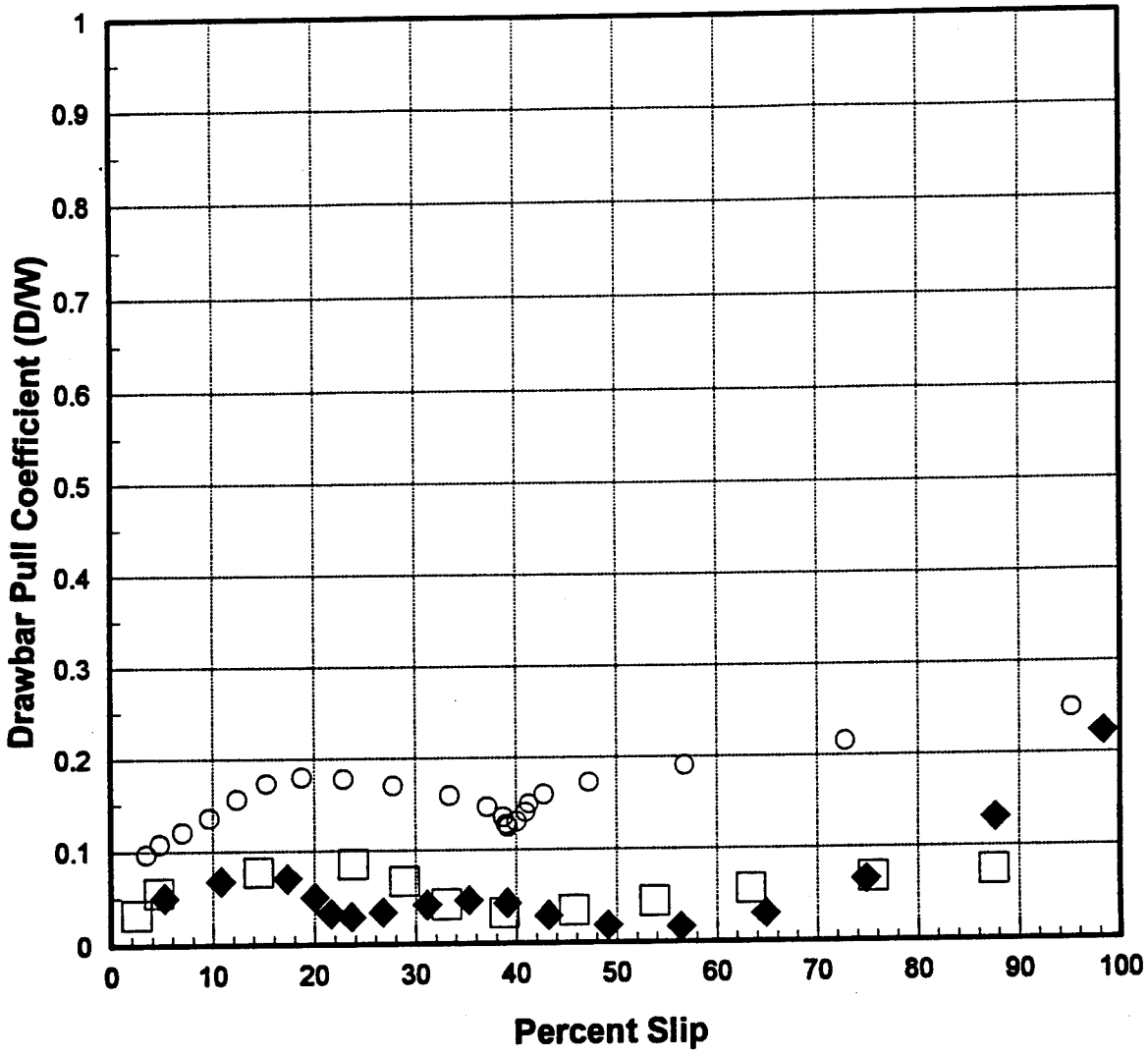


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	50	50	4400
◆	35	35	3600
○	15	15	2200

M35A2 W/ SINGLES
GOODYEAR G286
11.00R20

CONFIGURATION 34

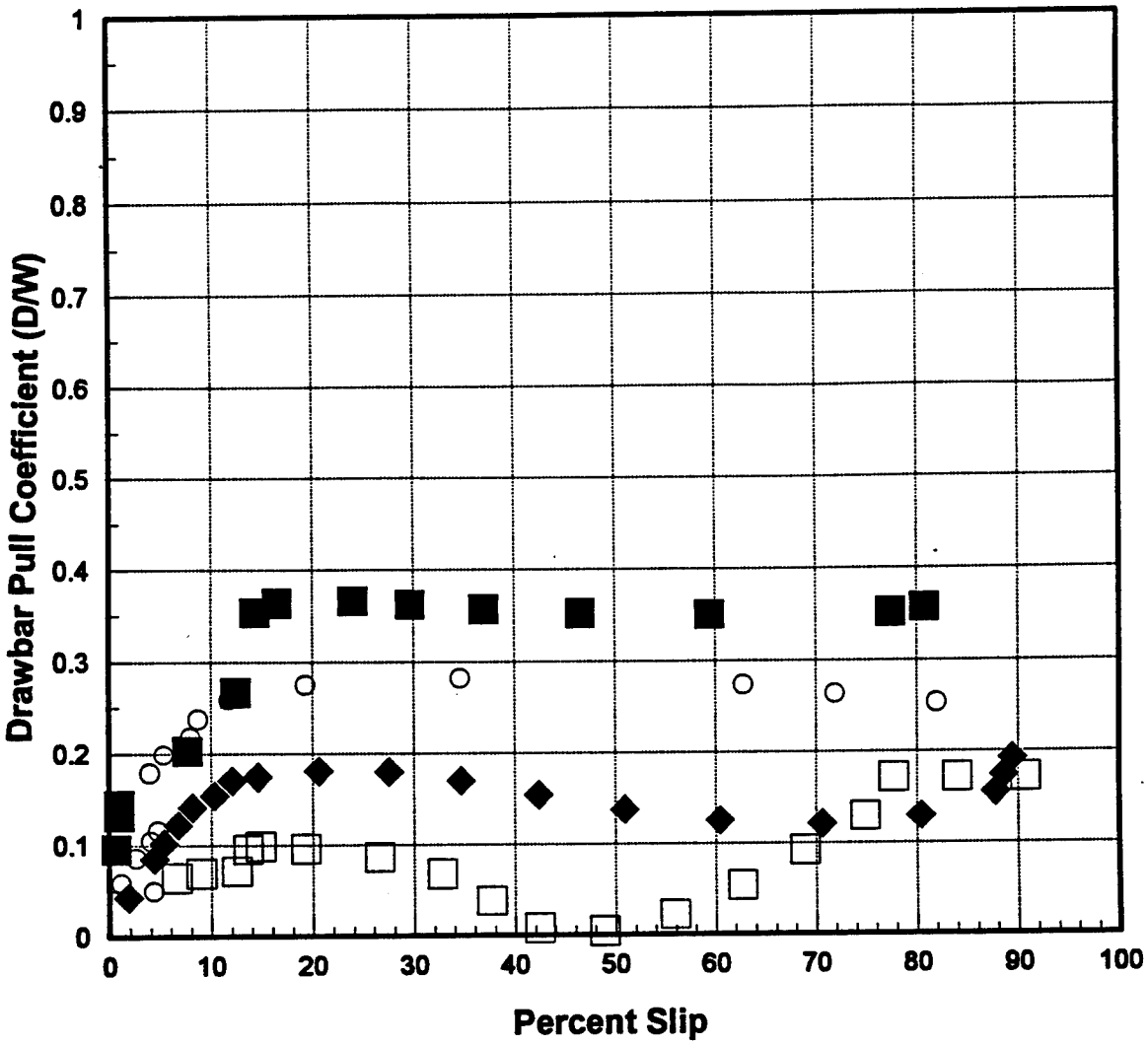


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	50	50	4000
◆	35	35	3600
○	15	15	2400

M35A2 W/ SINGLES
GOODYEAR UNISTEEL G188
11.00R20

CONFIGURATION 23



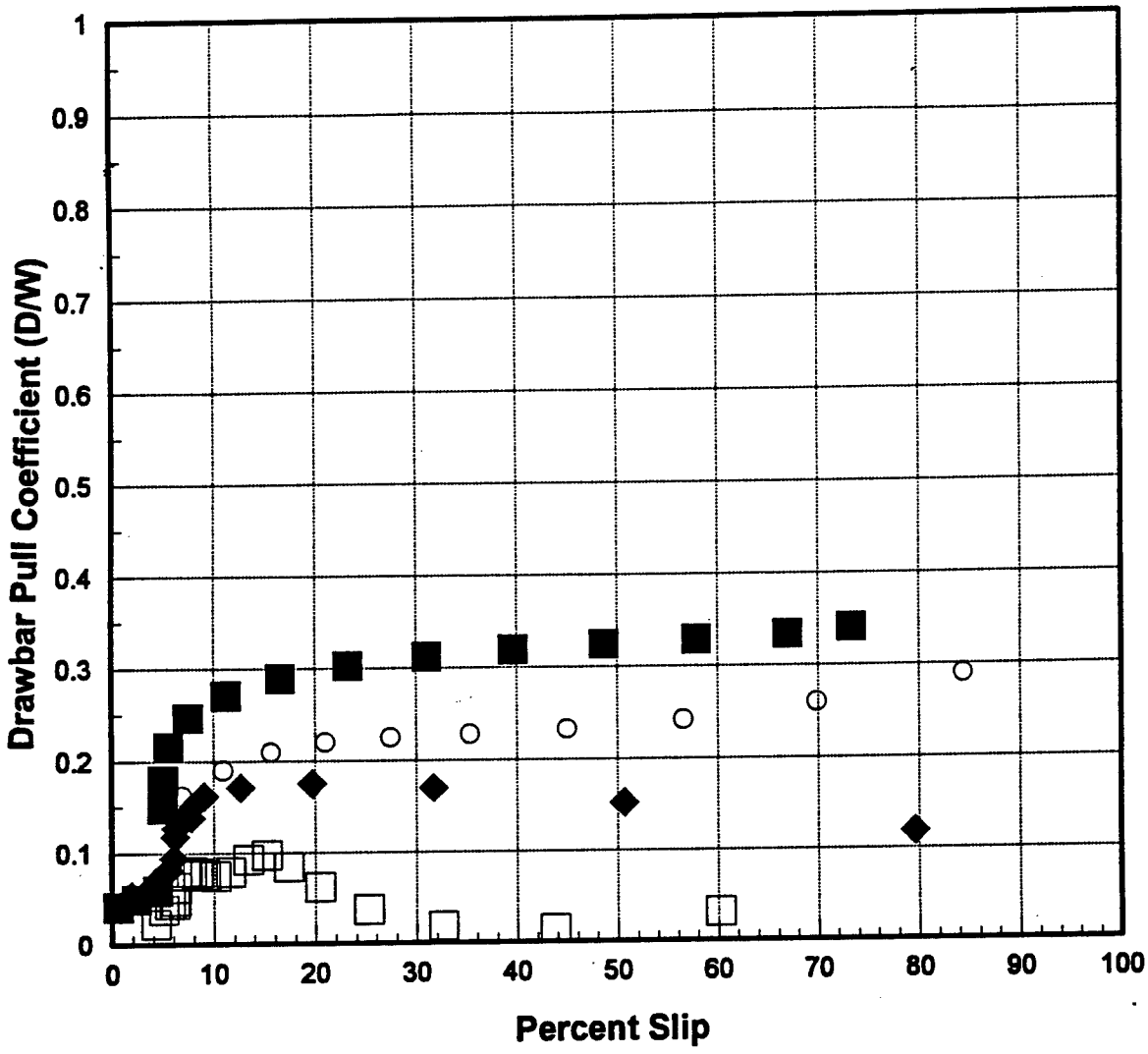
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	60	60	5400
◆	36	36	4800
○	28	28	3900
■	15	15	3600

M813
GOODYEAR AT-2A
14.00R20

PLATE 35

CONFIGURATION 37

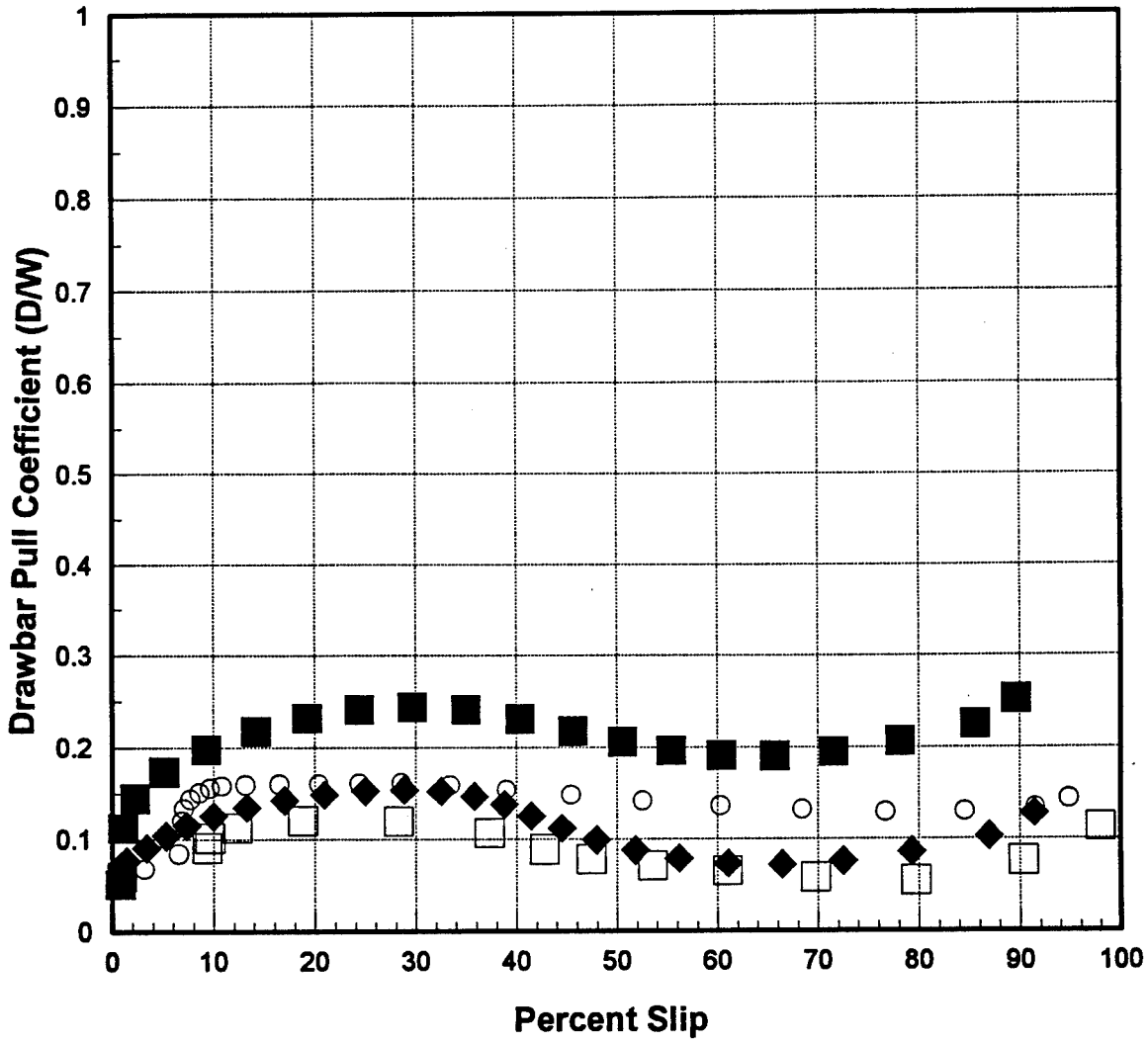


LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	60	60	5200
◆	36	36	2900
○	28	28	2500
■	15	15	2000

M813
BRIDGESTONE VSTEEL JAMAL
14.00R20

CONFIGURATION 36



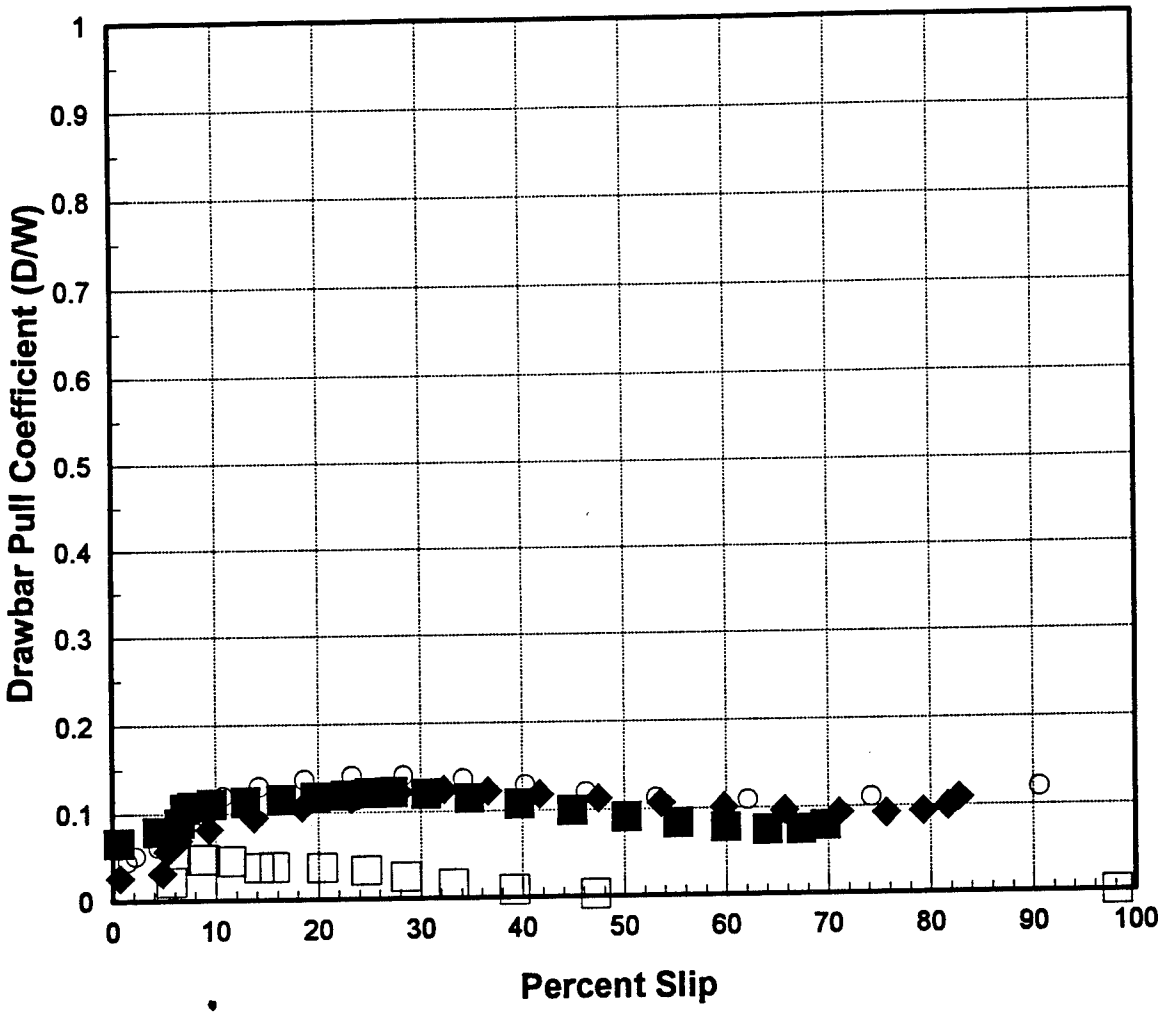
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	3000
◆	25	25	2500
○	20	20	1750
■	15	15	1250

M1008
GOODYEAR WRANGLER HT
255/85R16LT

PLATE 37

CONFIGURATION 36
WITH TRAILER

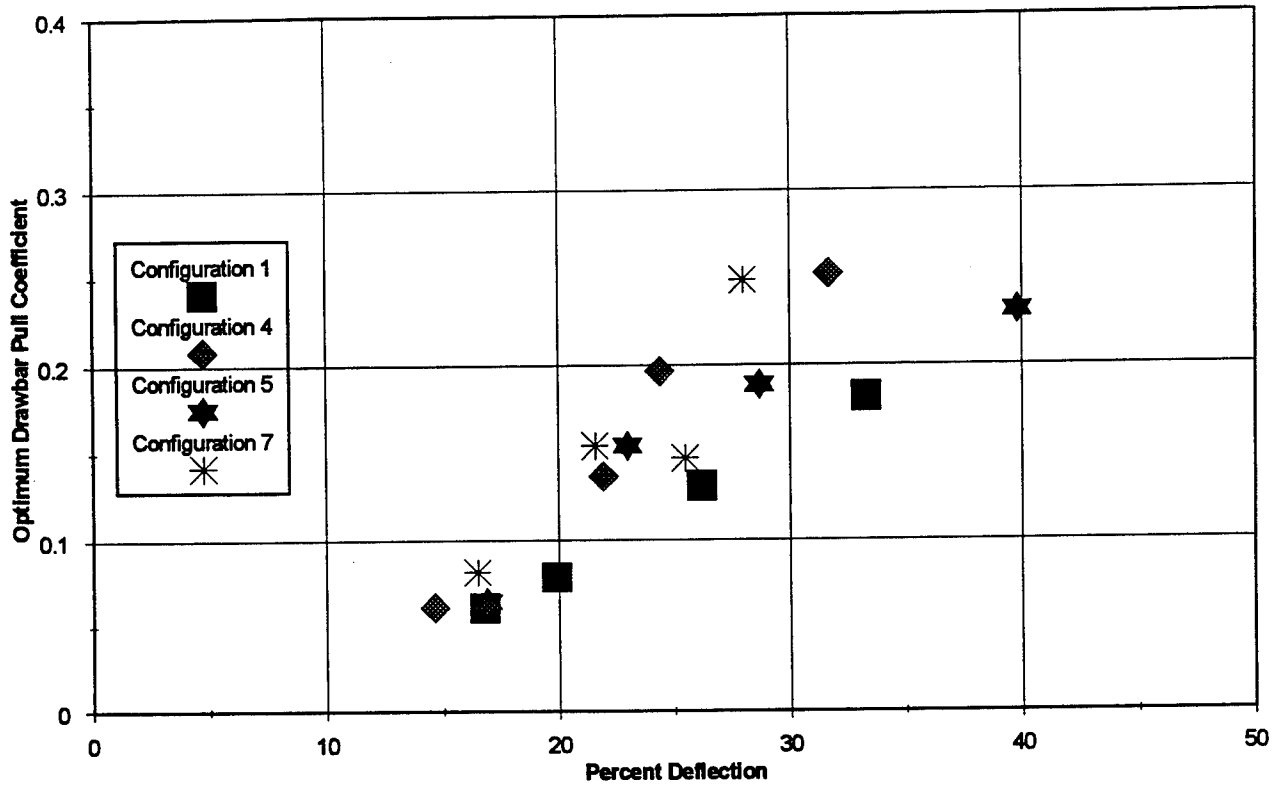


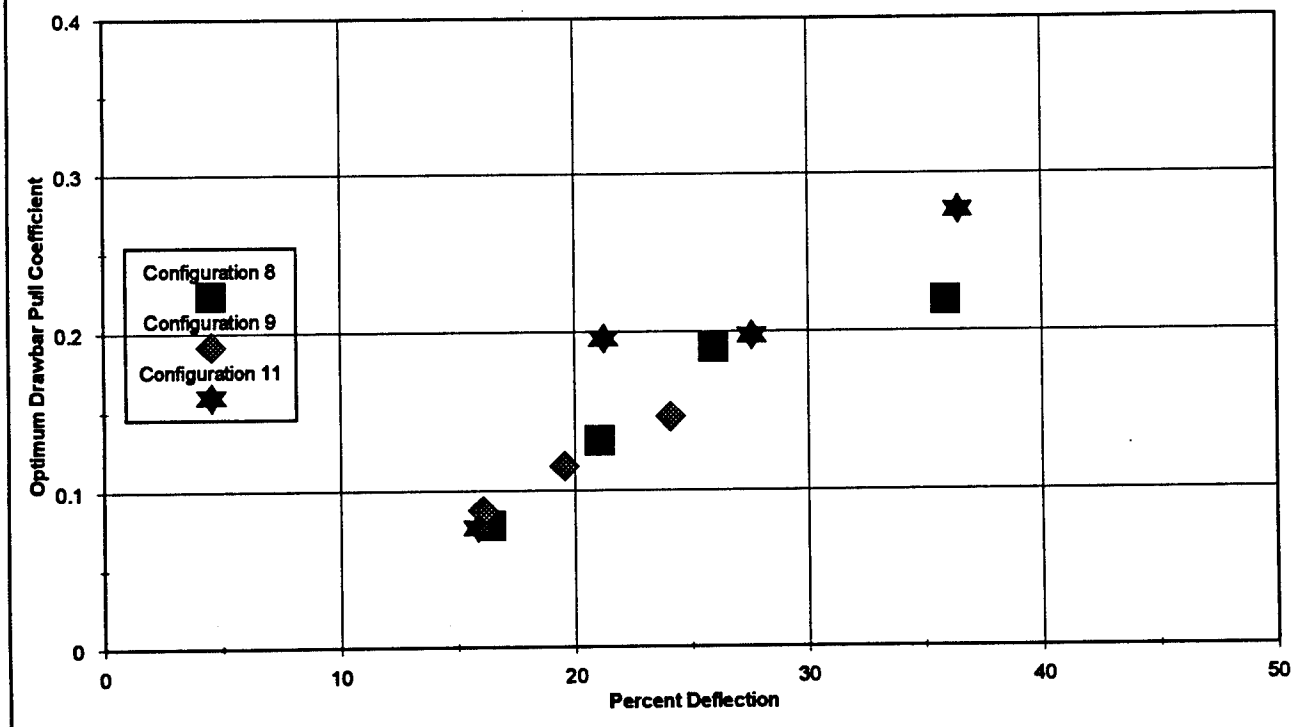
LEGEND

	PRESSURE, PSI FRONT	PRESSURE, PSI REAR	MOTION RESISTANCE, LBS
□	30	30	3750
◆	25	25	2500
○	20	20	2000
■	15	15	1800

M1008
GOODYEAR WRANGLER HT
255/85R16LT

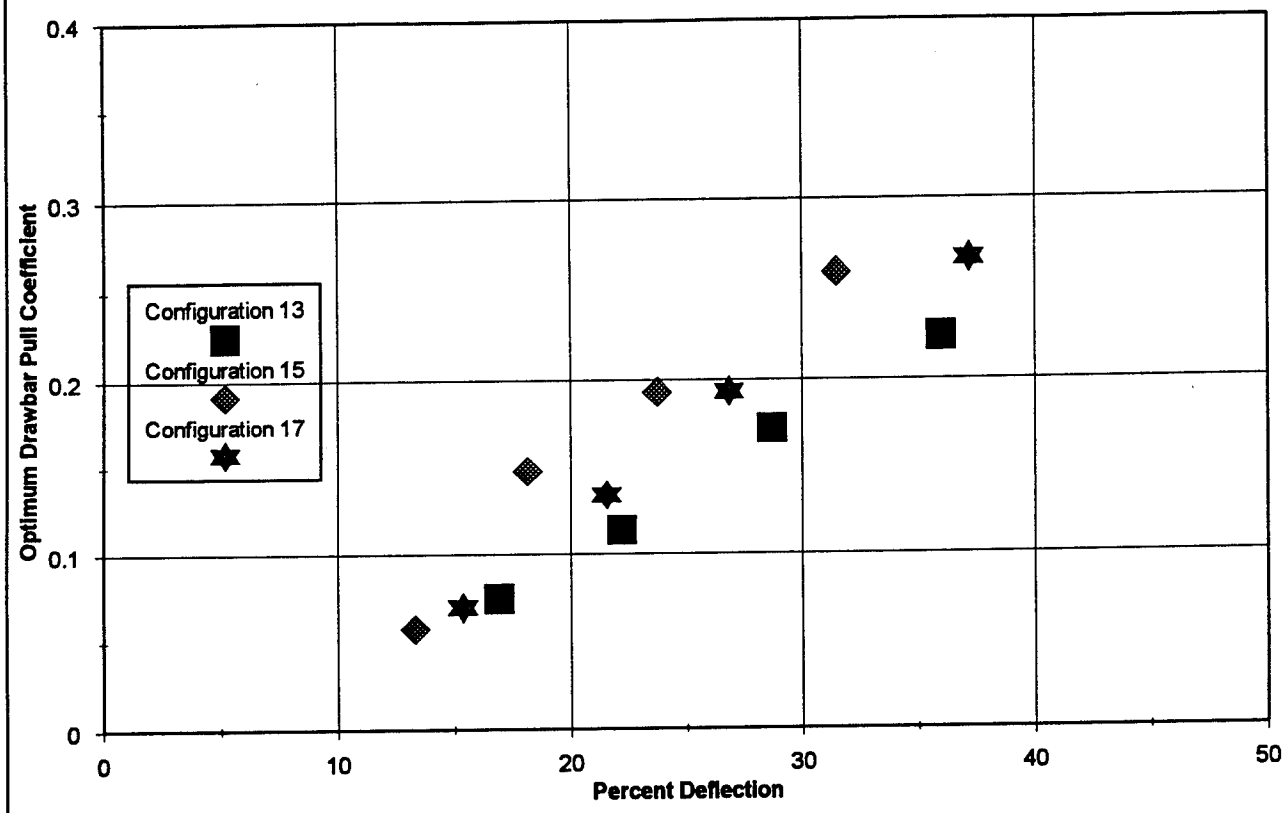
PLATE 38





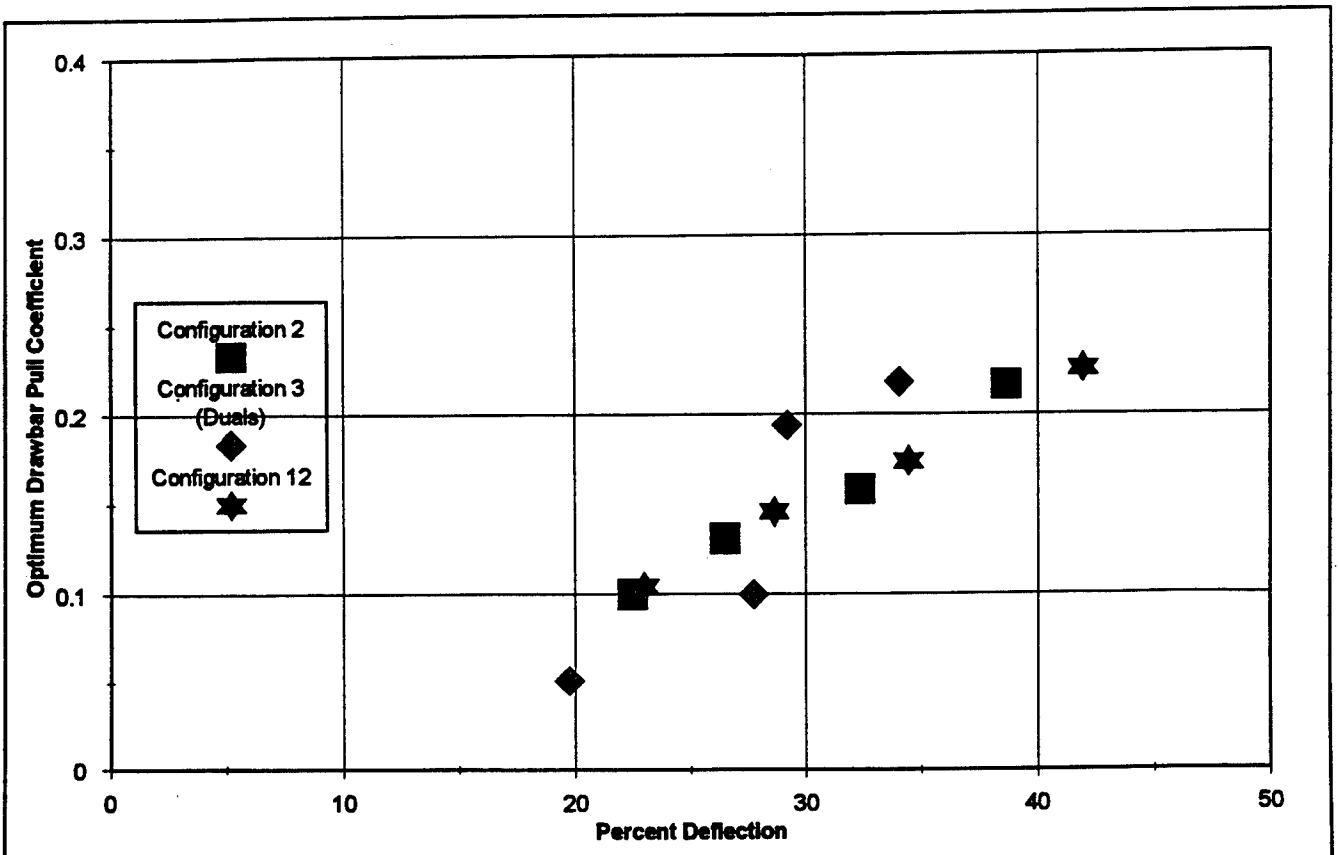
M1009 CUCV WITH 15 IN. RIMS

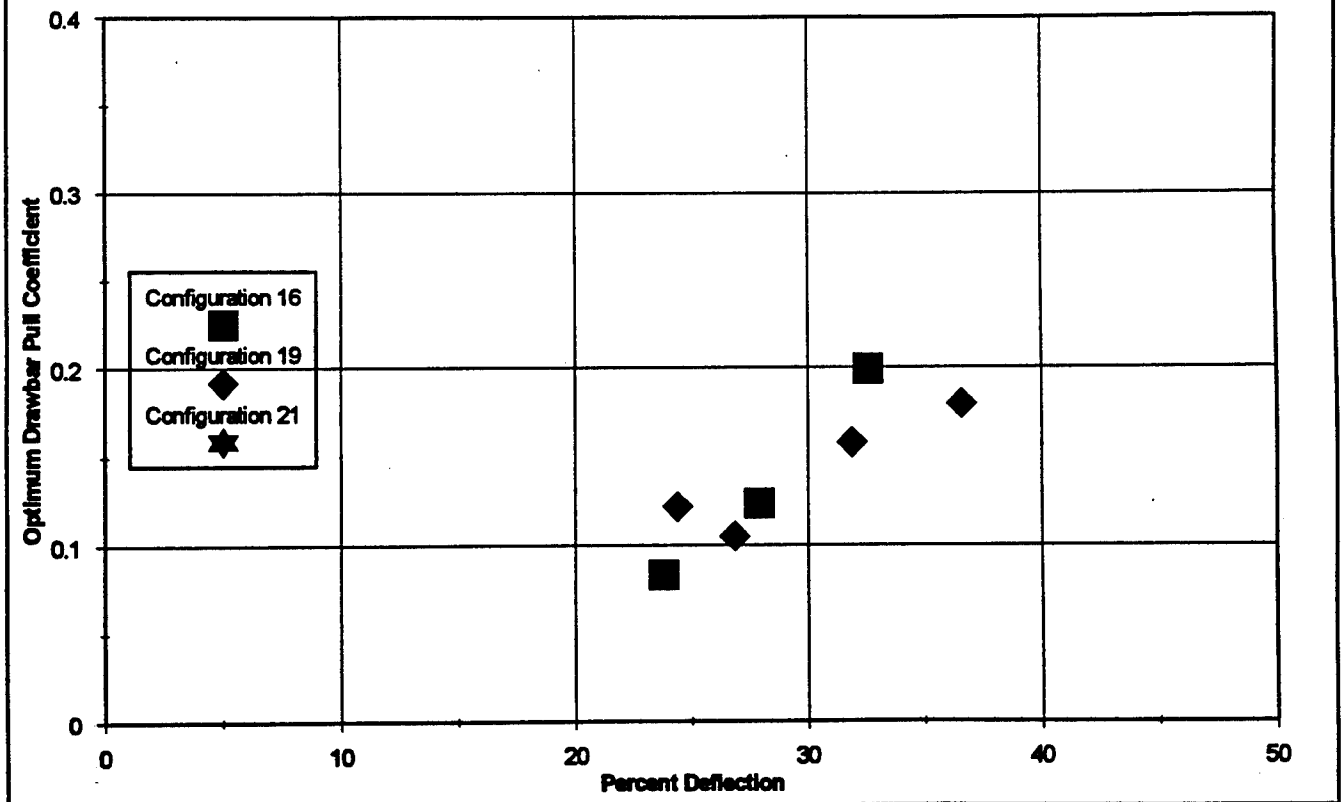
PLATE 39



M1009 CUCV WITH 15 IN. RIMS

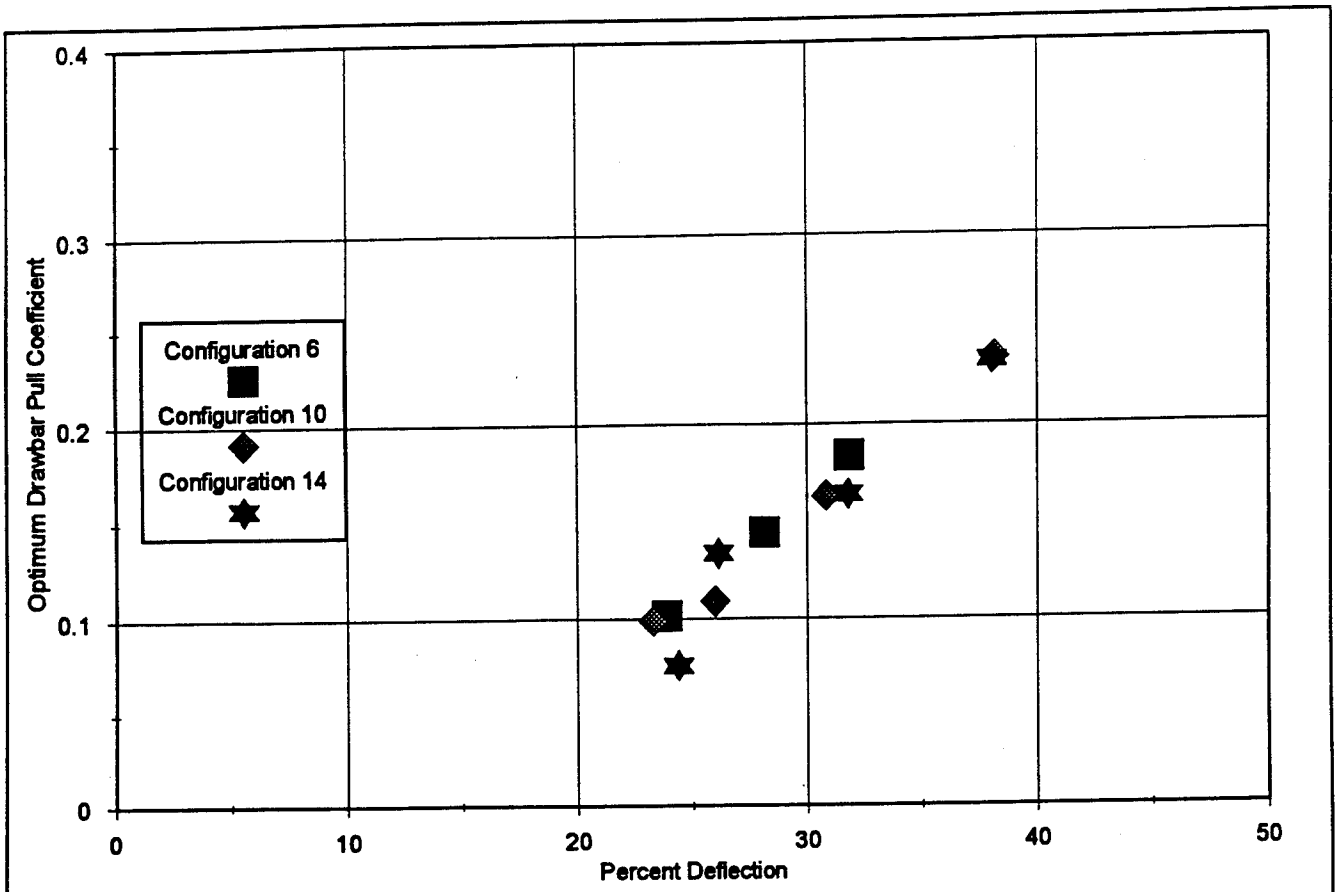
PLATE 40

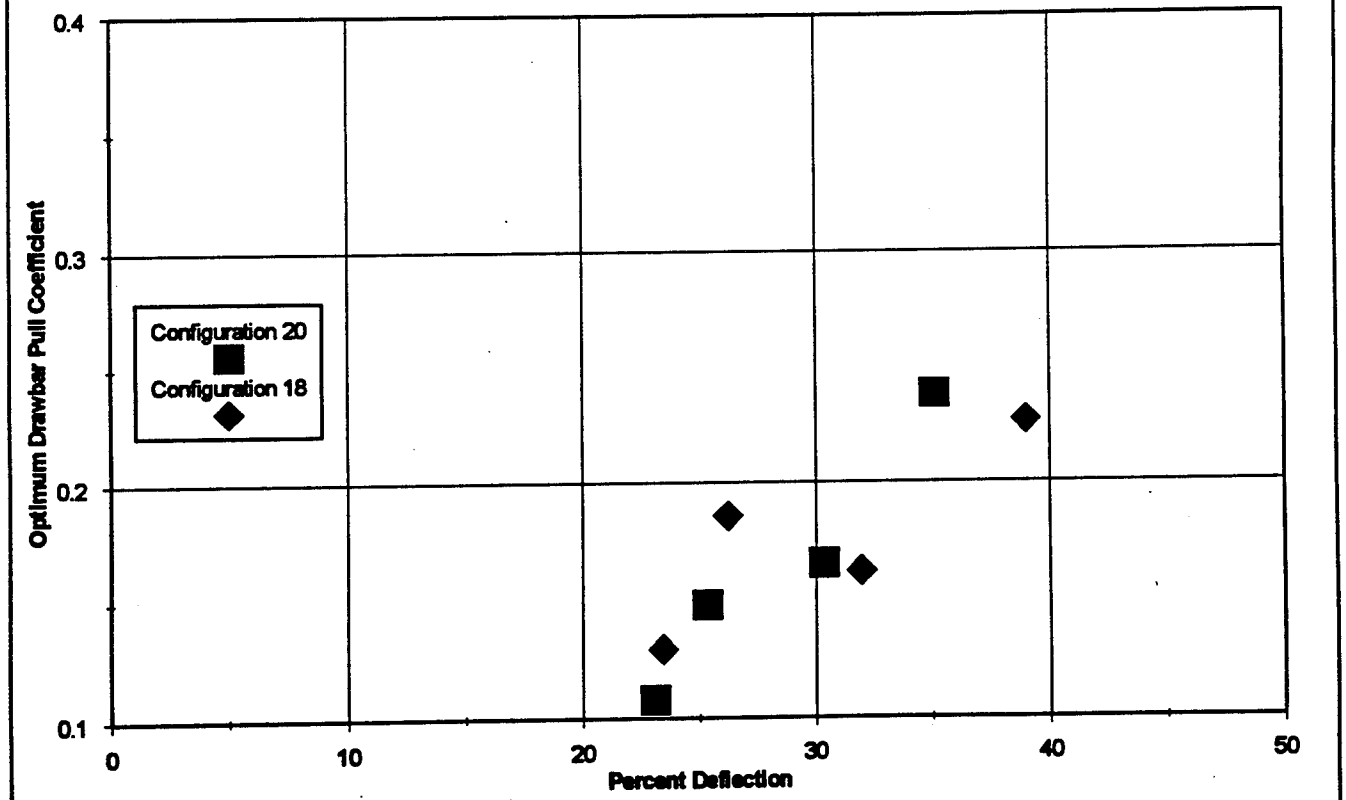




M1028 SHELTER CARRIER WITH 16 IN. RIMS

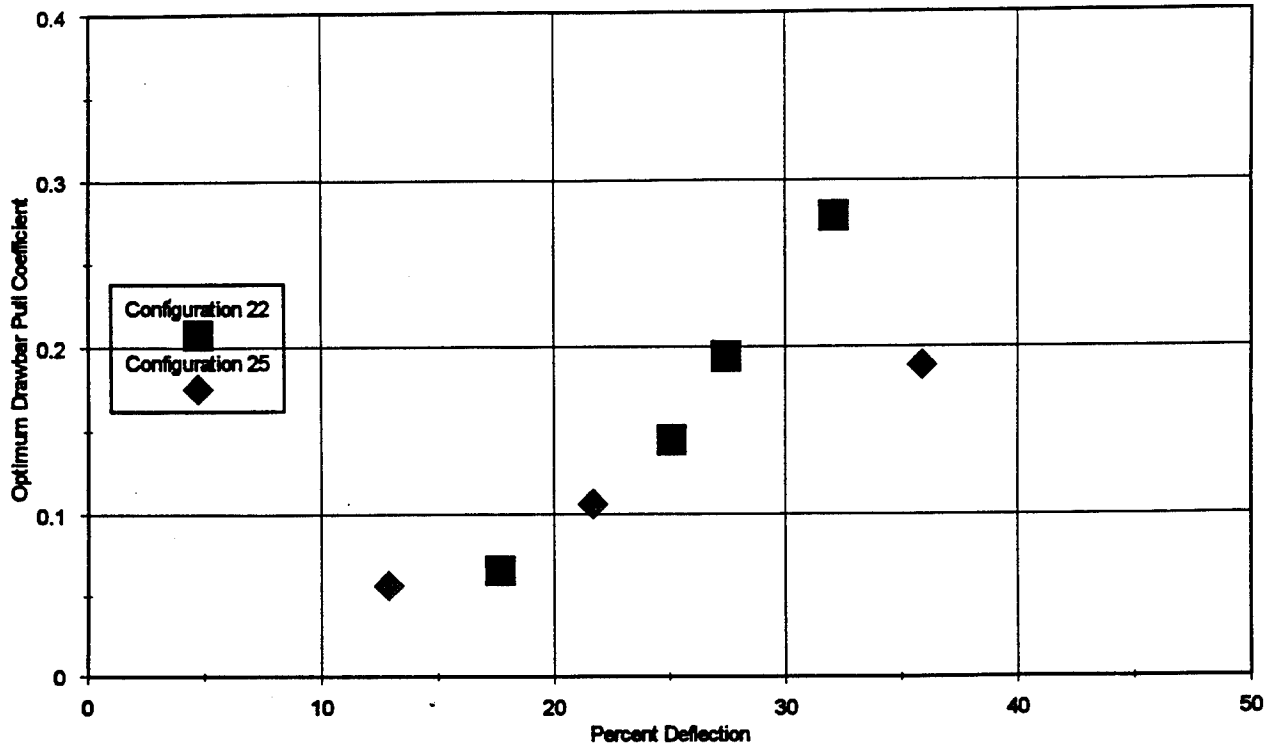
PLATE 41

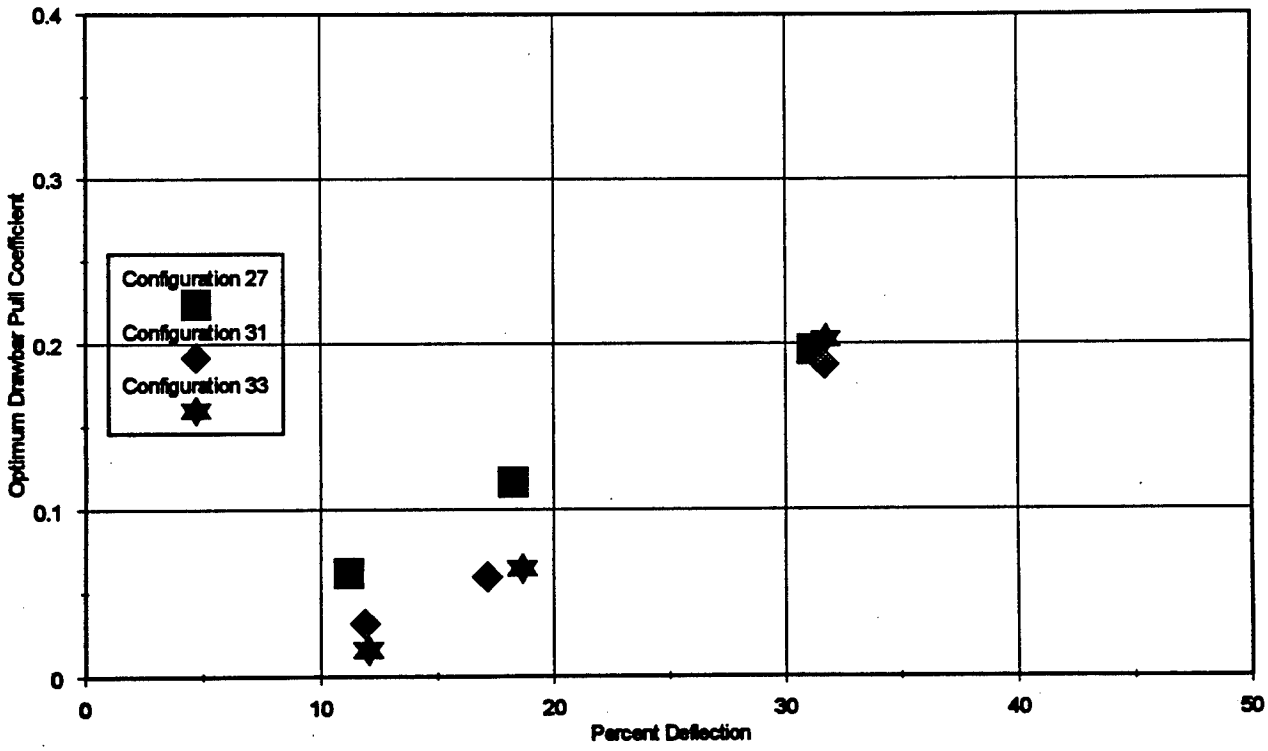




M1028 SHELTER CARRIER WITH 16.5 IN. RIMS

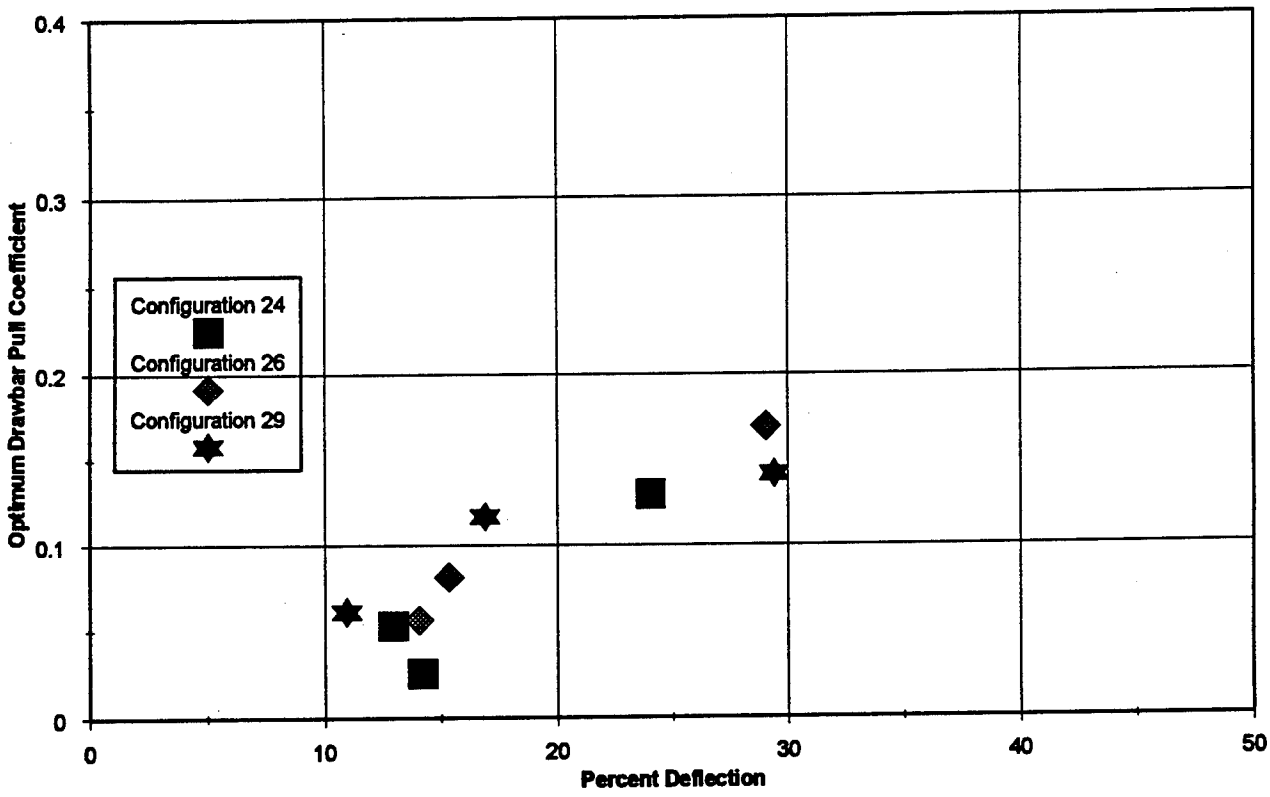
PLATE 42





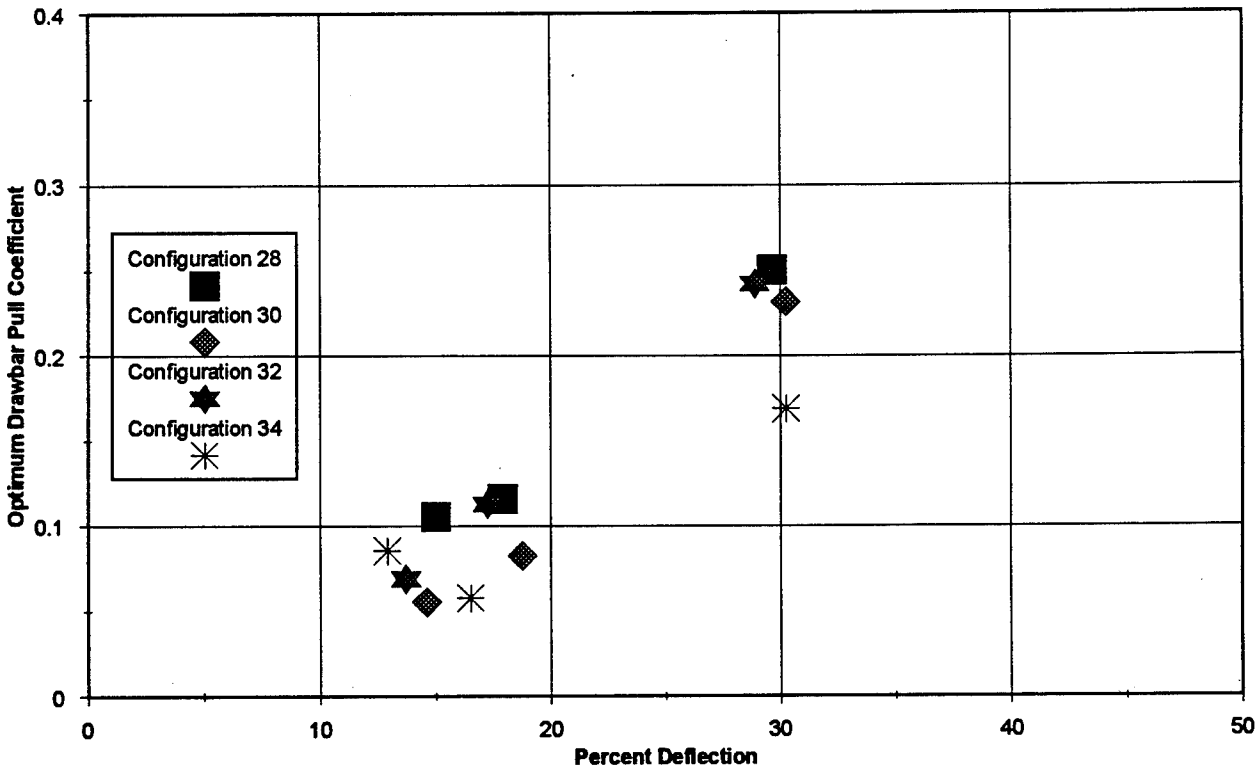
M54-5 Ton

PLATE 43



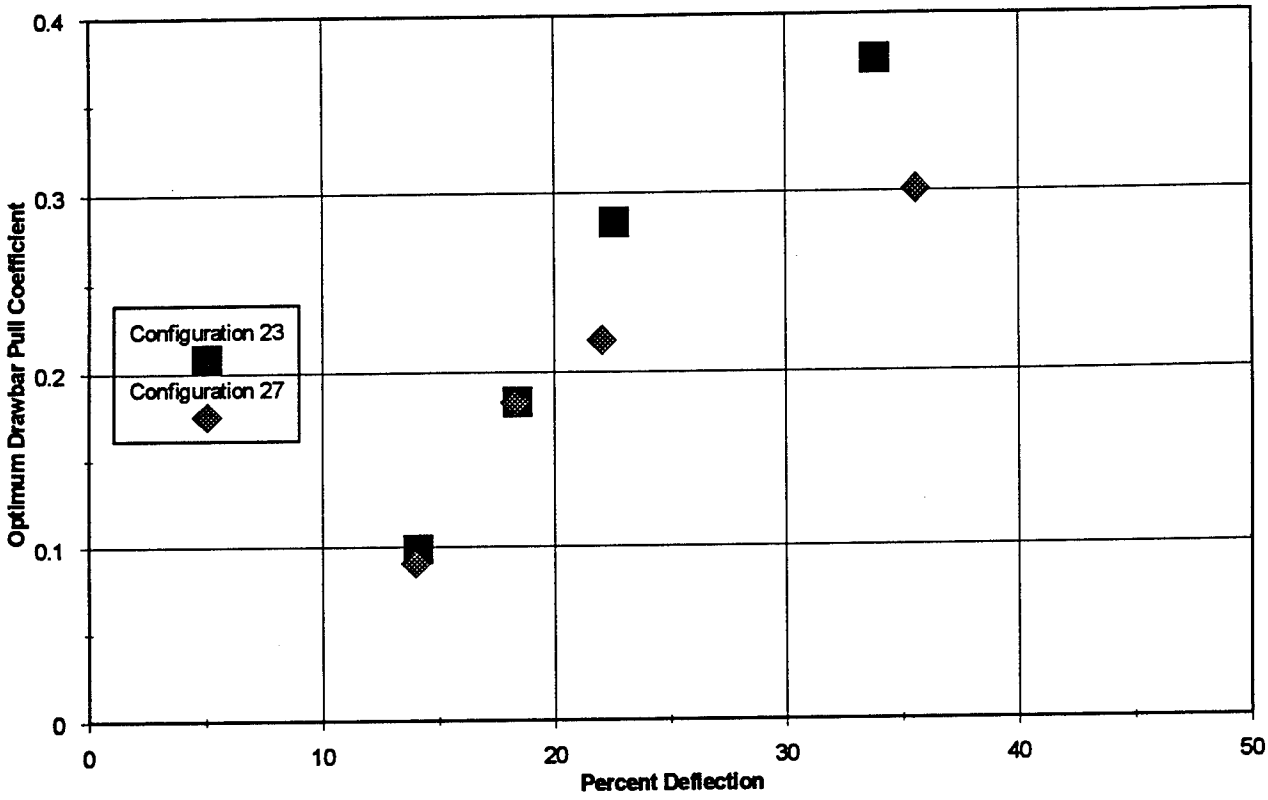
M35A2

PLATE 44



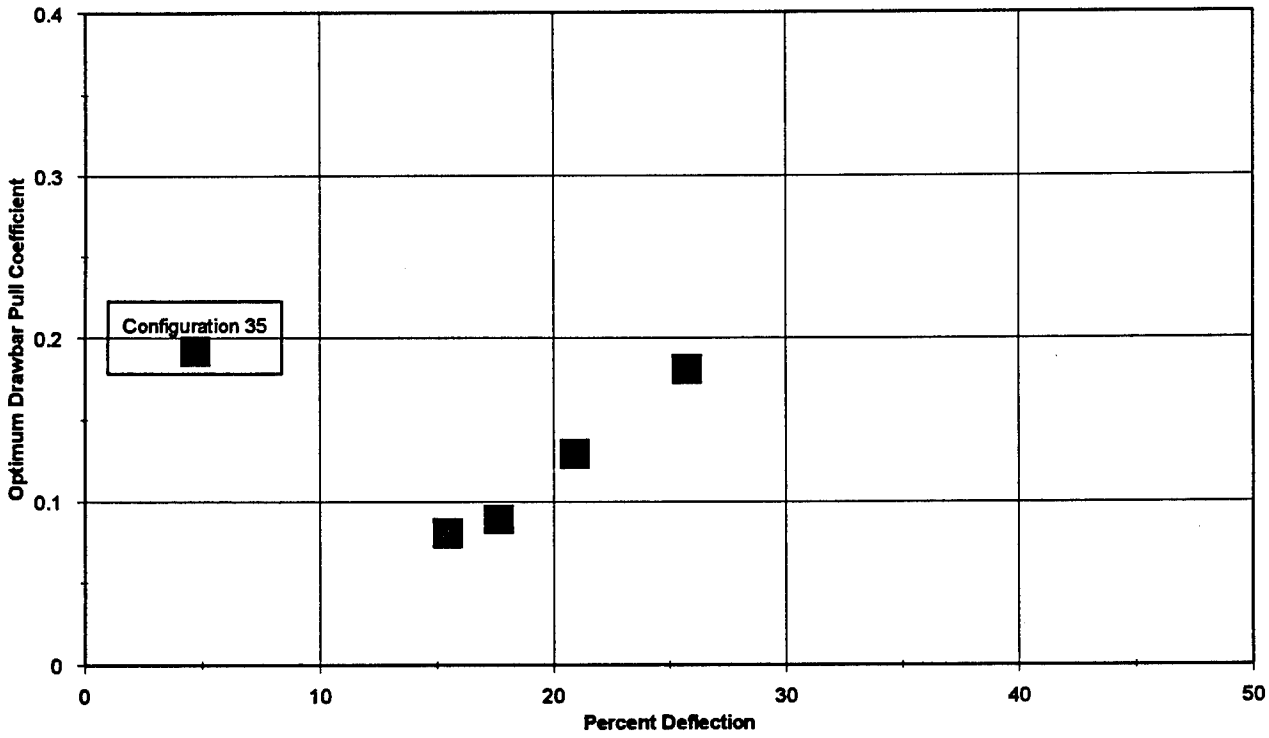
M35A2
WITH SINGLES

PLATE 45



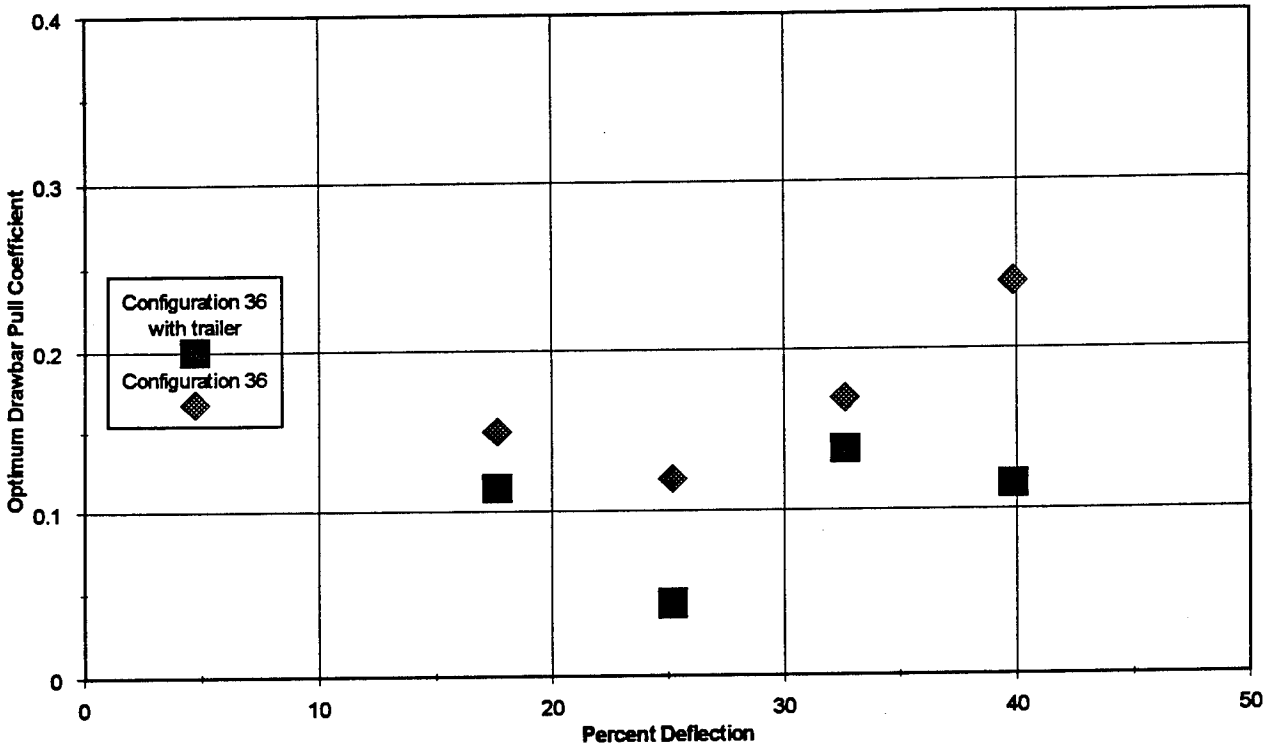
M813

PLATE 46



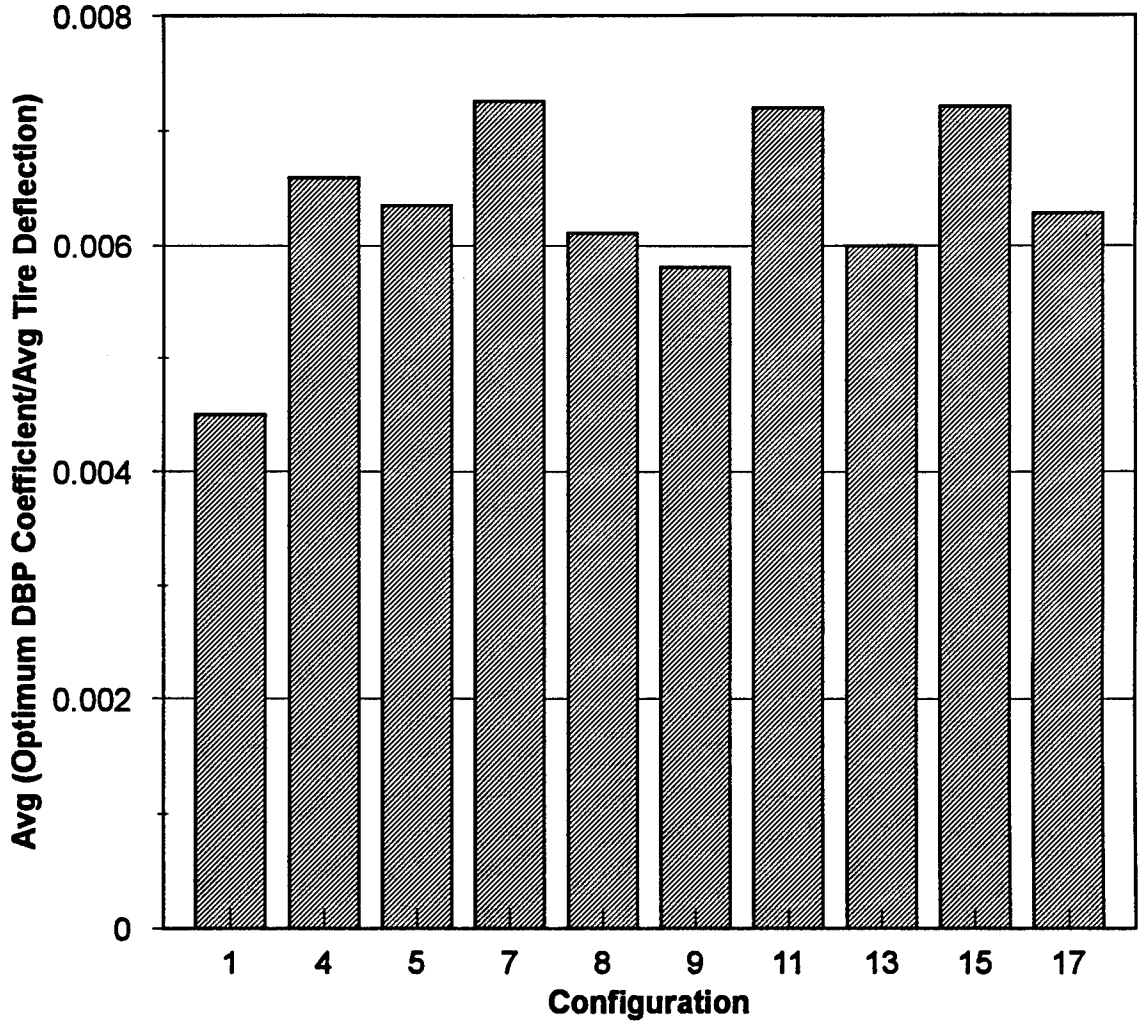
M1009
STORMER

PLATE 47



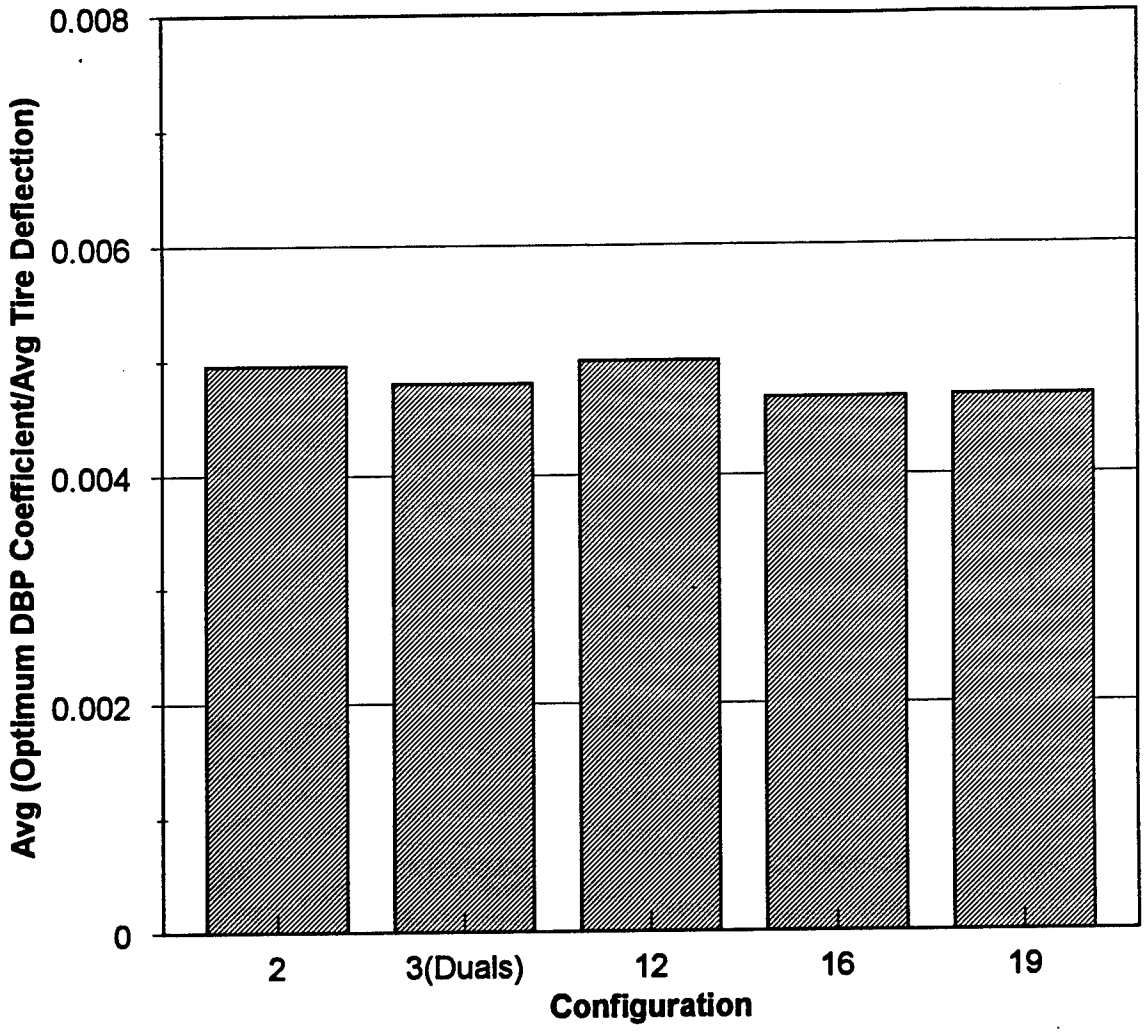
M1008

PLATE 48



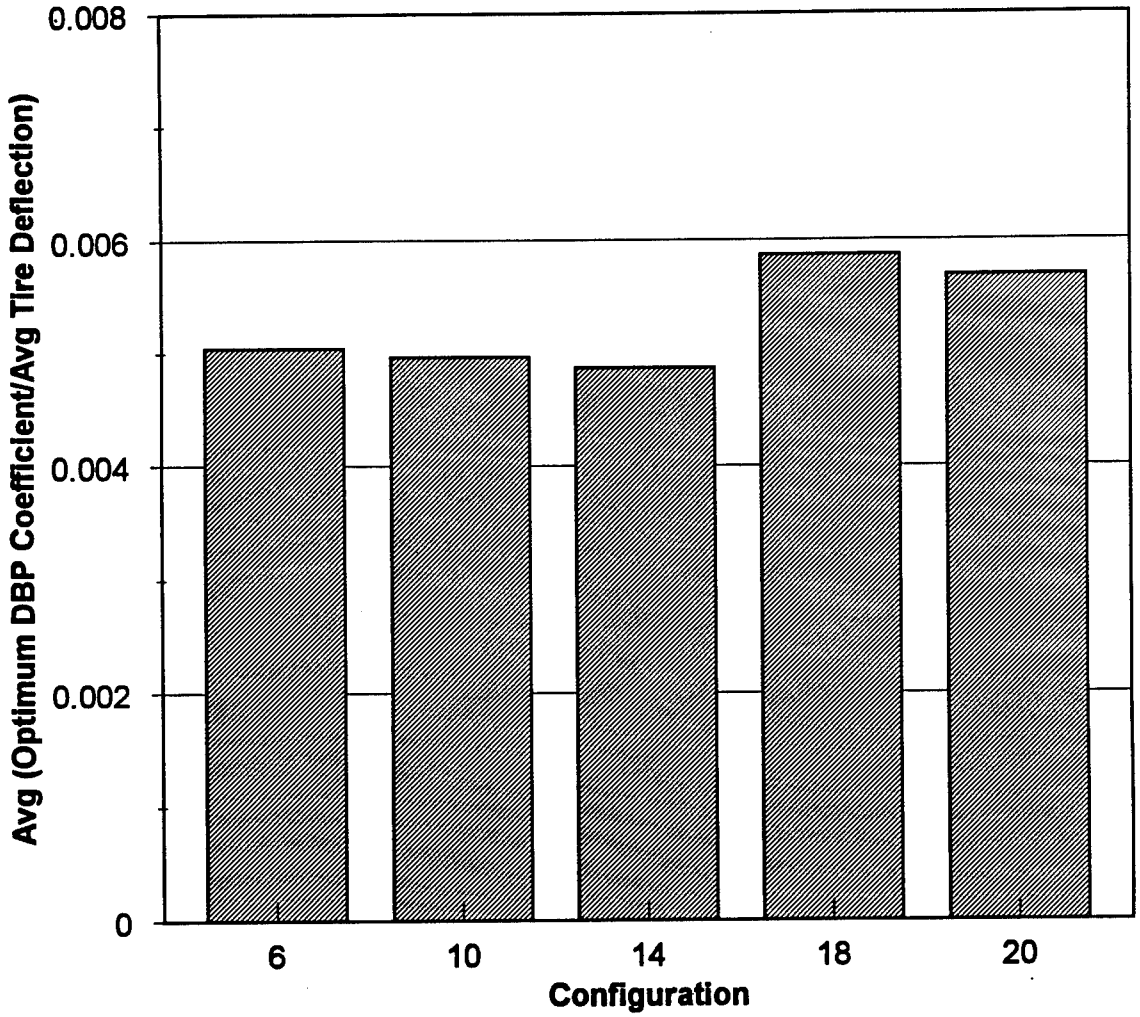
M1009 CUCV
WITH 15 IN. RIMS

PLATE 49



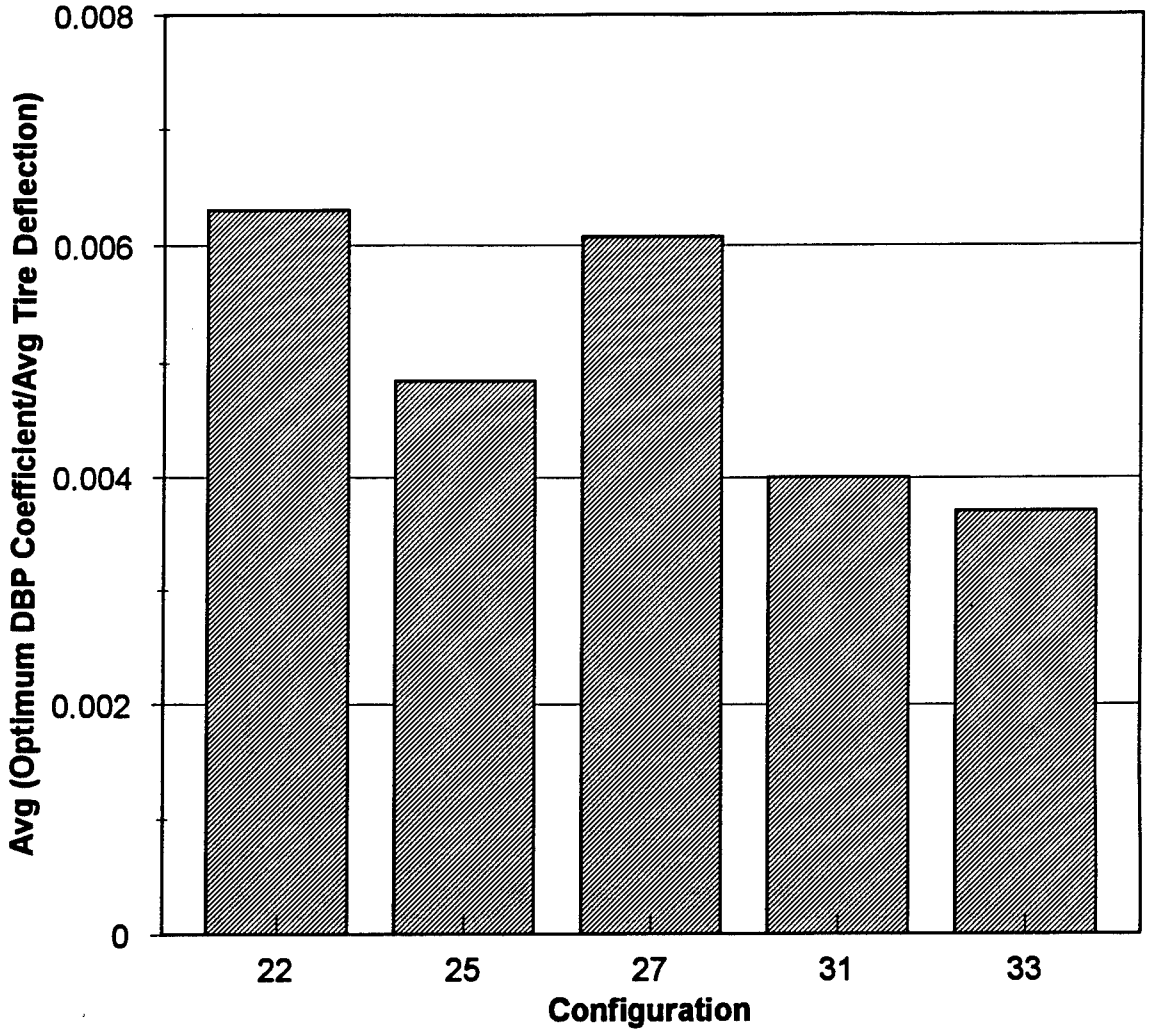
M1028 SHELTER CARRIER WITH 16 IN. RIMS

PLATE 50



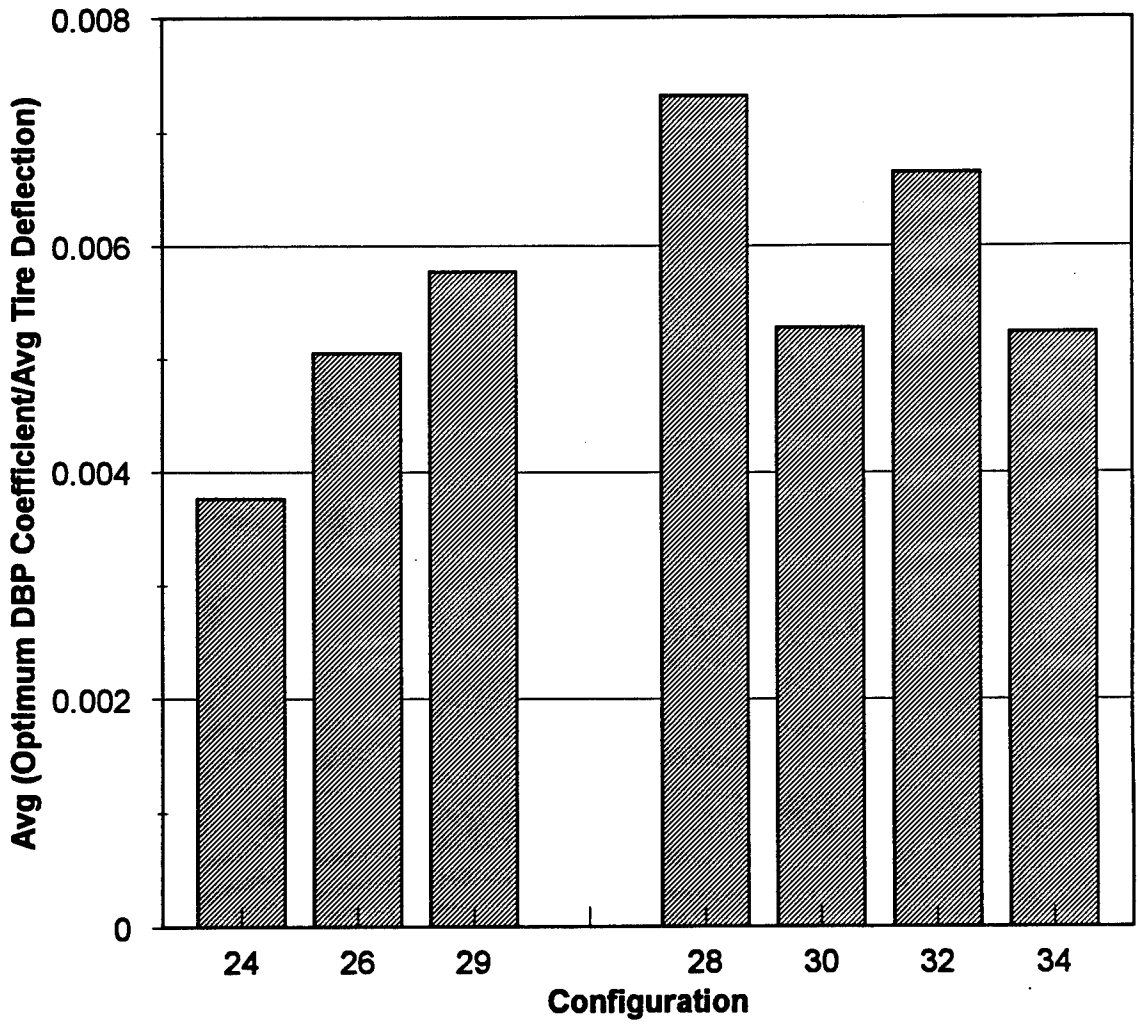
M1028 SHELTER CARRIER WITH 16.5 IN. SPLIT RIMS

PLATE 51



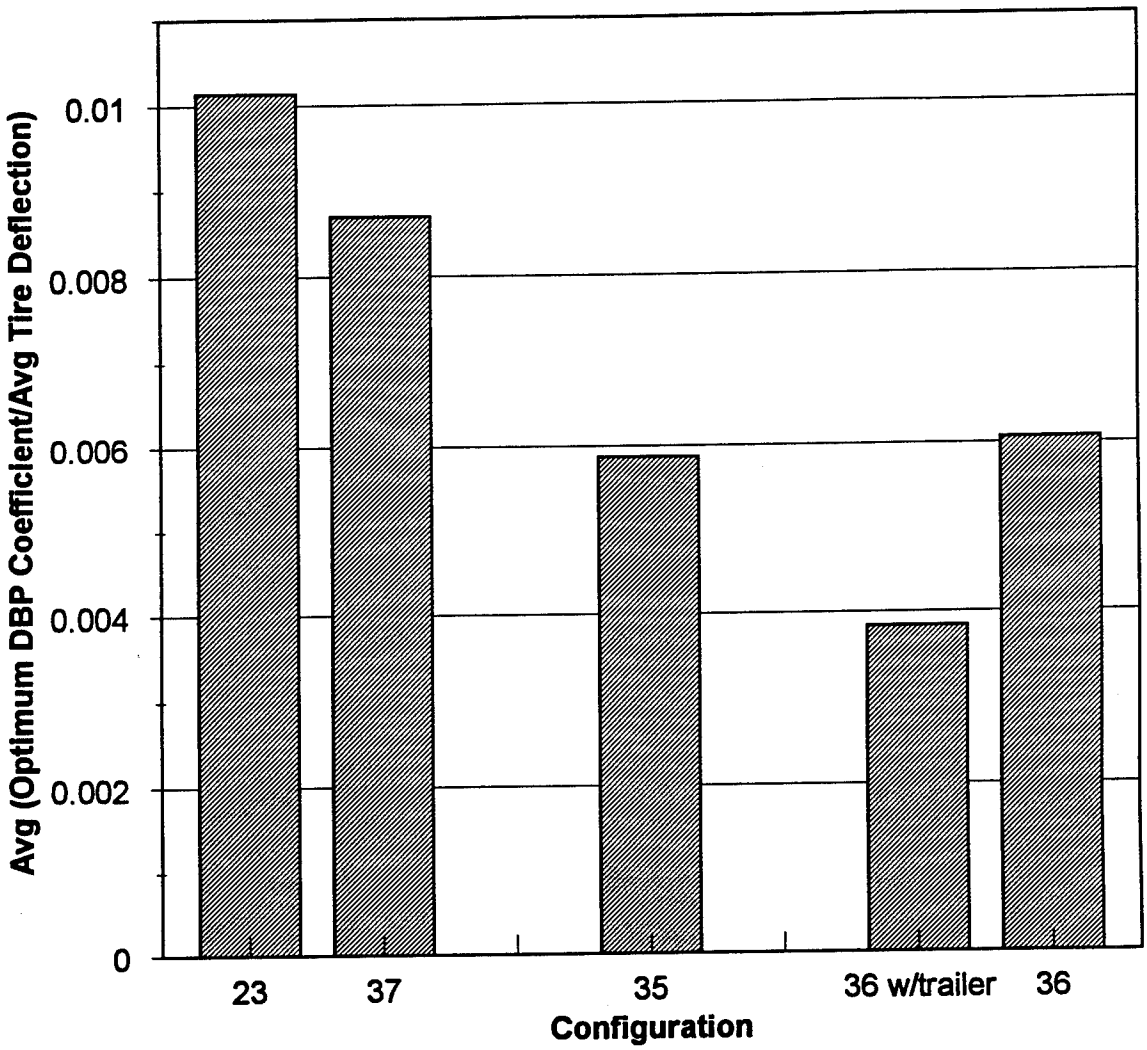
M54 5-TON

PLATE 52



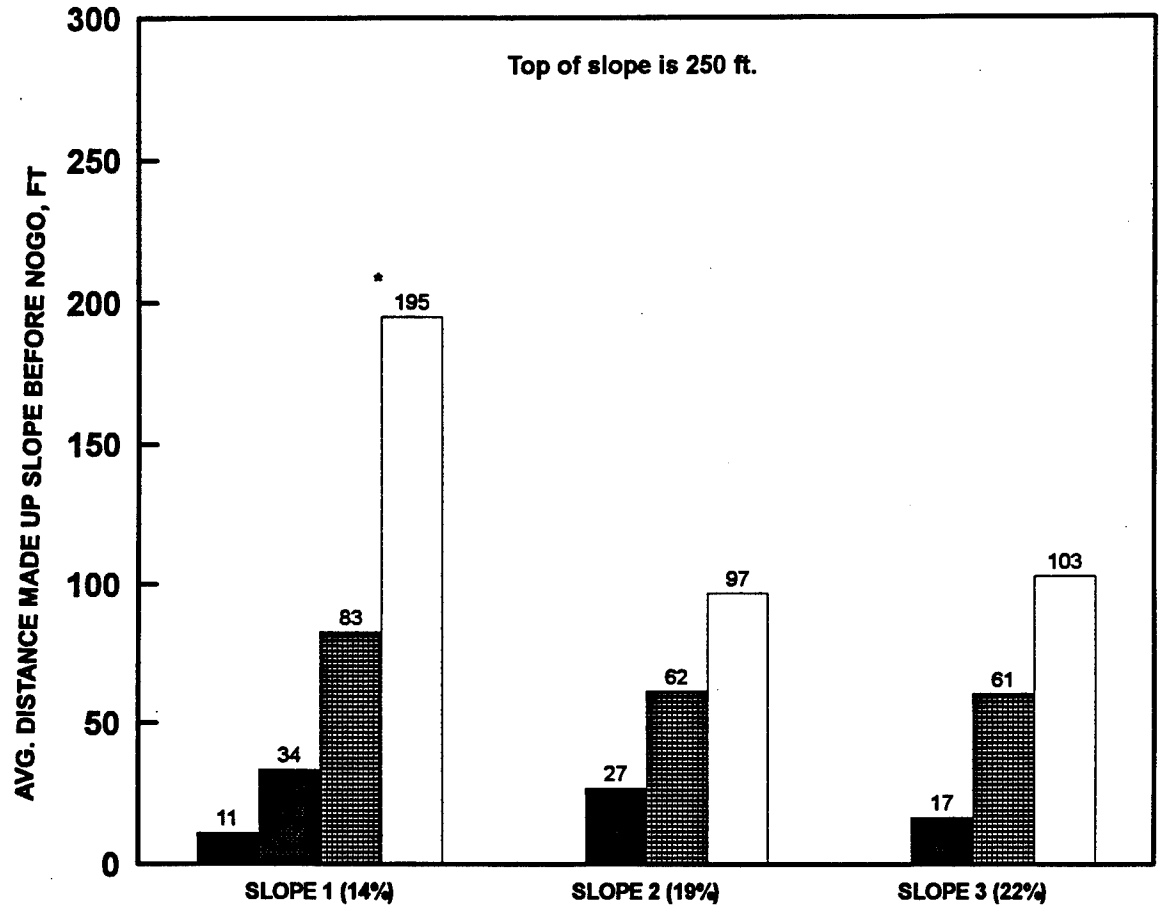
M35A2 AND M35A2 WITH SINGLES

PLATE 53



M813
M1009 STORMER
M1008

PLATE 54



LEGEND

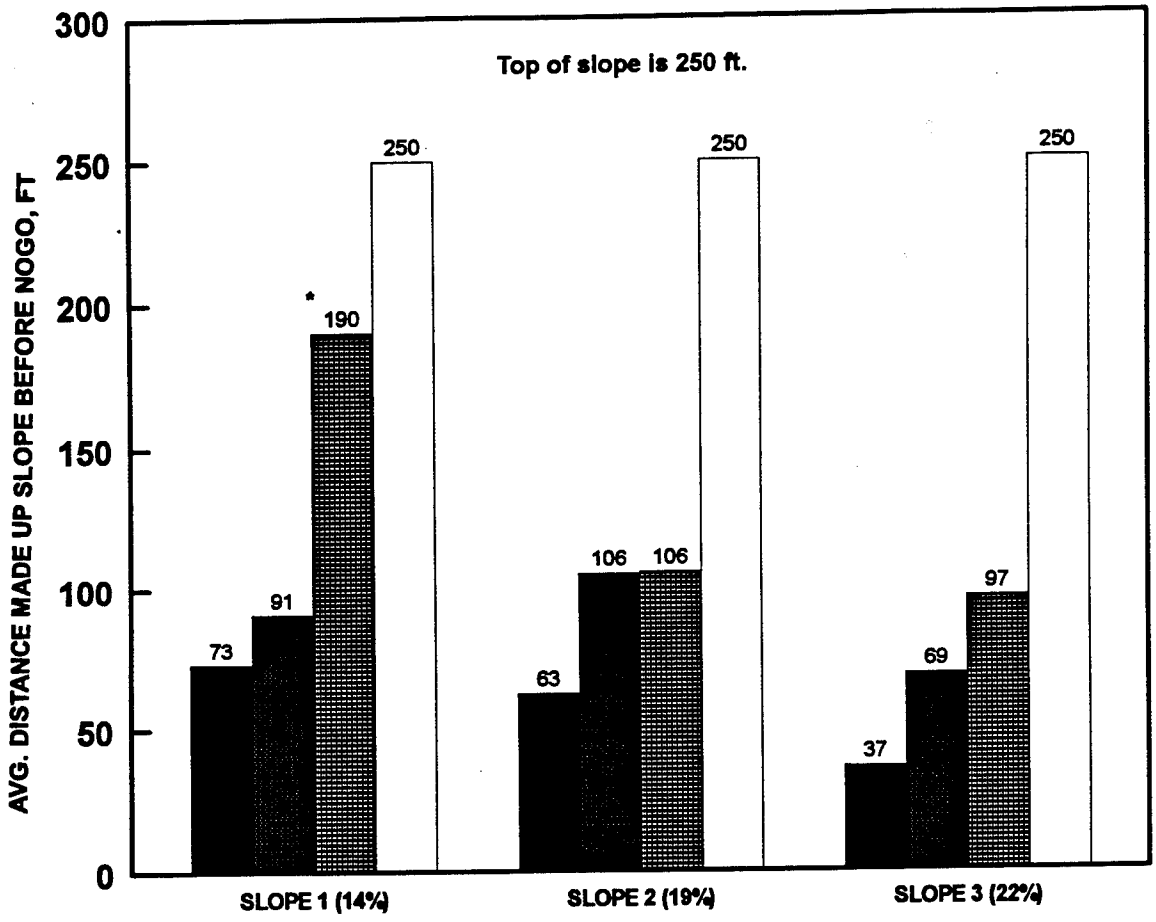
■ — 35/35 PSI ■ — 20/20 PSI

■ — 30/30 PSI □ — 15/15 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1009 CONFIGURATION 1

PLATE 55



LEGEND

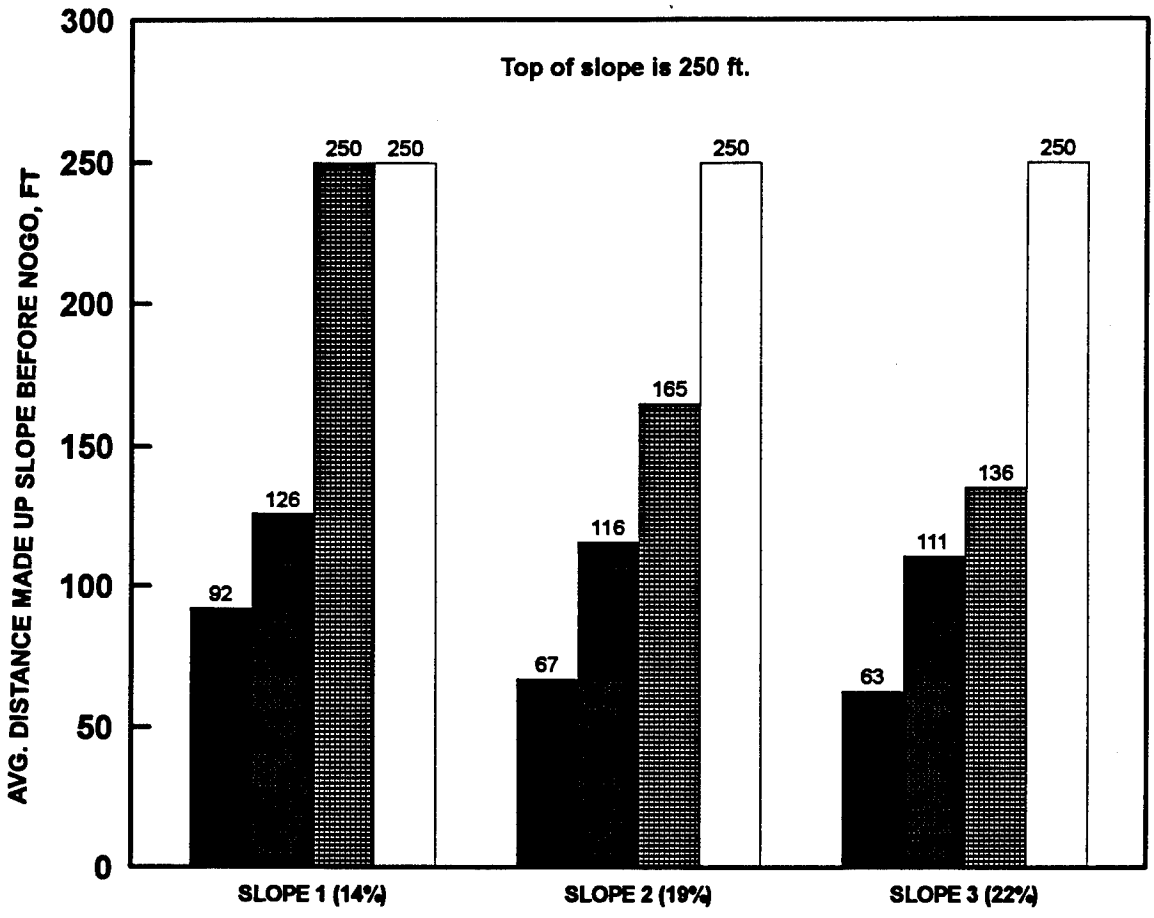
■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSi

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1009 CONFIGURATION 4

PLATE 56



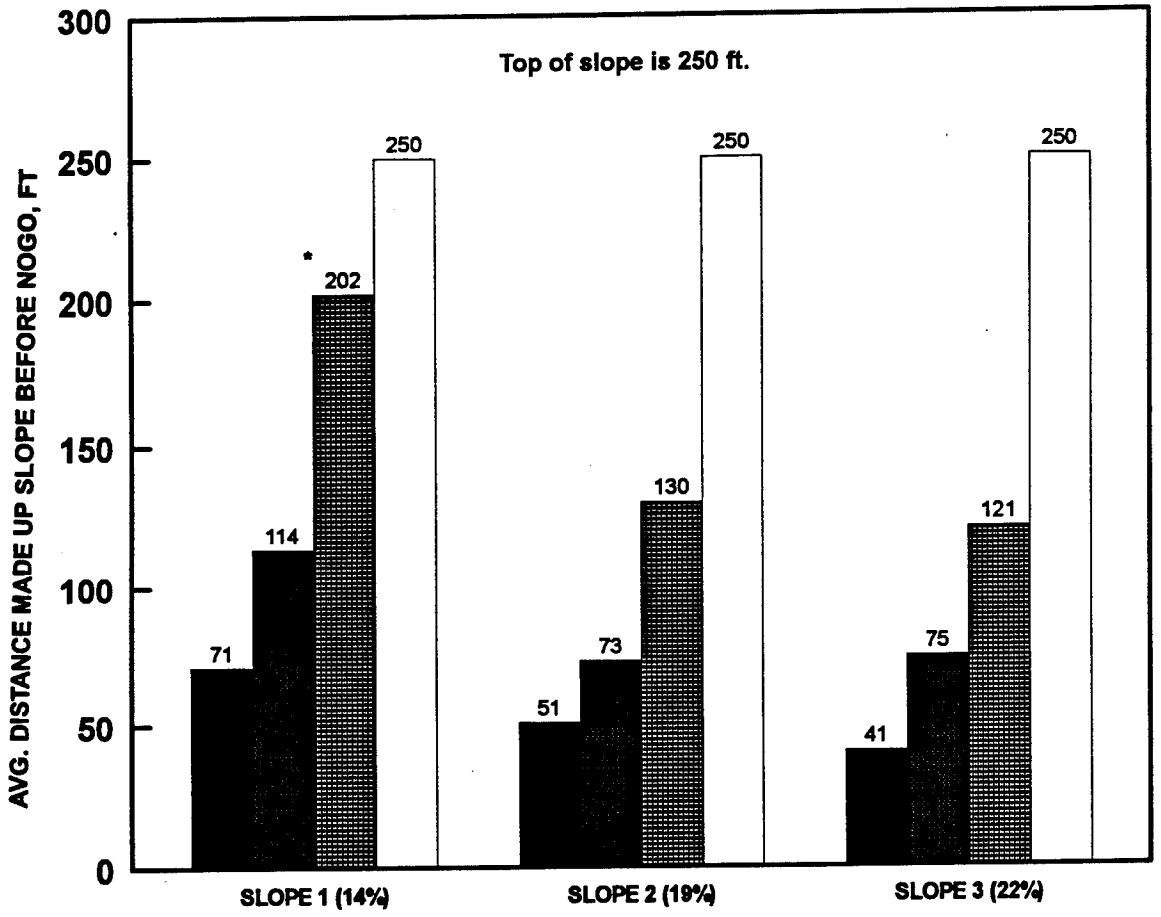
LEGEND

■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSi

SLOPE TEST RESULTS
WITH THE
M1009
CONFIGURATION 5

PLATE 57



LEGEND

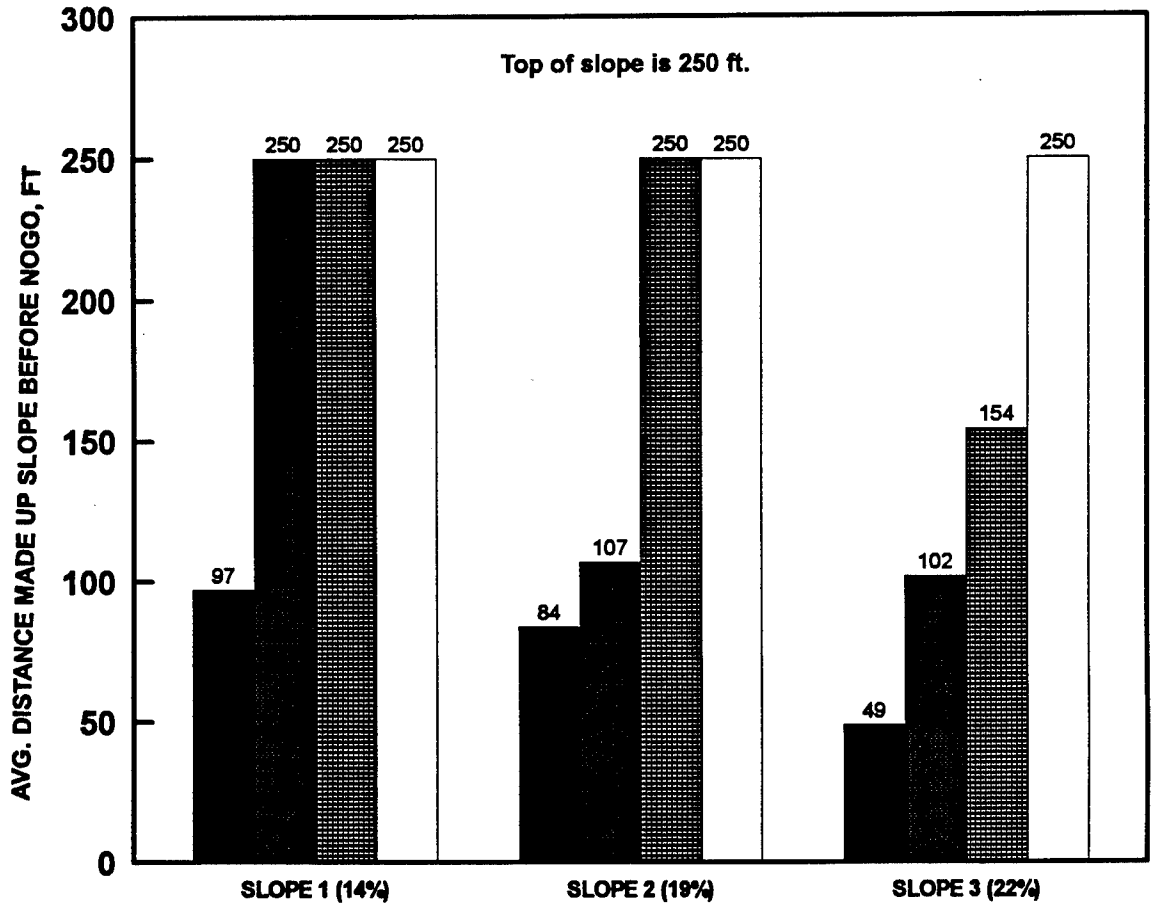
■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSi

* Average includes at least one GO

SLOPE TEST RESULTS
WITH THE
M1009
CONFIGURATION 7

PLATE 58



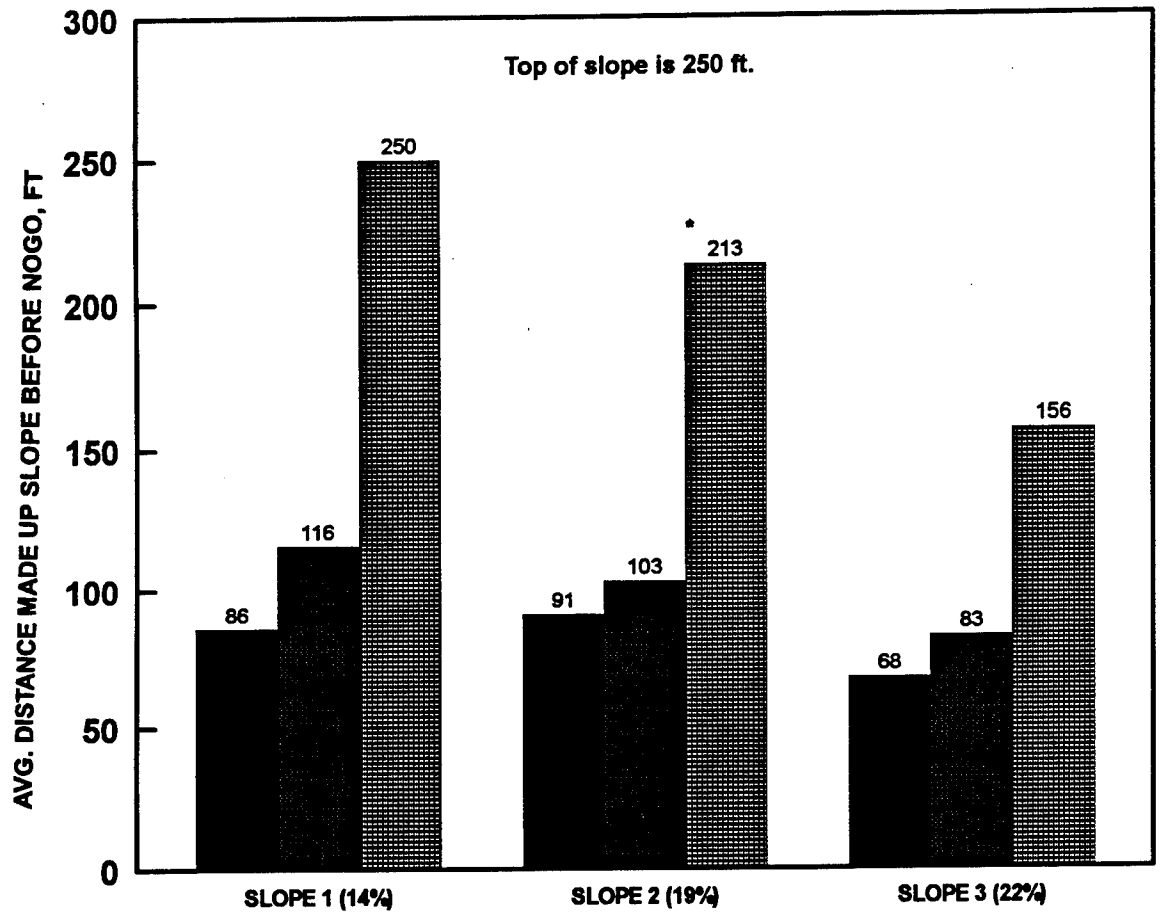
LEGEND

■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSi

SLOPE TEST RESULTS
WITH THE
M1009
CONFIGURATION 8

PLATE 59



LEGEND

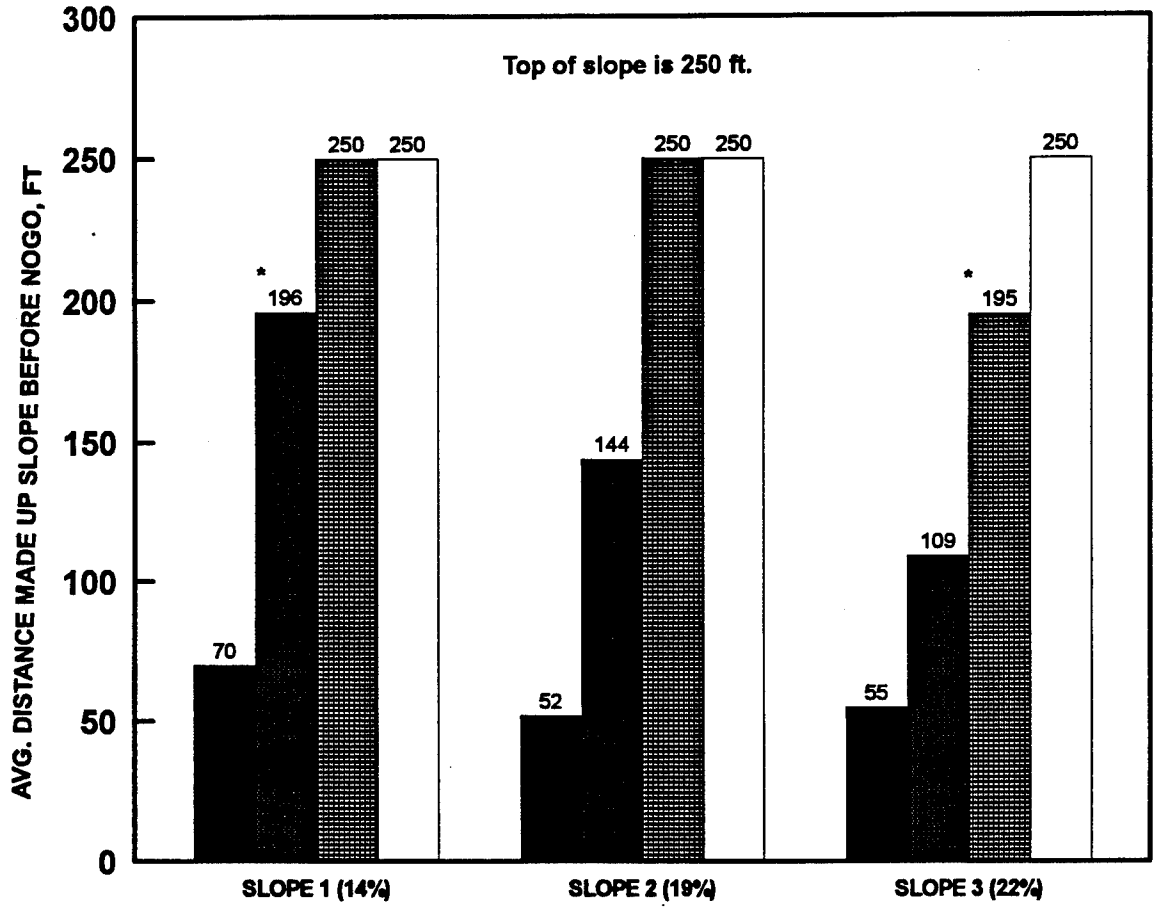
■ — 20/20 PSI ■ — 10/10 PSI

■ — 15/15 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1009 CONFIGURATION 9

PLATE 60



LEGEND

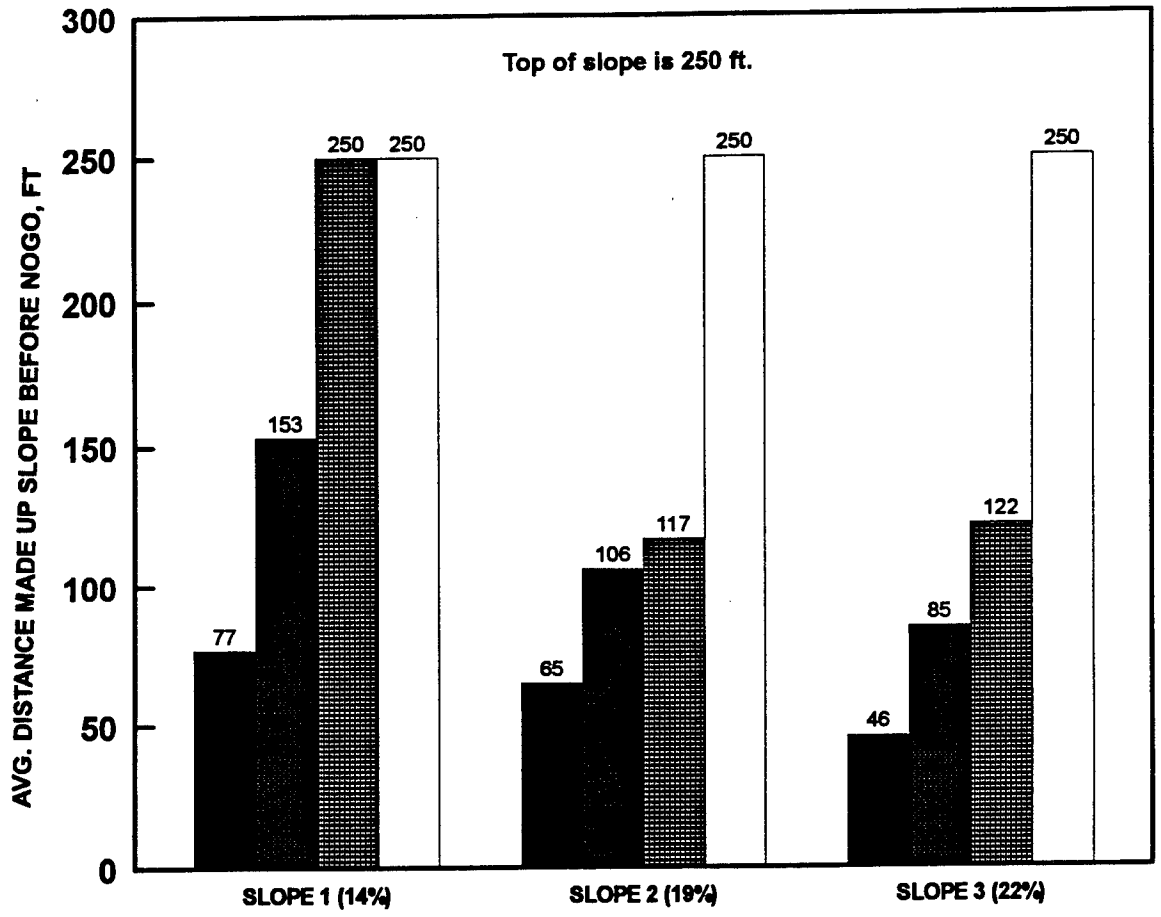
■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSi

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1009 CONFIGURATION 11

PLATE 61



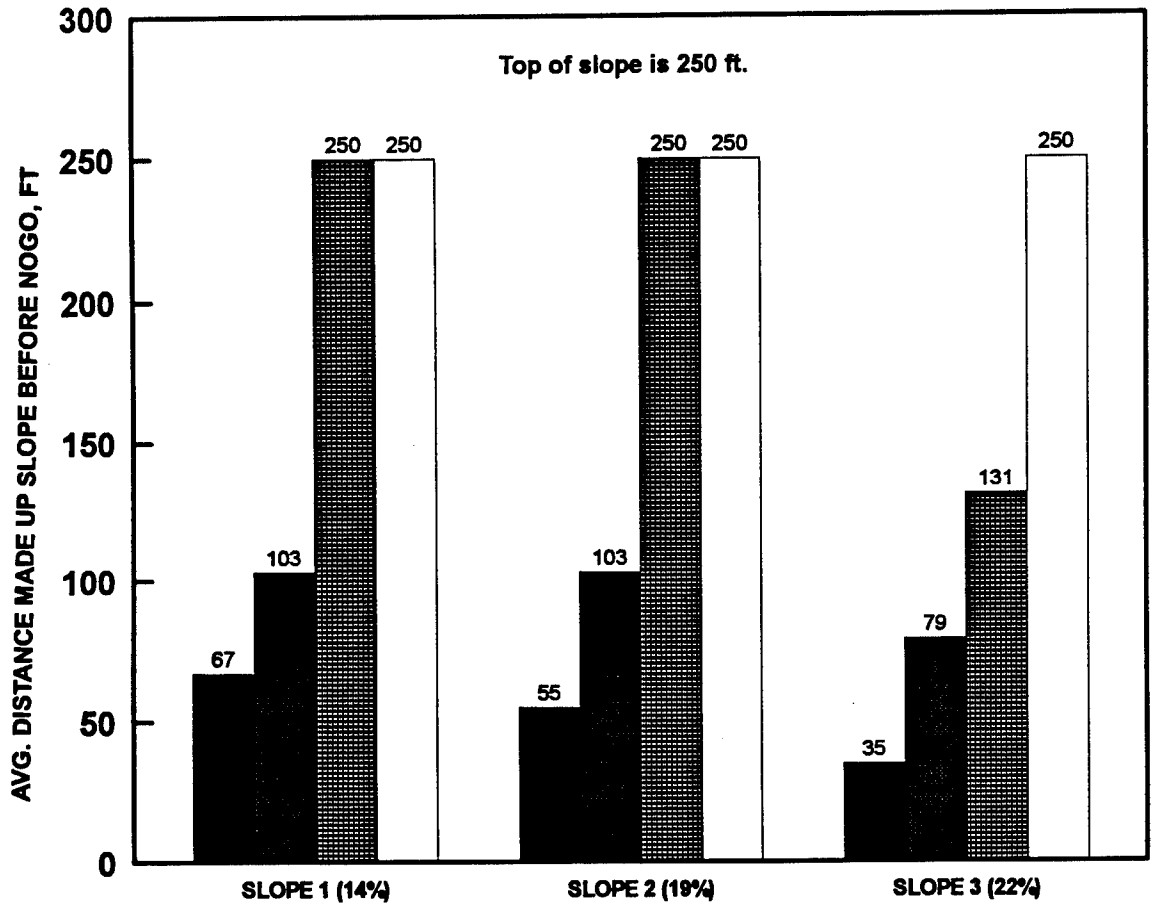
LEGEND

■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSi

SLOPE TEST RESULTS
WITH THE
M1009
CONFIGURATION 13

PLATE 62



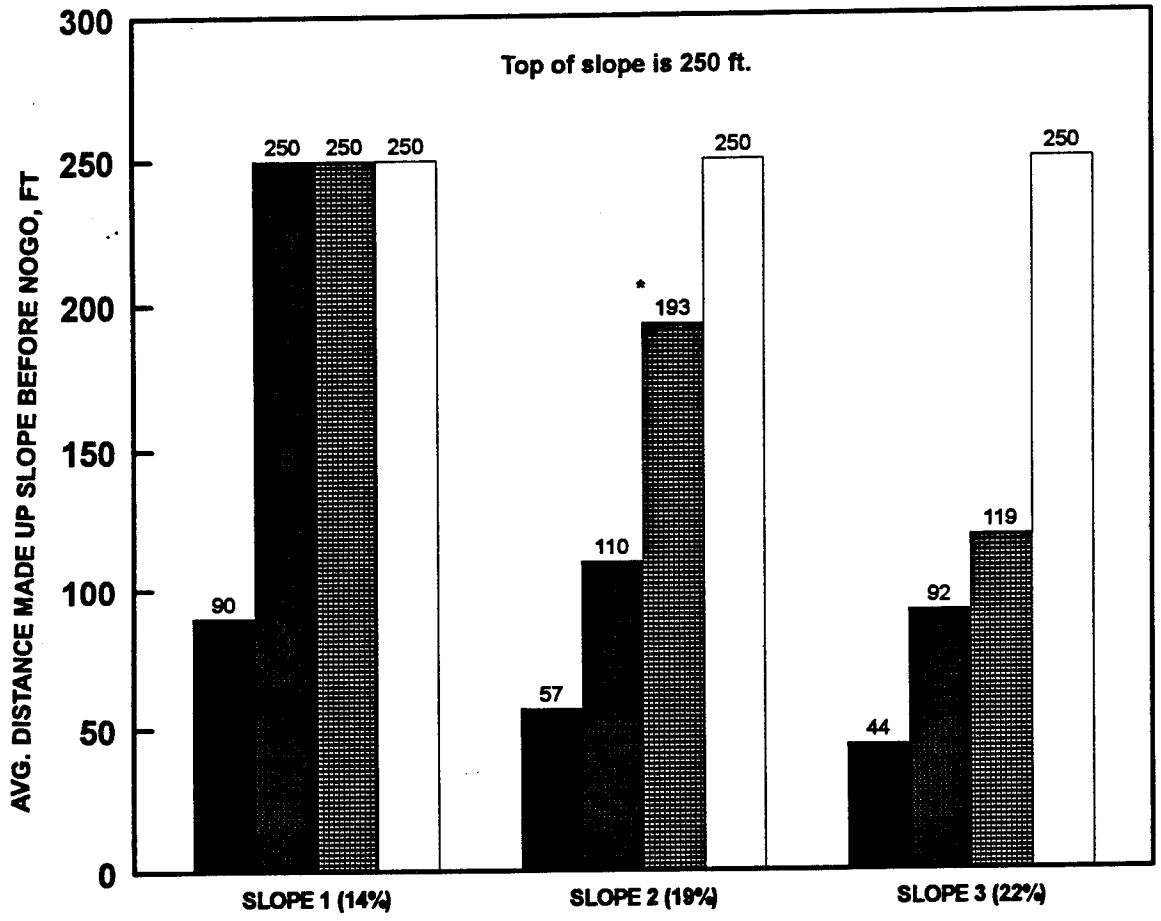
LEGEND

■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSi

SLOPE TEST RESULTS
WITH THE
M1009
CONFIGURATION 15

PLATE 63



LEGEND

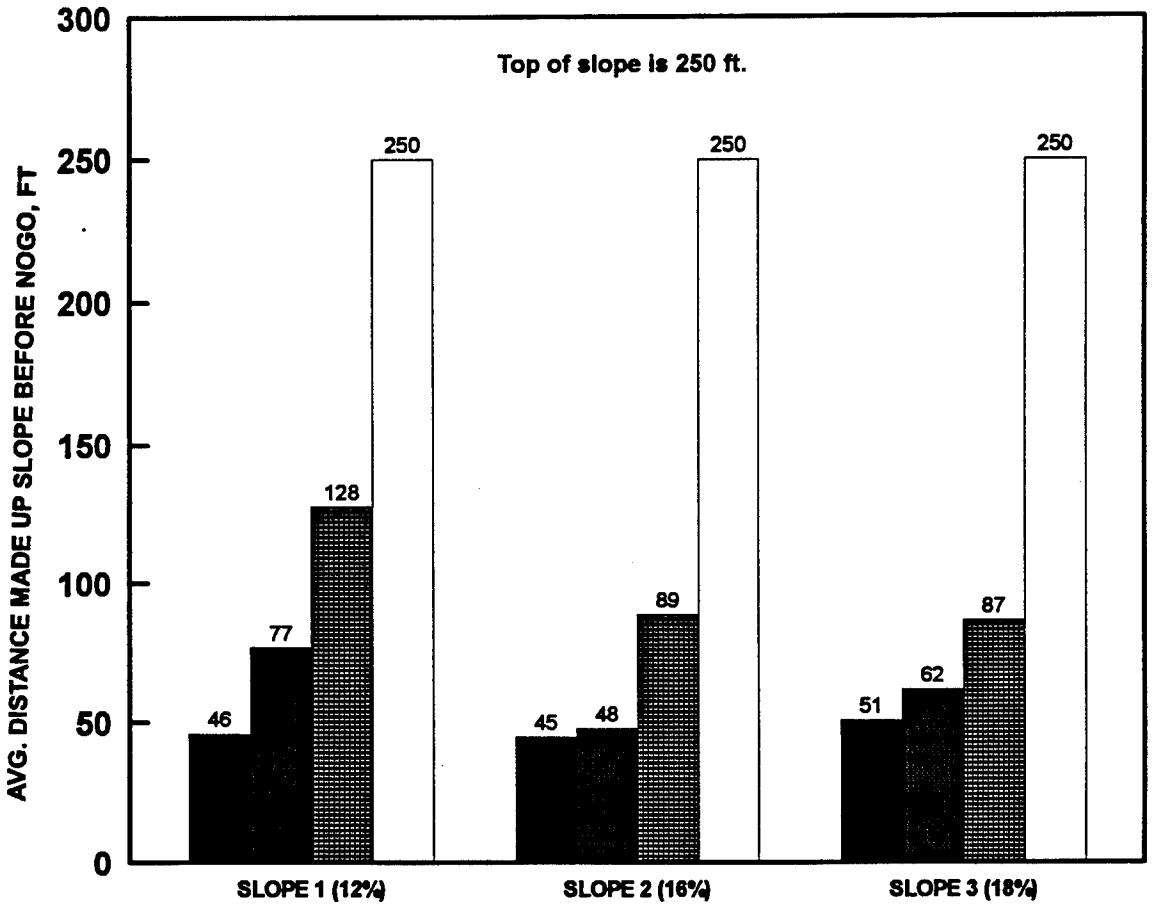
■ — 30/30 PSI ■ — 15/15 PSI

■ — 20/20 PSI □ — 10/10 PSI

* Average includes at least one GO

SLOPE TEST RESULTS
WITH THE
M1009
CONFIGURATION 17

PLATE 64



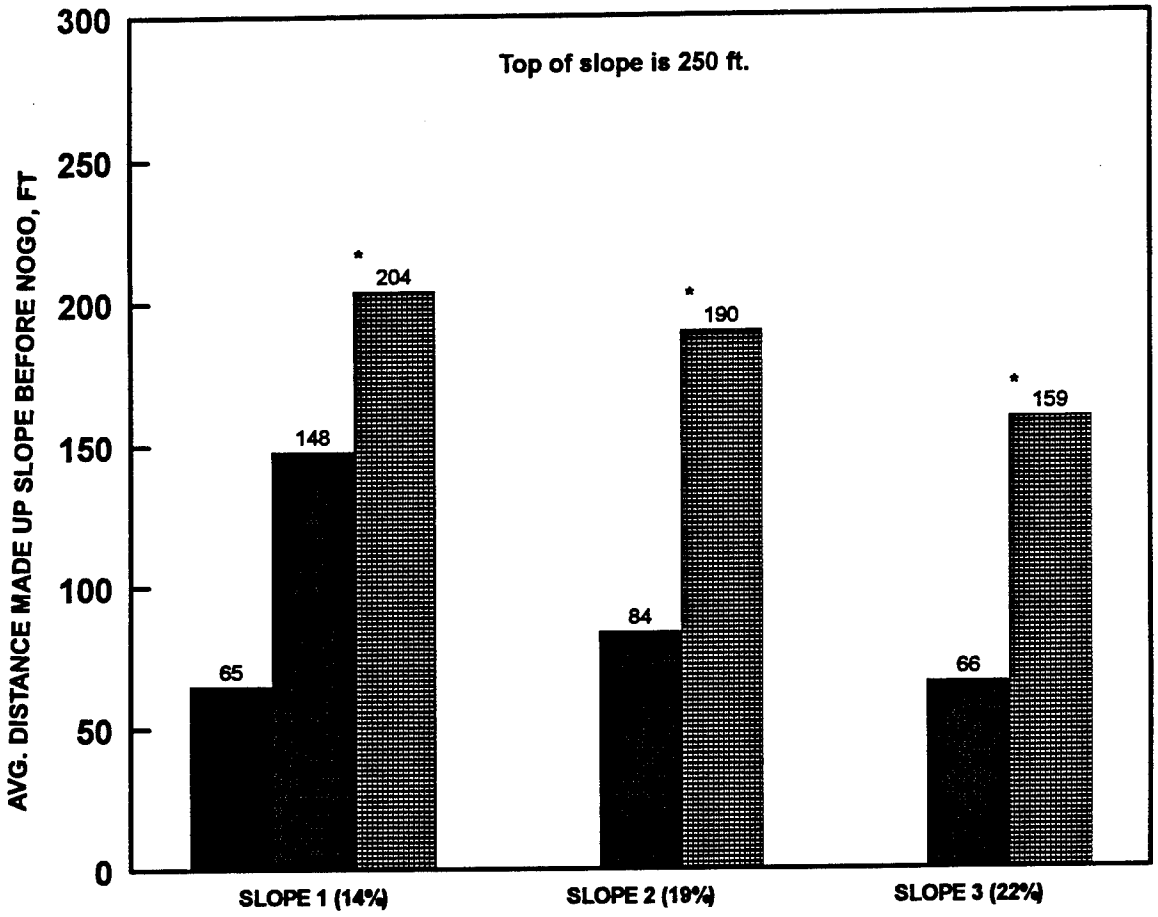
LEGEND

■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI □ — 15/15 PSI

SLOPE TEST RESULTS WITH THE M1009 STORMER CONFIGURATION 35

PLATE 65



LEGEND

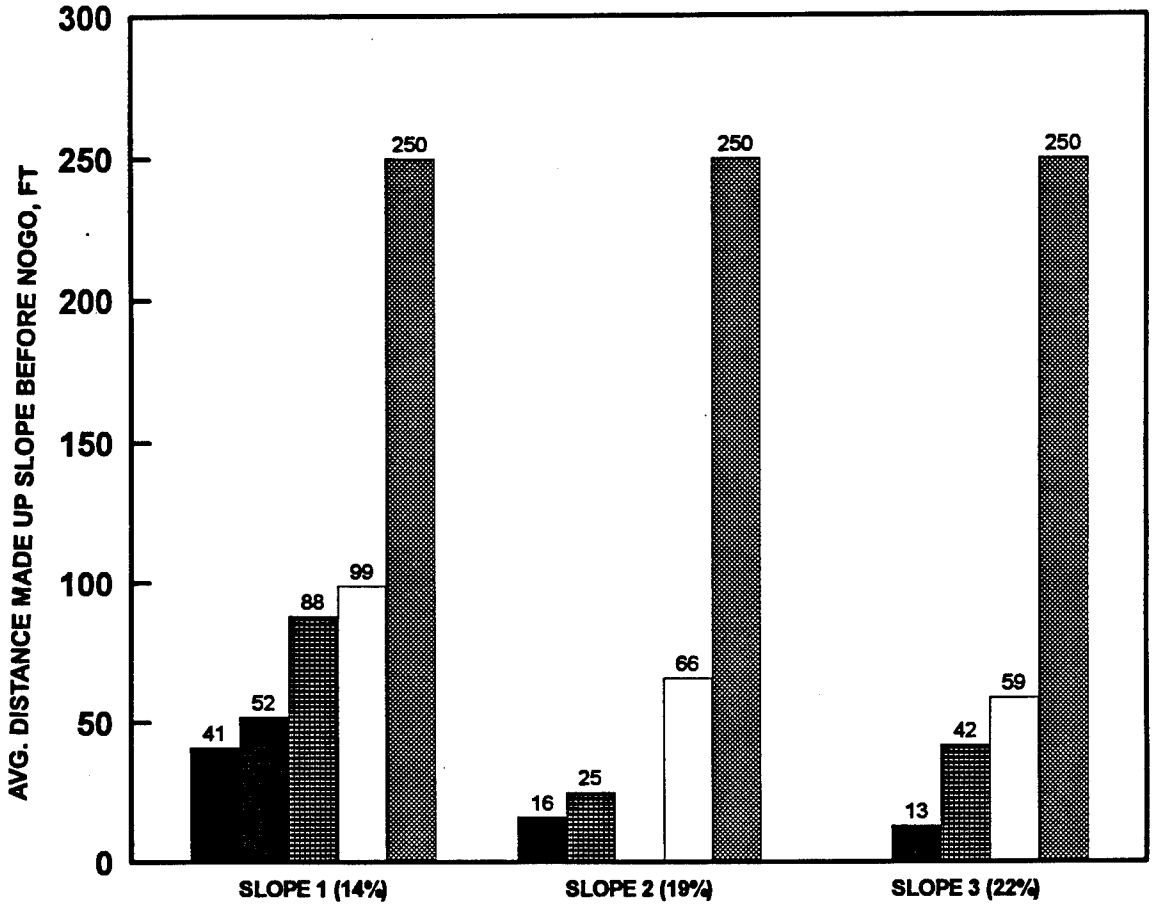
■ — 35/35 PSI ■ — 20/20 PSI

■ — 25/25 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. RIMS CONFIGURATION 2

PLATE 66



LEGEND

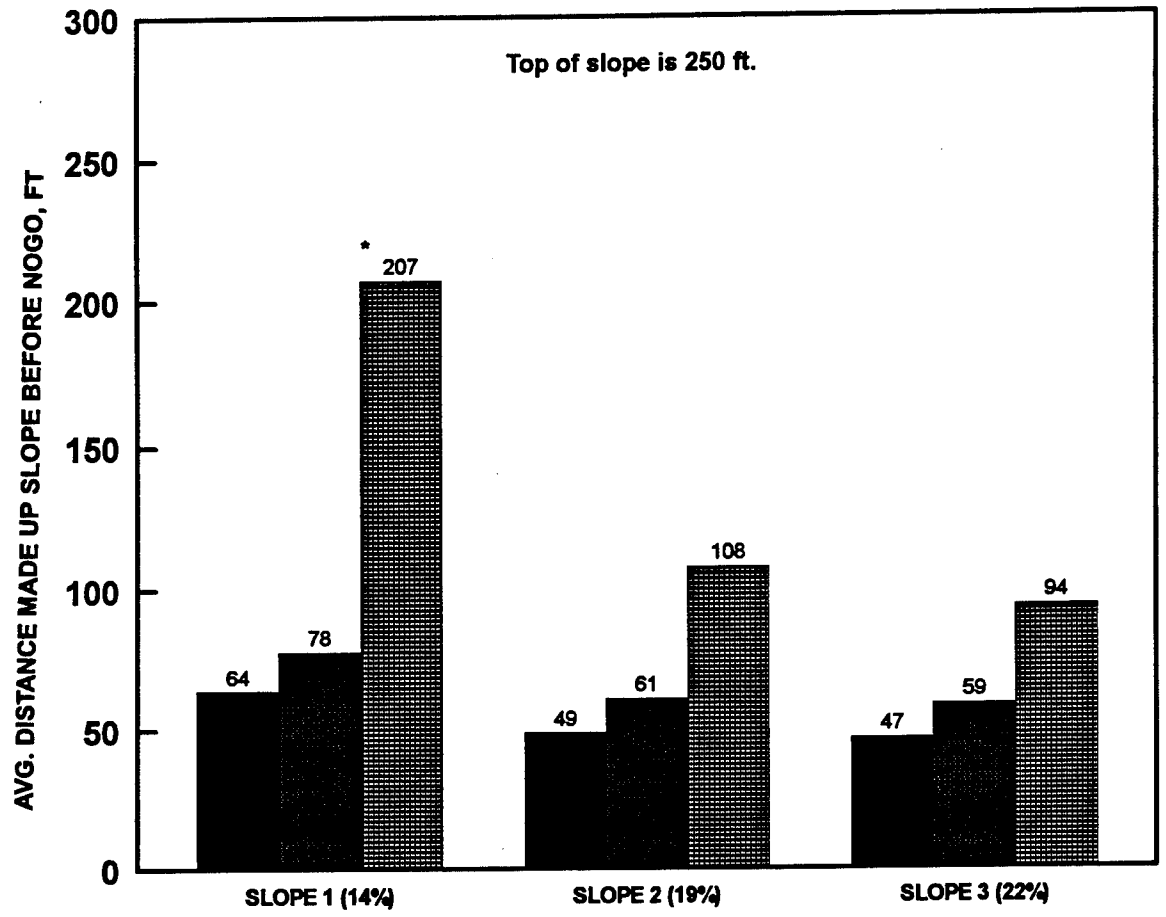
■ — 35/50 PSI ■ — 20/20 PSI

■ — 35/35 PSI □ — 20/15 PSI

▩ — 20/10 PSI

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. RIMS (DUALS IN REAR) CONFIGURATION 3

PLATE 67



LEGEND

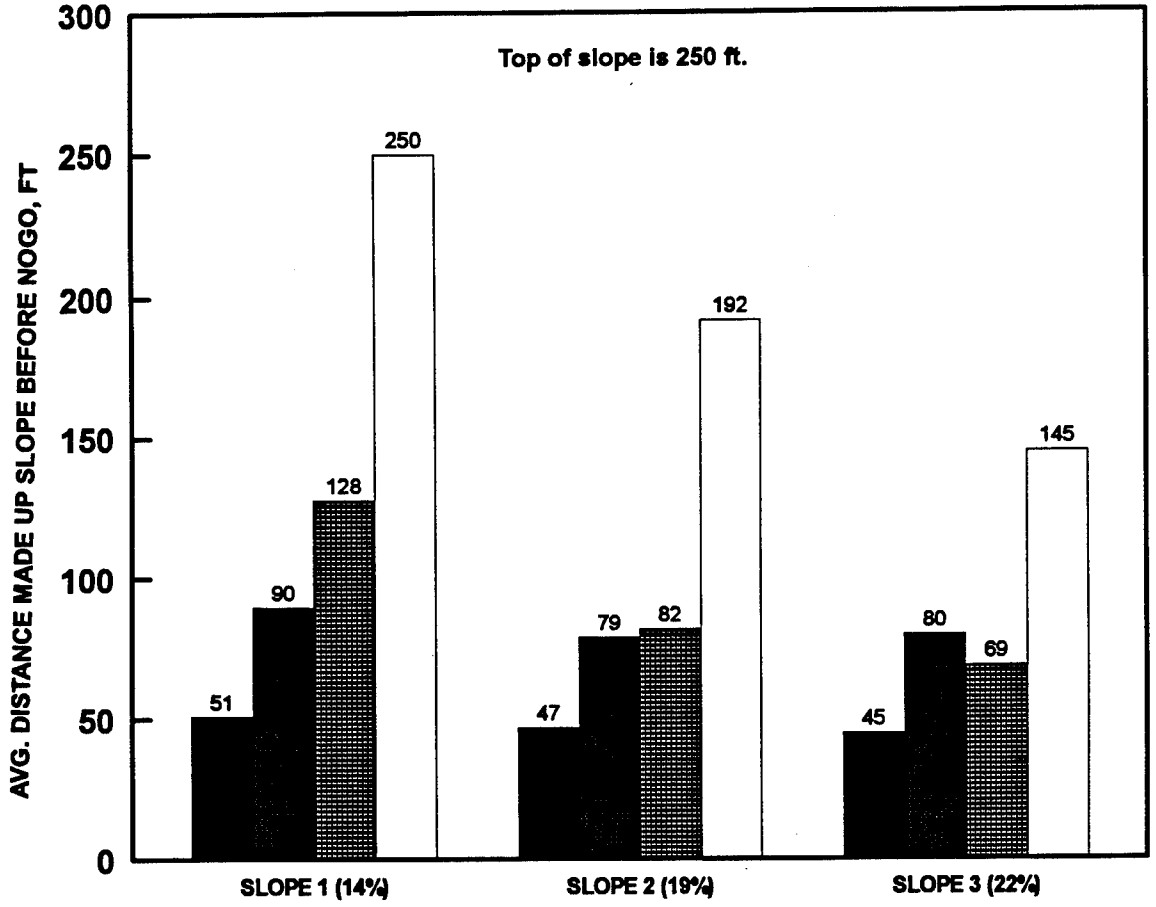
■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. SPLIT RIMS CONFIGURATION 6

PLATE 68



LEGEND

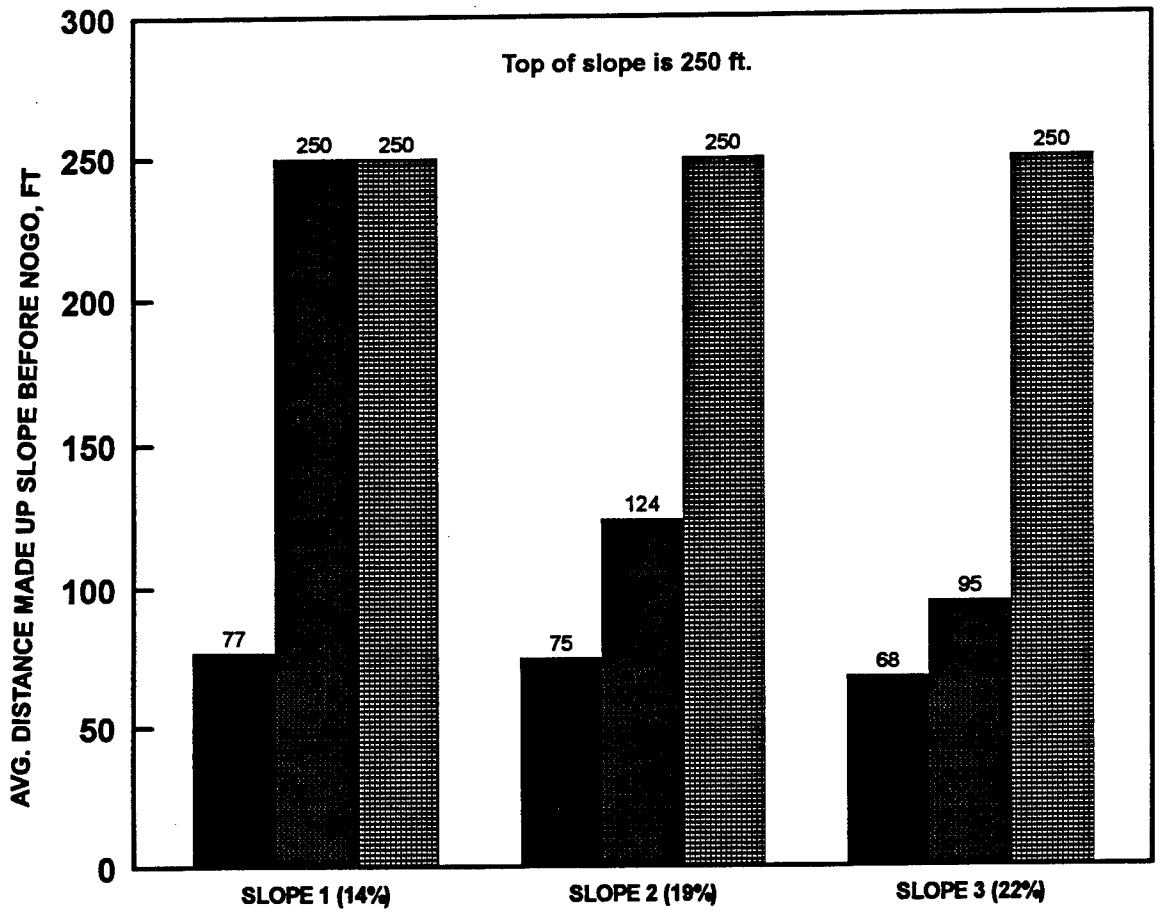
■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI □ — 15/15 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. SPLIT RIMS CONFIGURATION 10

PLATE 69



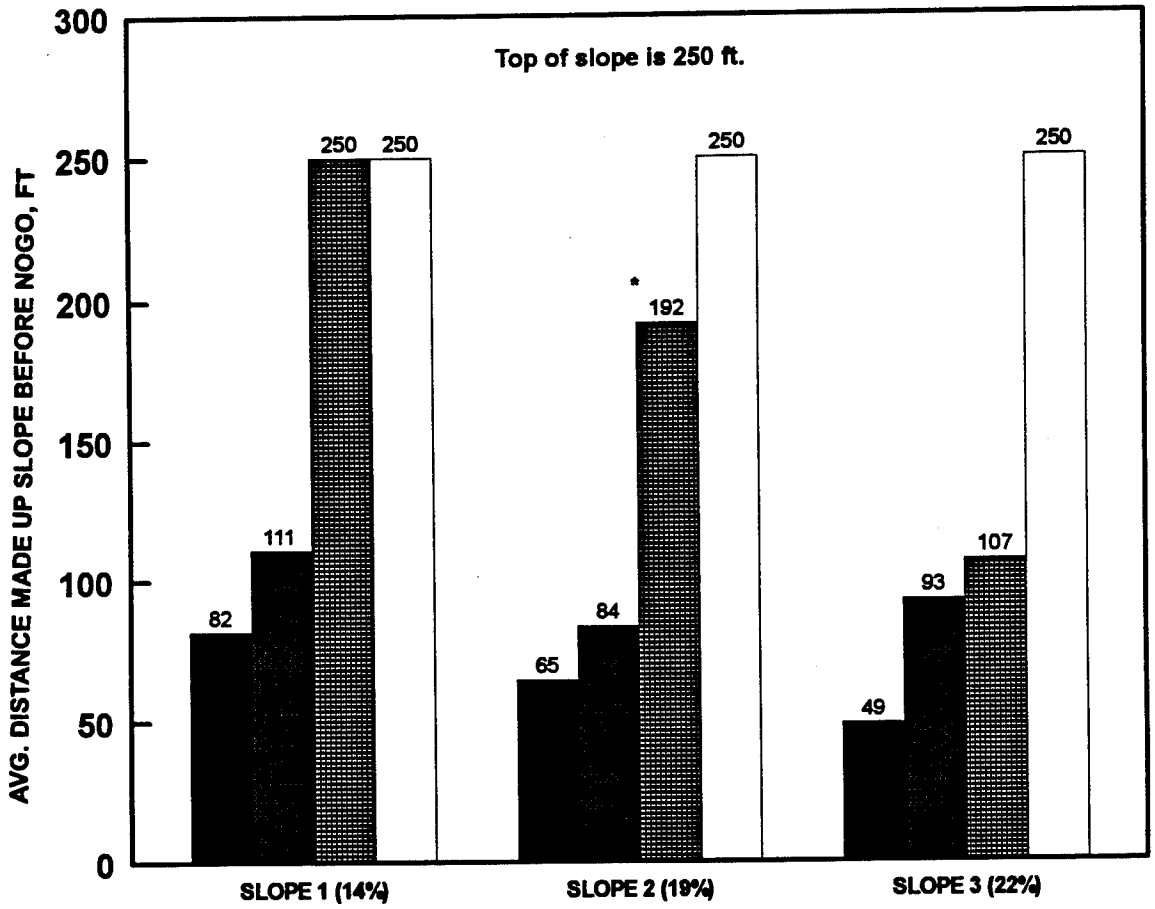
LEGEND

■ — 35/35 PSI ■ — 20/20 PSI

■ — 25/25 PSI

SLOPE TEST RESULTS
WITH THE
M1028 WITH 16 IN. RIMS
CONFIGURATION 12

PLATE 70



LEGEND

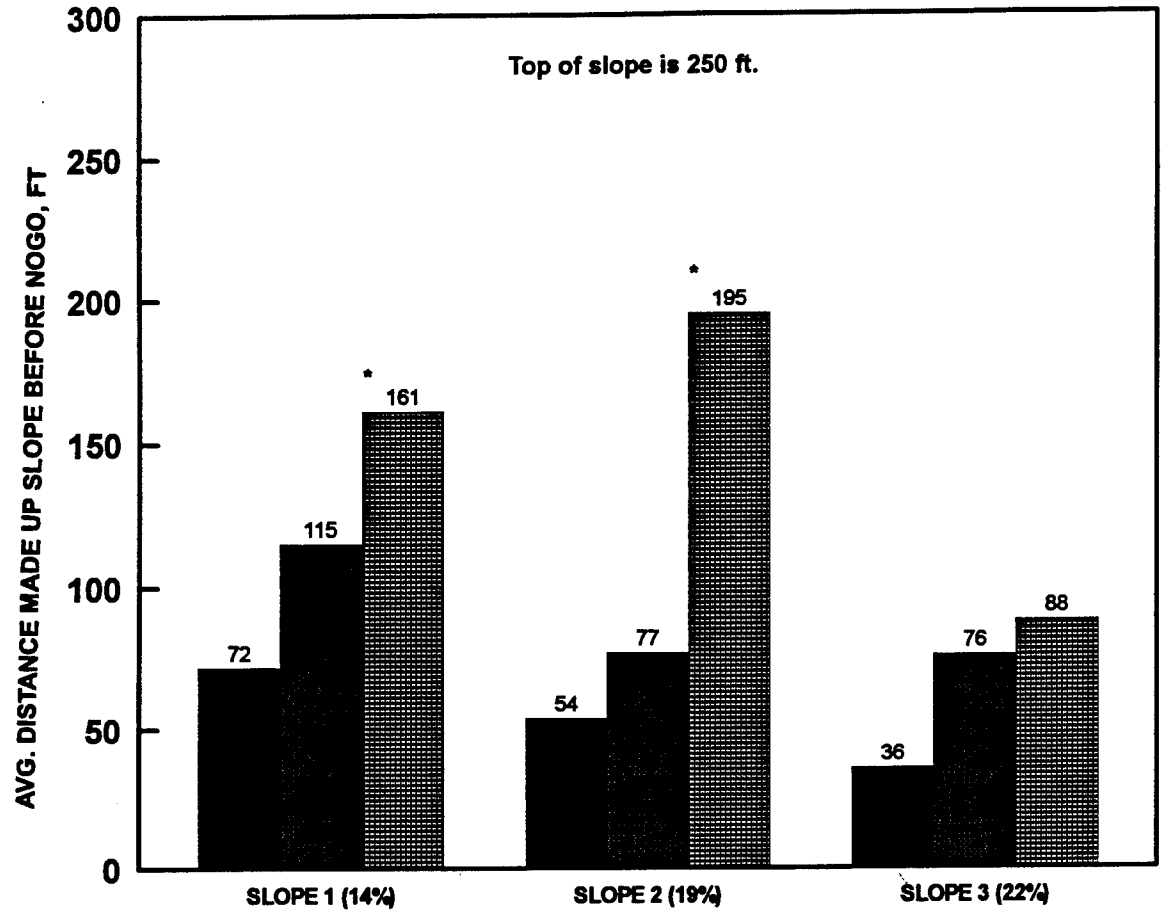
■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI □ — 15/15 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. SPLIT RIMS CONFIGURATION 14

PLATE 71



LEGEND

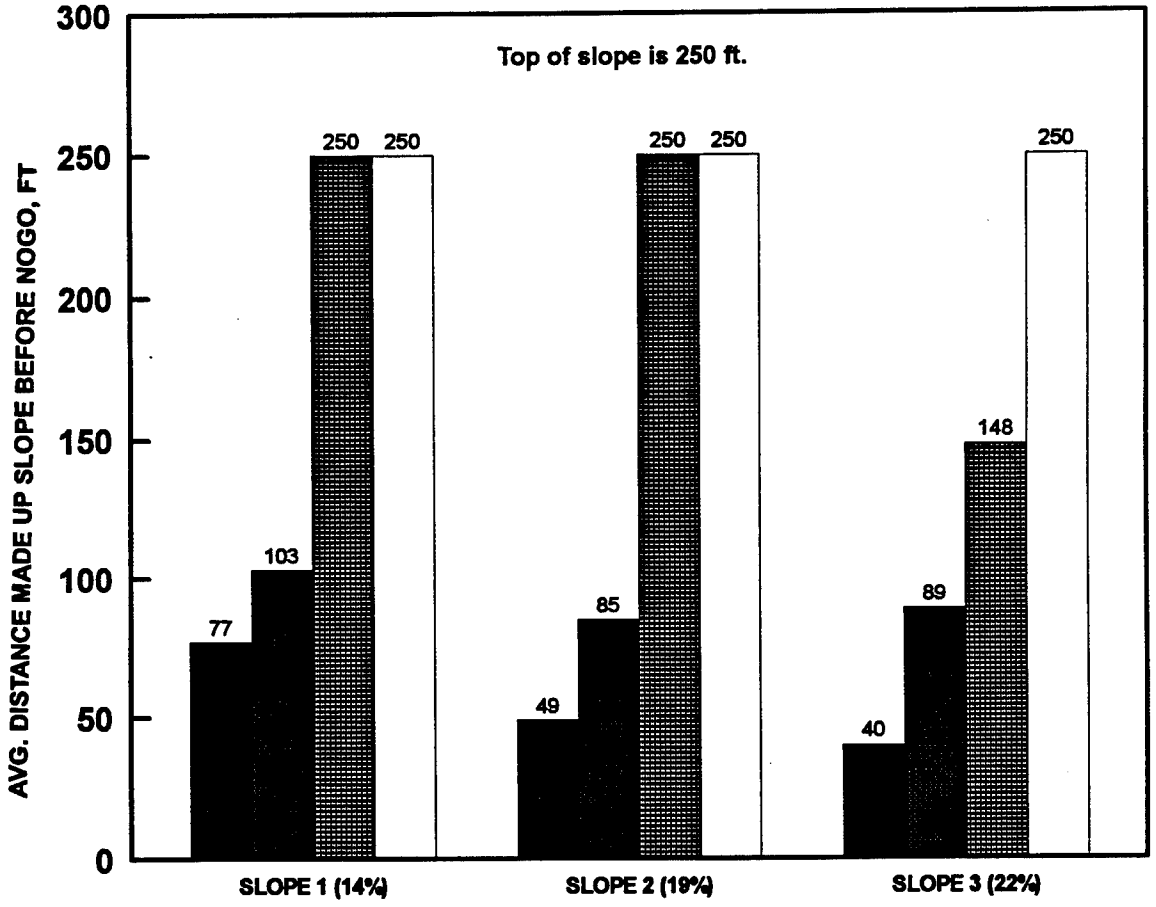
■ — 35/35 PSI ■ — 25/25 PSI

■ — 30/30 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. RIMS CONFIGURATION 16

PLATE 72



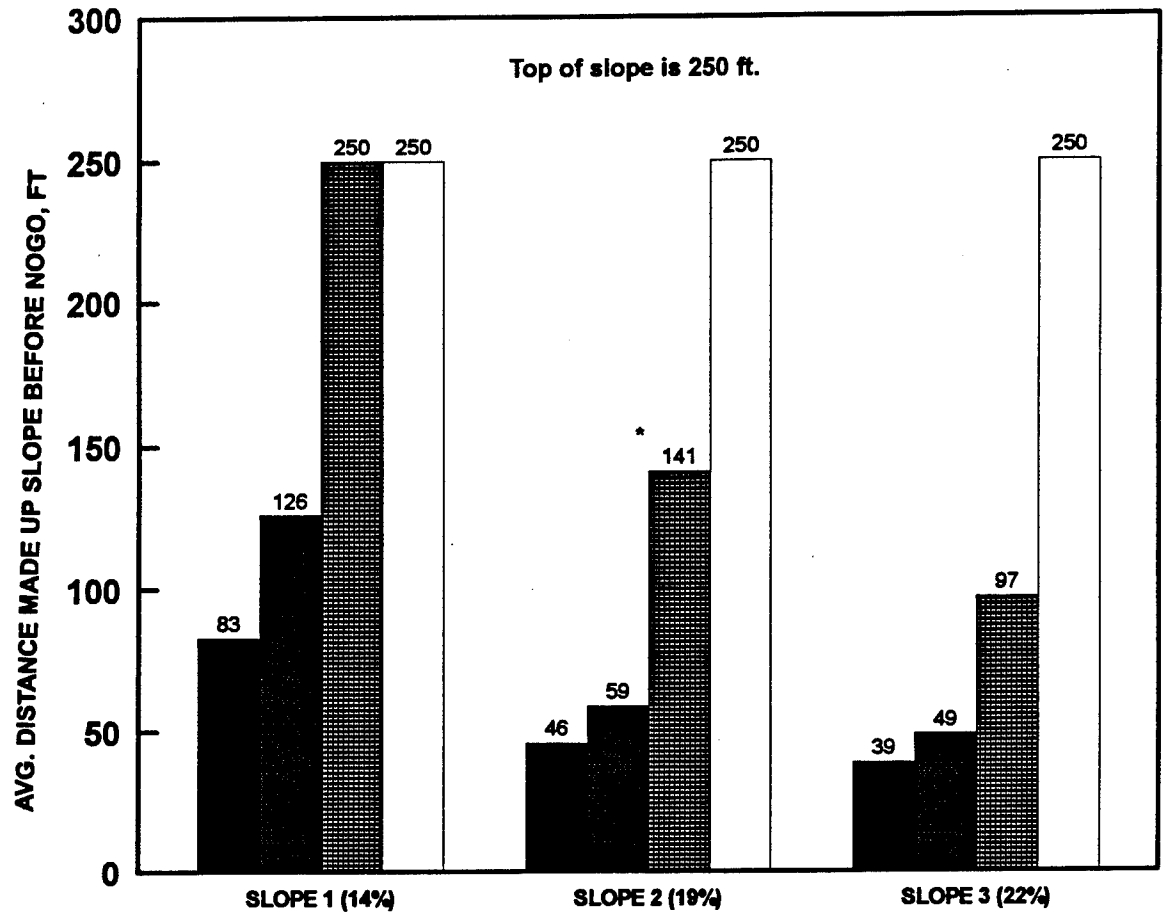
LEGEND

■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI □ — 15/15 PSI

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. SPLIT RIMS CONFIGURATION 18

PLATE 73



LEGEND

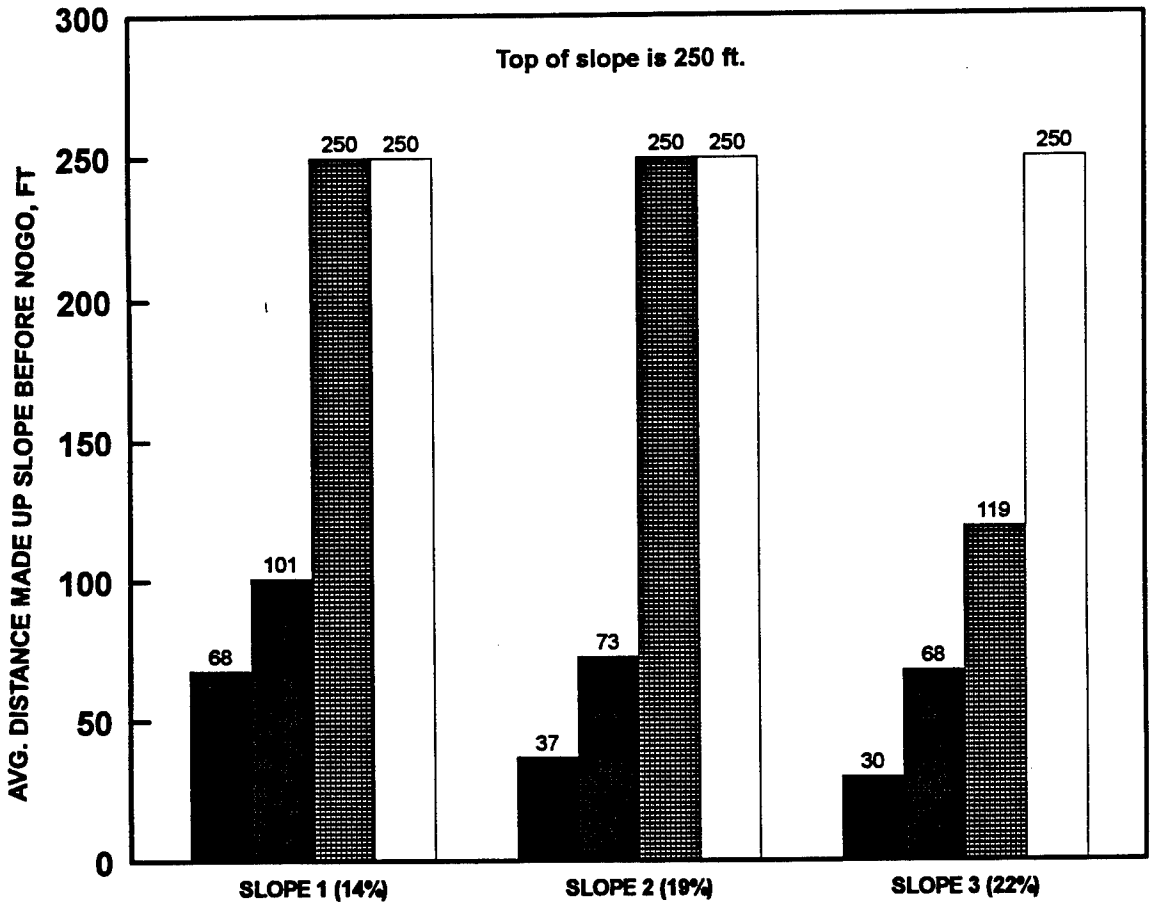
■ — 35/35 PSI ■ — 25/25 PSI

■ — 30/30 PSI □ — 20/20 PSI

* Average includes at least one GO

SLOPE TEST RESULTS
WITH THE
M1028 WITH 16 IN. RIMS
CONFIGURATION 19

PLATE 74



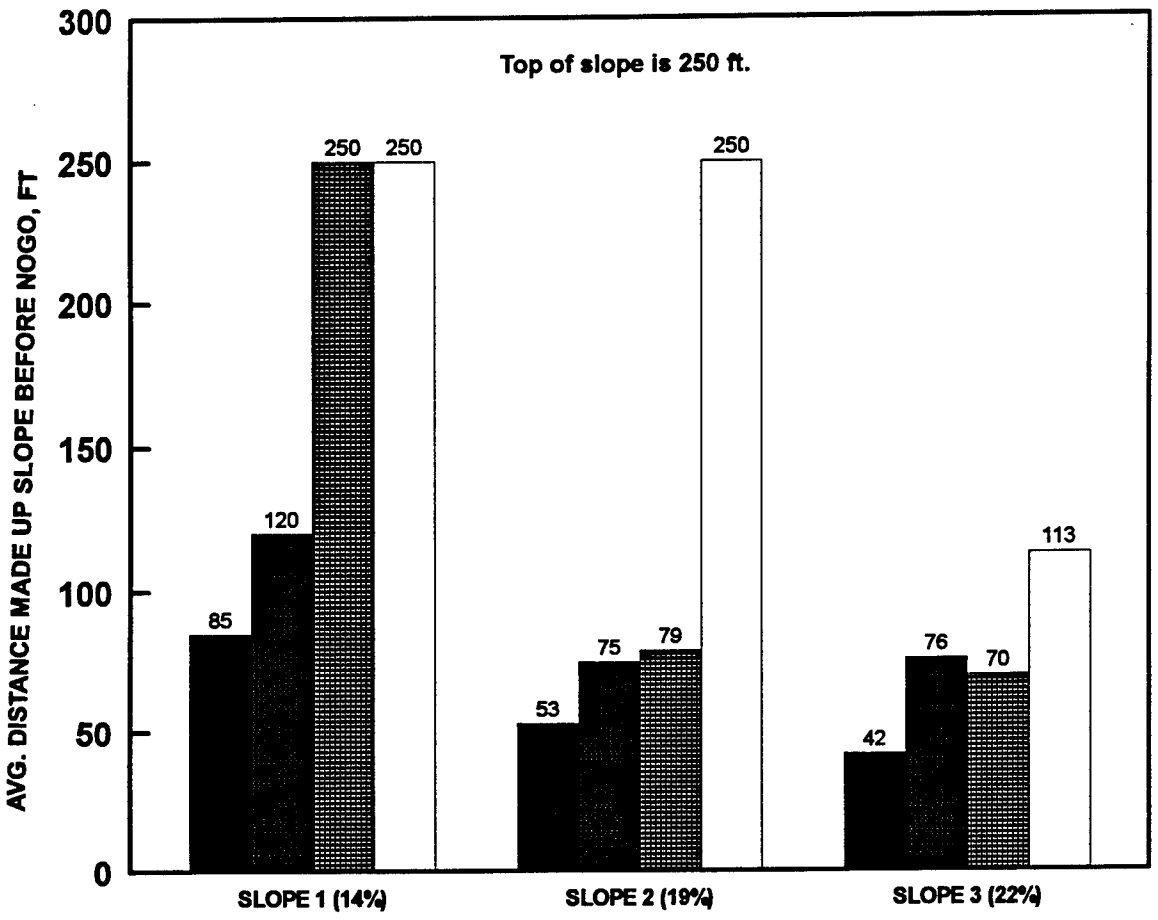
LEGEND

■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI □ — 15/15 PSI

SLOPE TEST RESULTS WITH THE M1028 WITH 16 IN. SPLIT RIMS CONFIGURATION 20

PLATE 75

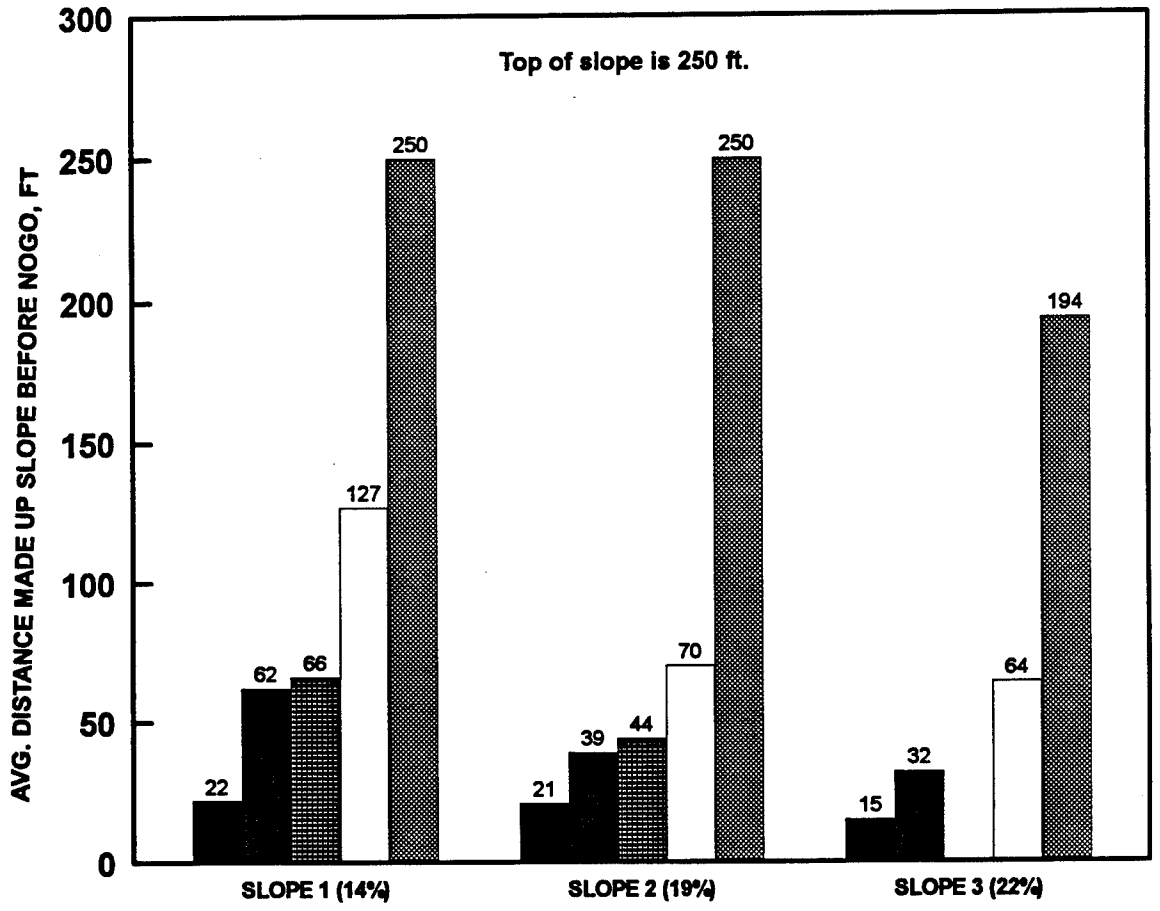


LEGEND

■ — 35/35 PSI ■ — 25/25 PSI

■ — 30/30 PSI □ — 20/20 PSI

SLOPE TEST RESULTS
WITH THE
M1028 WITH 16 IN. RIMS
CONFIGURATION 21



LEGEND

■ — 70/70 PSI ■ — 25/25 PSI

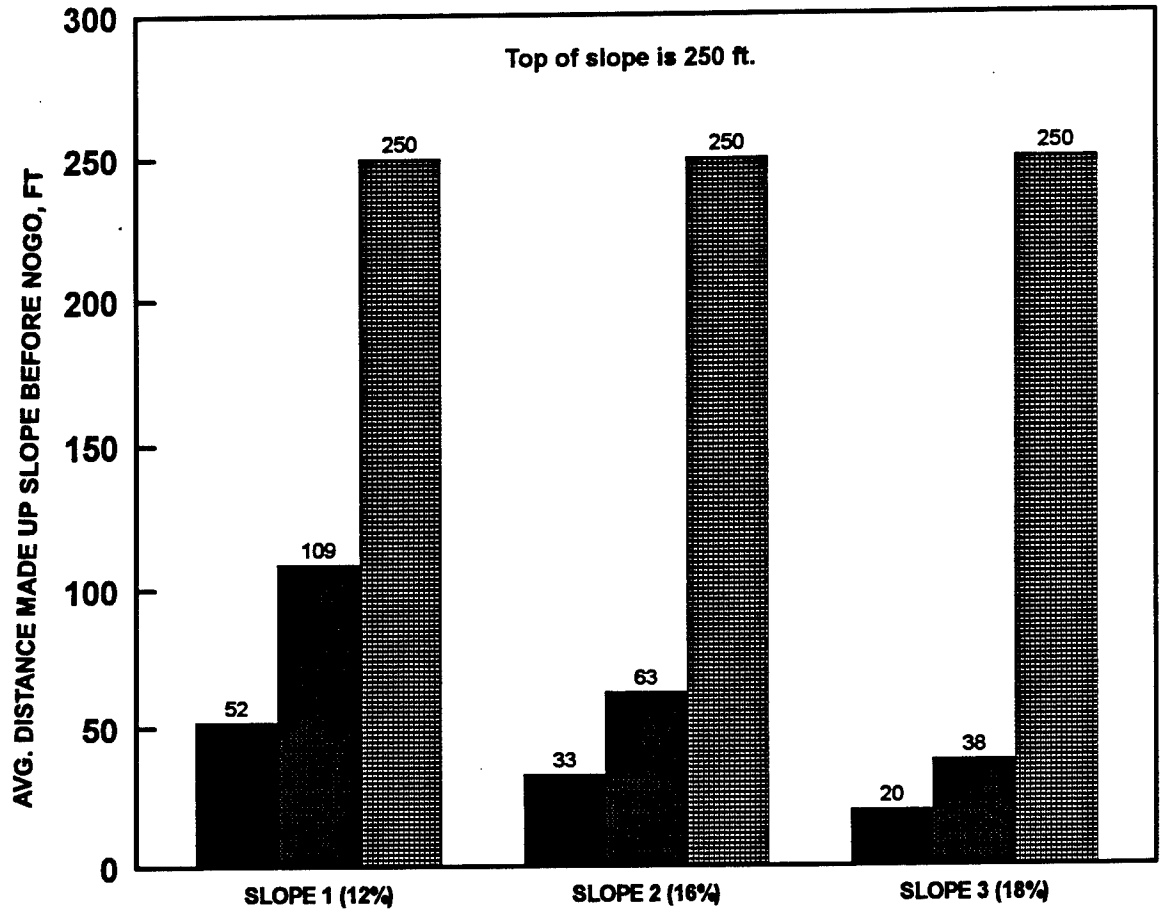
■ — 35/35 PSI □ — 25/20 PSI

▩ — 15/15 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M54A2 5-TON CONFIGURATION 22

PLATE 77



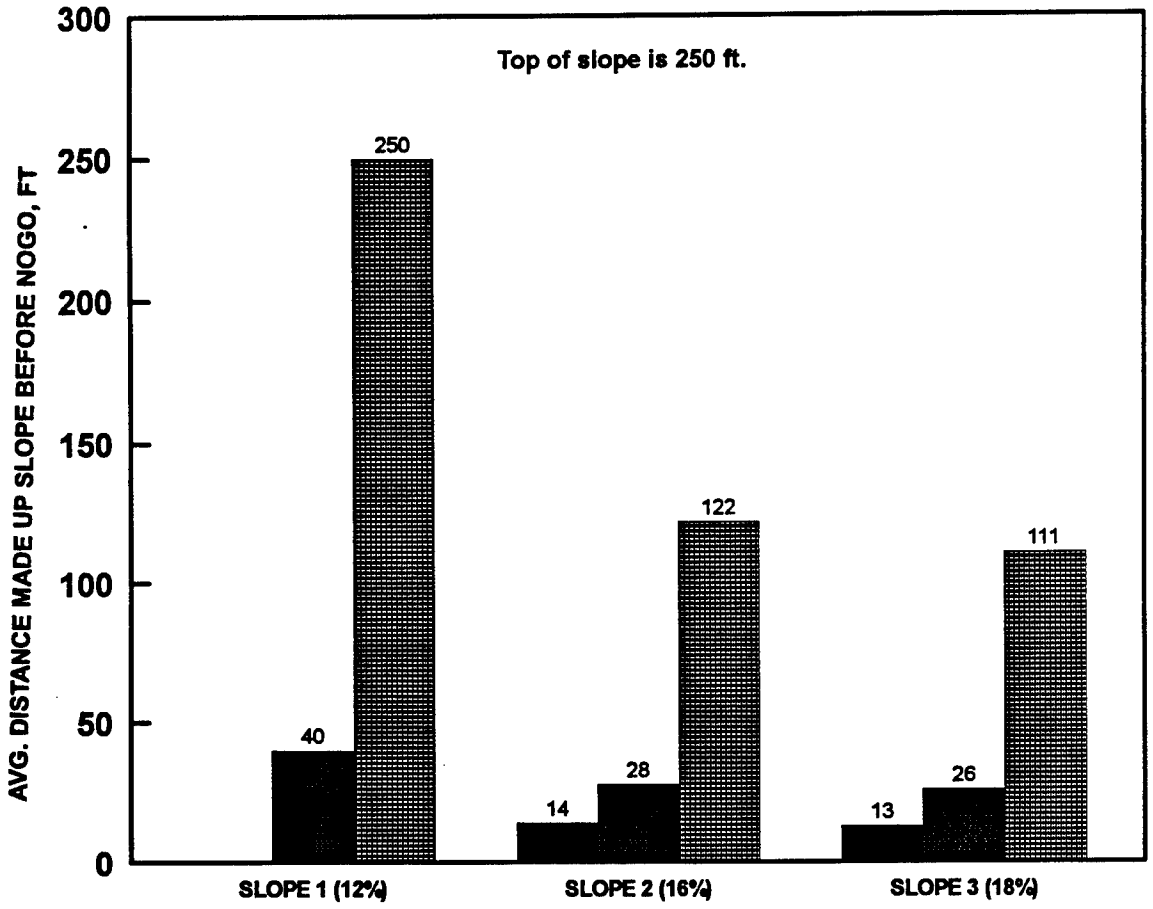
LEGEND

■ — 70/70 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS WITH THE M54A2 5-TON CONFIGURATION 25

PLATE 78



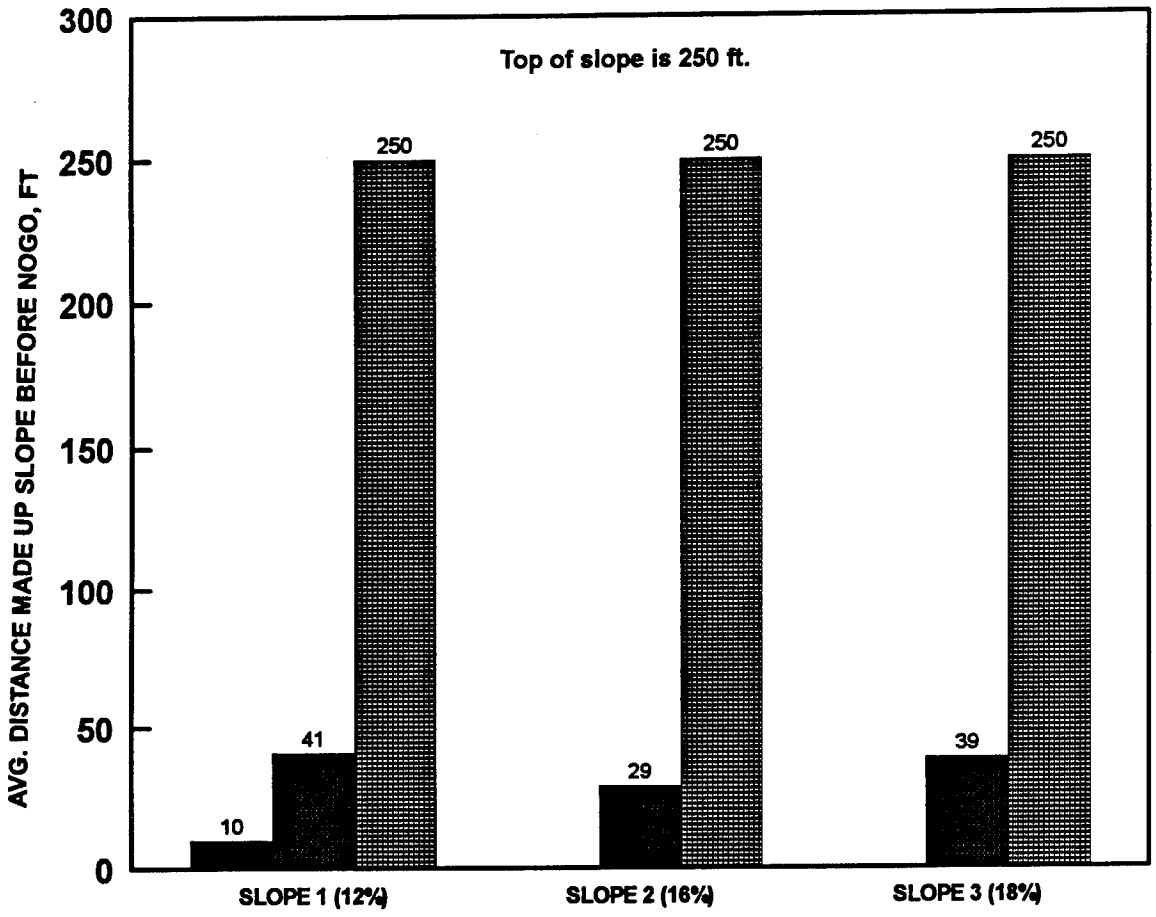
LEGEND

■ — 70/70 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS WITH THE M54A2 5-TON CONFIGURATION 27

PLATE 79



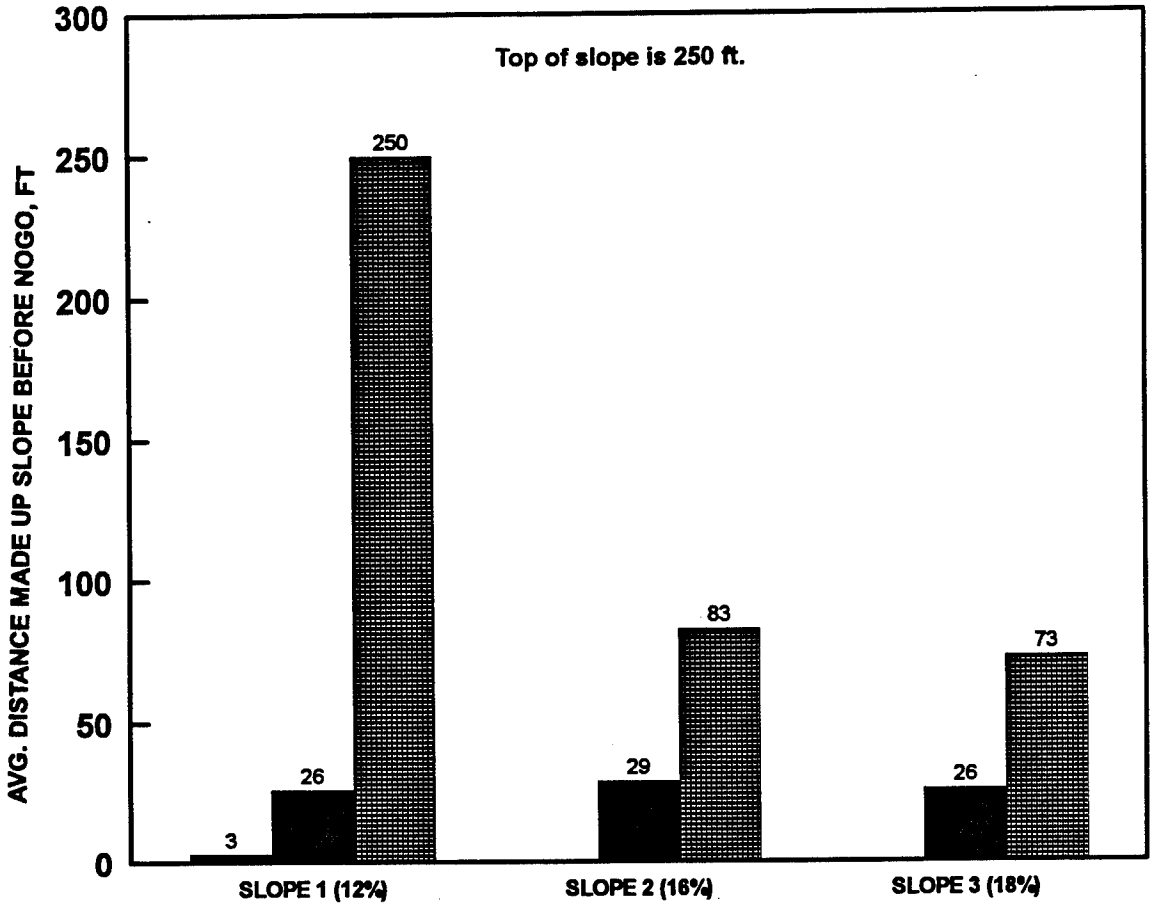
LEGEND

■ — 70/70 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS WITH THE M54A2 5-TON CONFIGURATION 31

PLATE 80



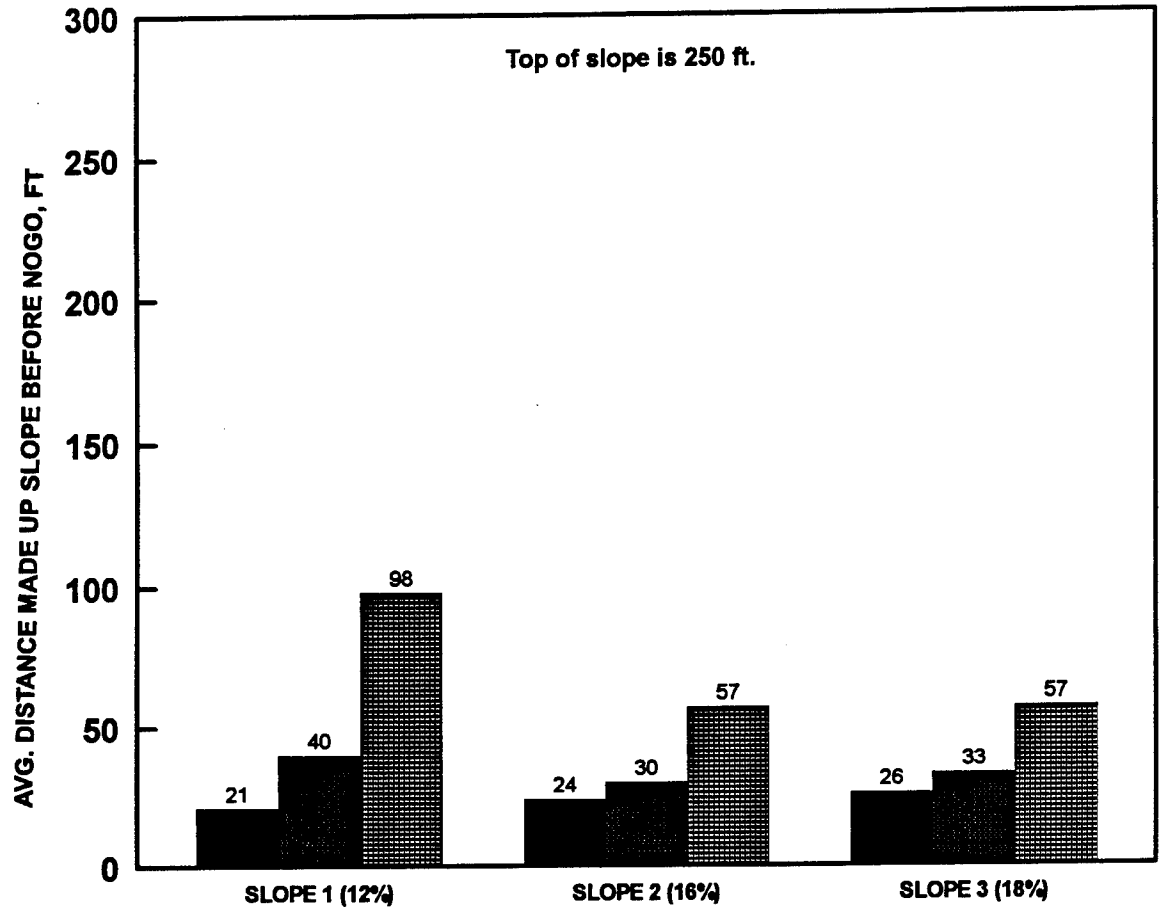
LEGEND

■ — 70/70 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS
WITH THE
M54A2 5-TON
CONFIGURATION 33

PLATE 81



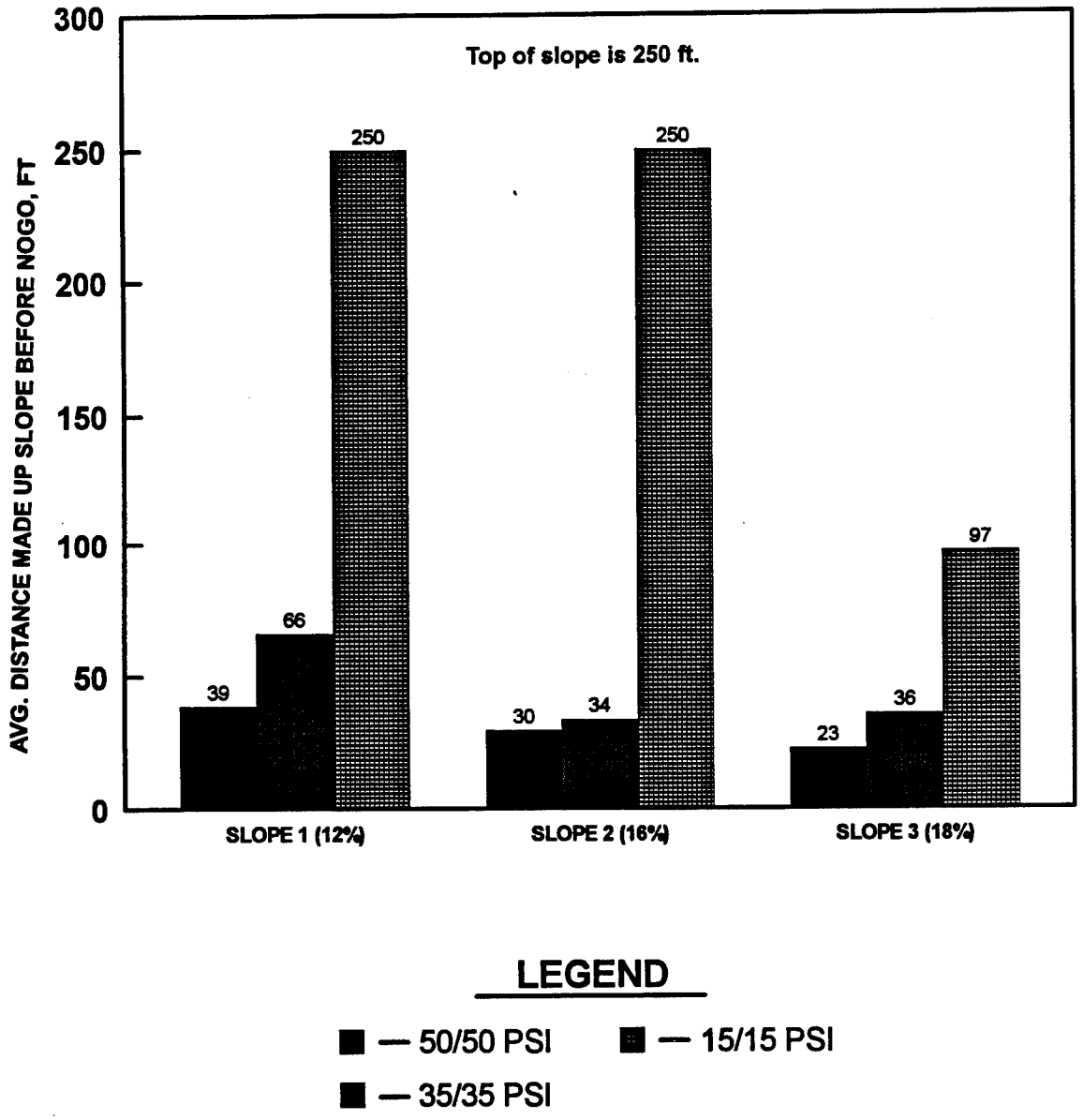
LEGEND

■ — 50/50 PSI ■ — 15/15 PSI

■ — 35/35 PSI

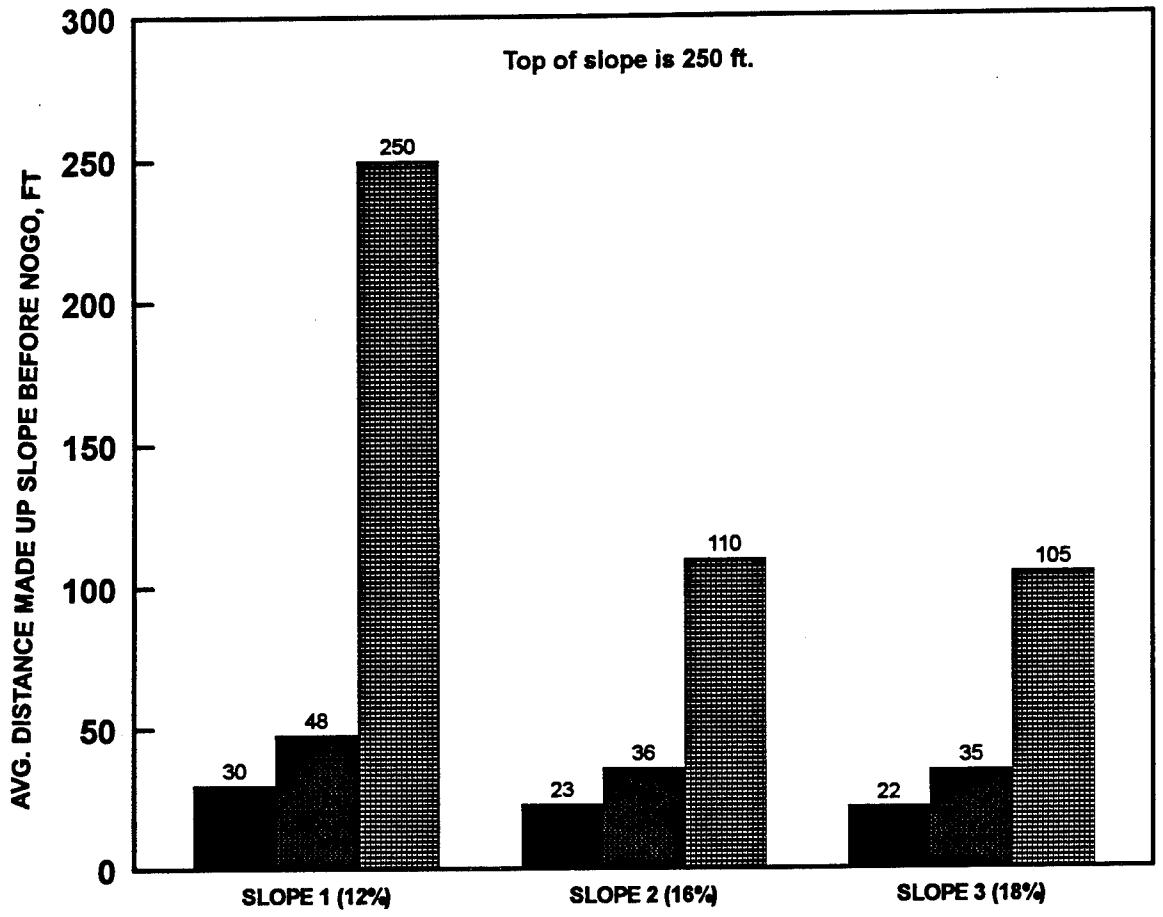
SLOPE TEST RESULTS
WITH THE
M35A2 2-1/2 TON
CONFIGURATION 24

PLATE 82



SLOPE TEST RESULTS WITH THE M35A2 2-1/2 TON CONFIGURATION 26

PLATE 83



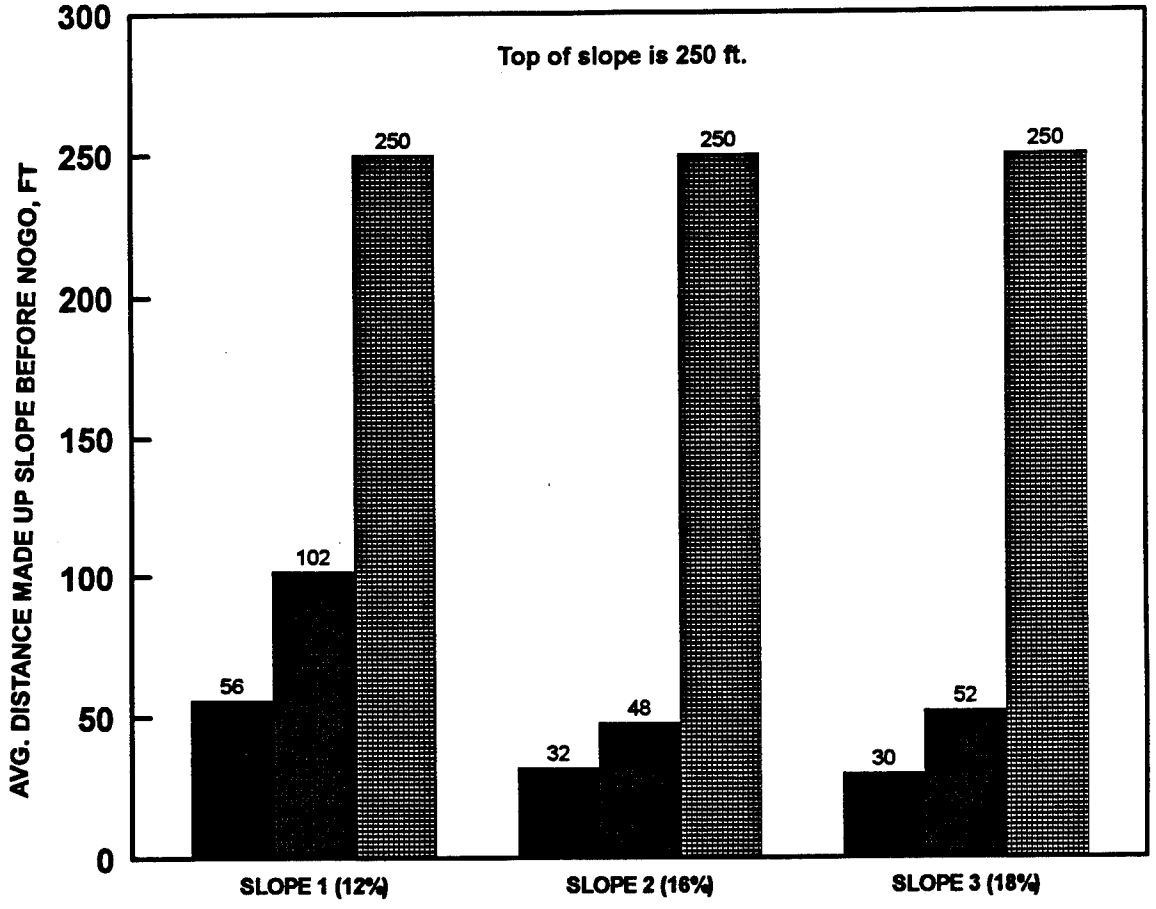
LEGEND

■ — 50/50 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS
WITH THE
M35A2 2-1/2 TON
CONFIGURATION 29

PLATE 84



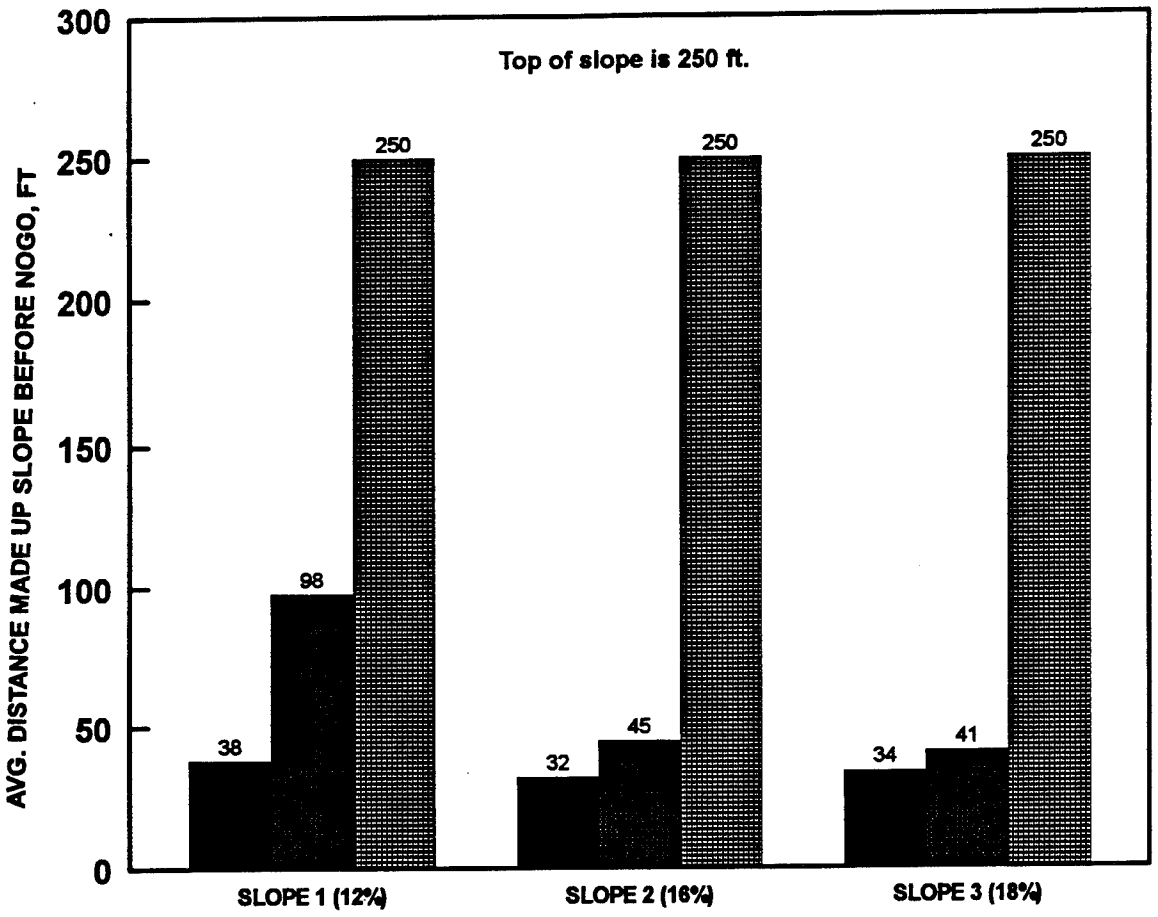
LEGEND

■ — 50/50 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS
WITH THE
M35A2 2-1/2 TON
WITH 11.00R20 SINGLES
CONFIGURATION 28

PLATE 85



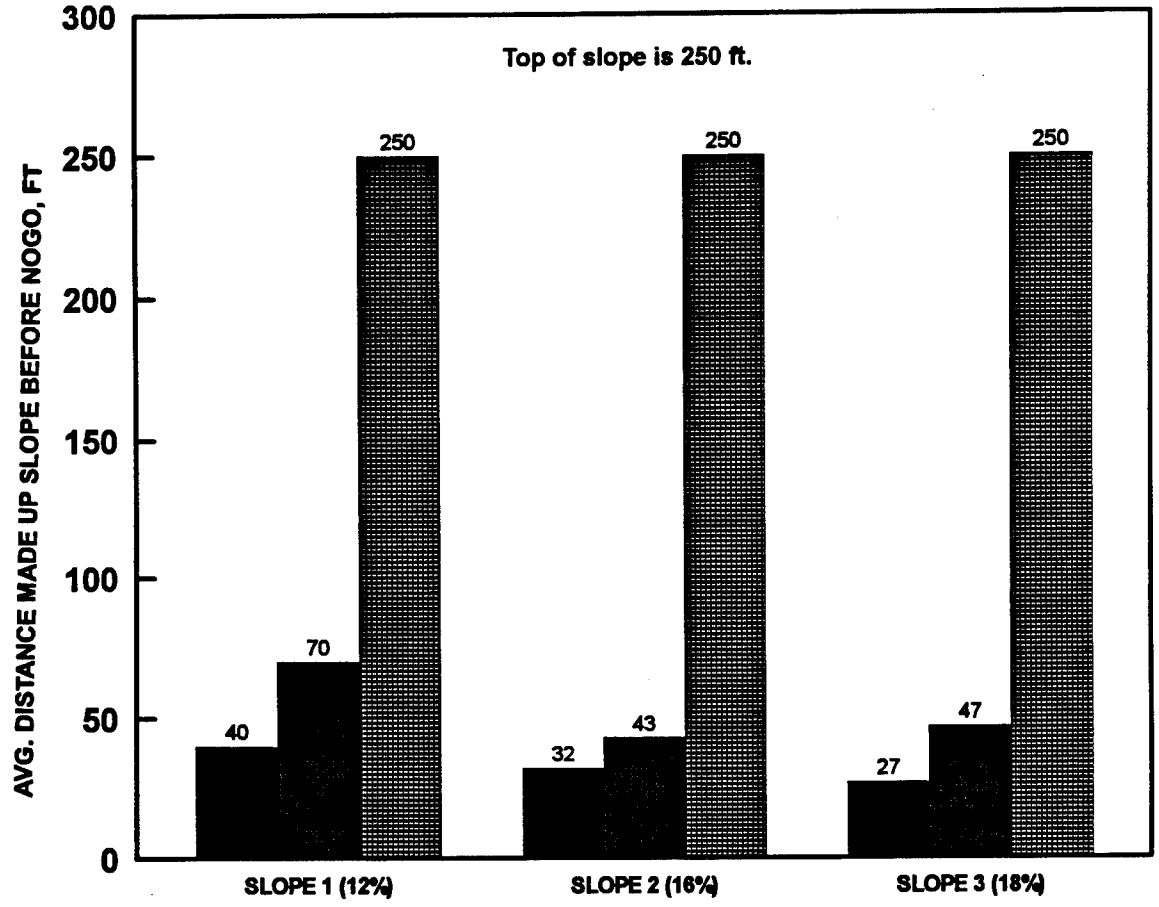
LEGEND

■ — 50/50 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS
WITH THE
M35A2 2-1/2 TON
WITH 11.00R20 SINGLES
CONFIGURATION 30

PLATE 86



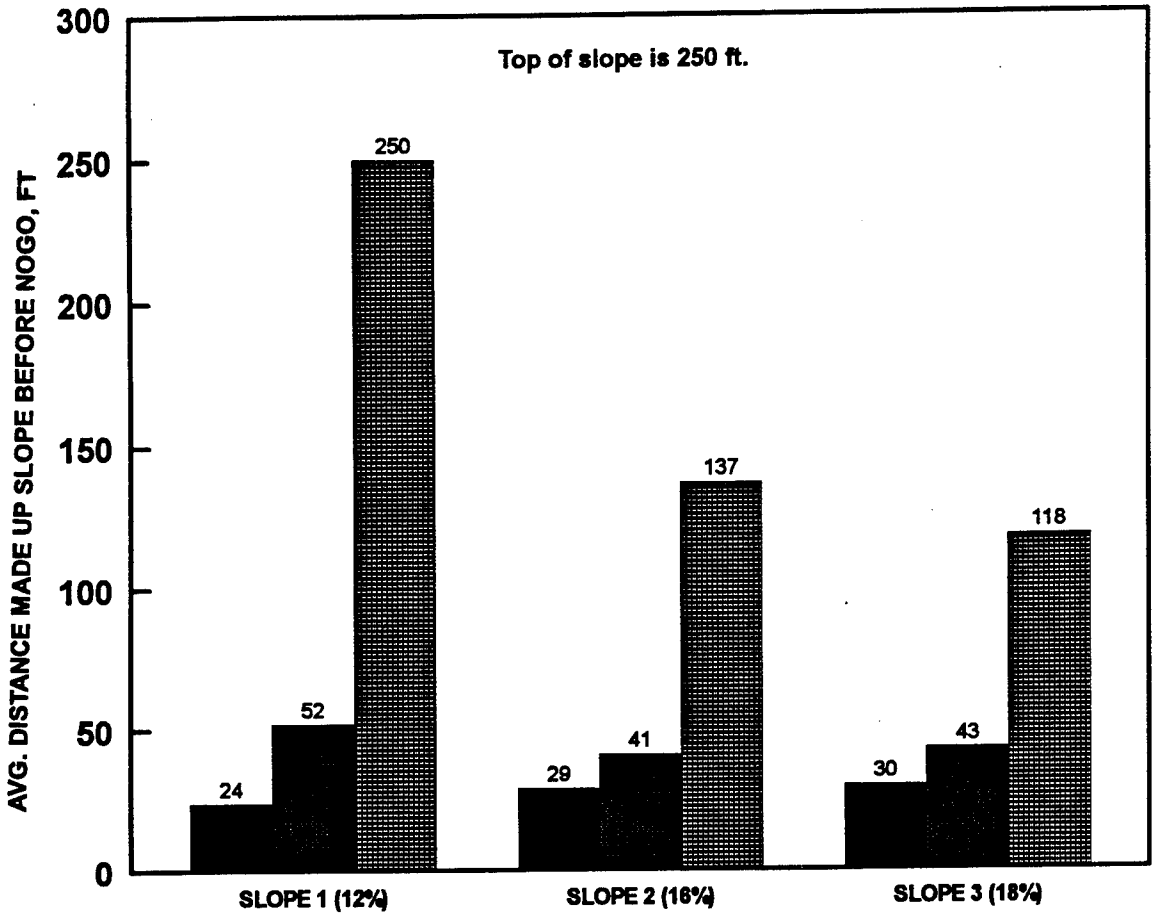
LEGEND

■ — 50/50 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS
WITH THE
M35A2 2-1/2 TON
WITH 11.00R20 SINGLES
CONFIGURATION 32

PLATE 87



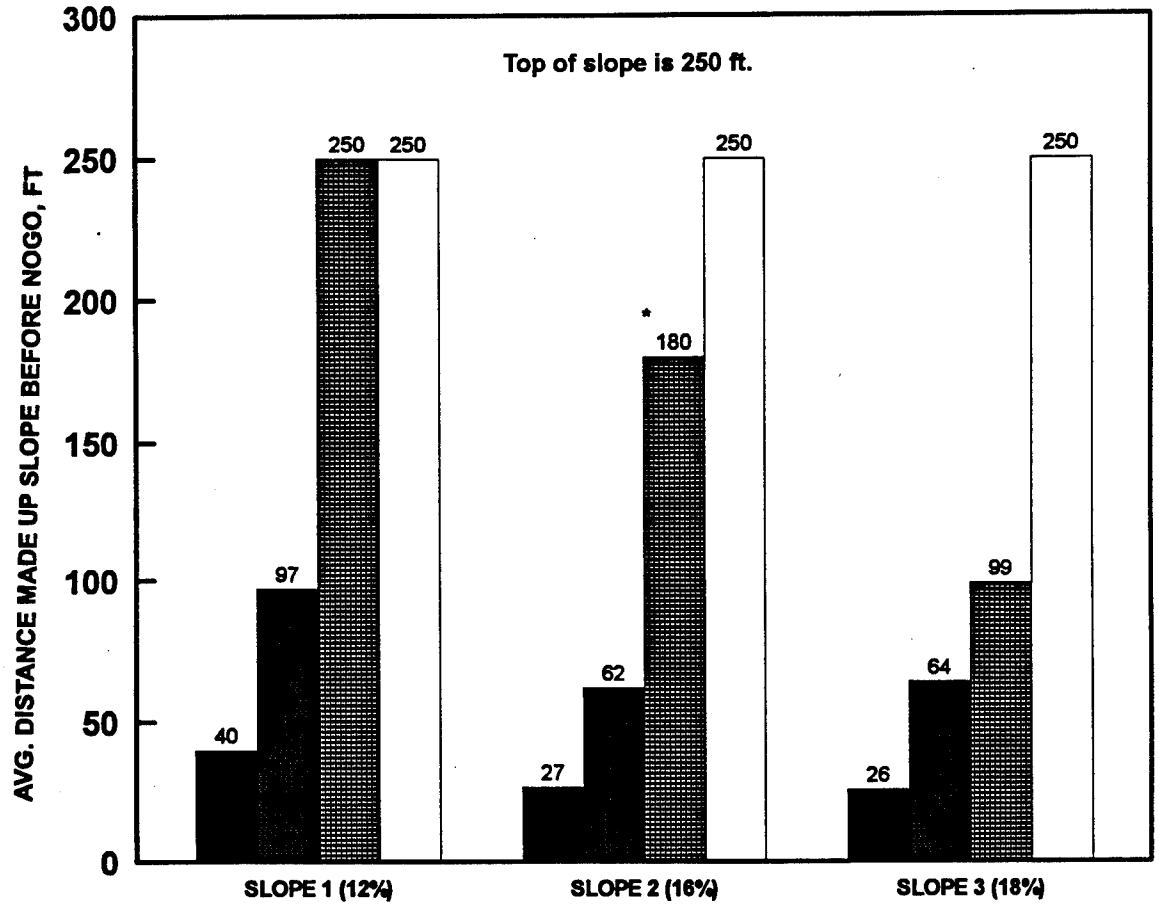
LEGEND

■ — 50/50 PSI ■ — 15/15 PSI

■ — 35/35 PSI

SLOPE TEST RESULTS
WITH THE
M35A2 2-1/2 TON
WITH 11.00R20 SINGLES
CONFIGURATION 34

PLATE 88



LEGEND

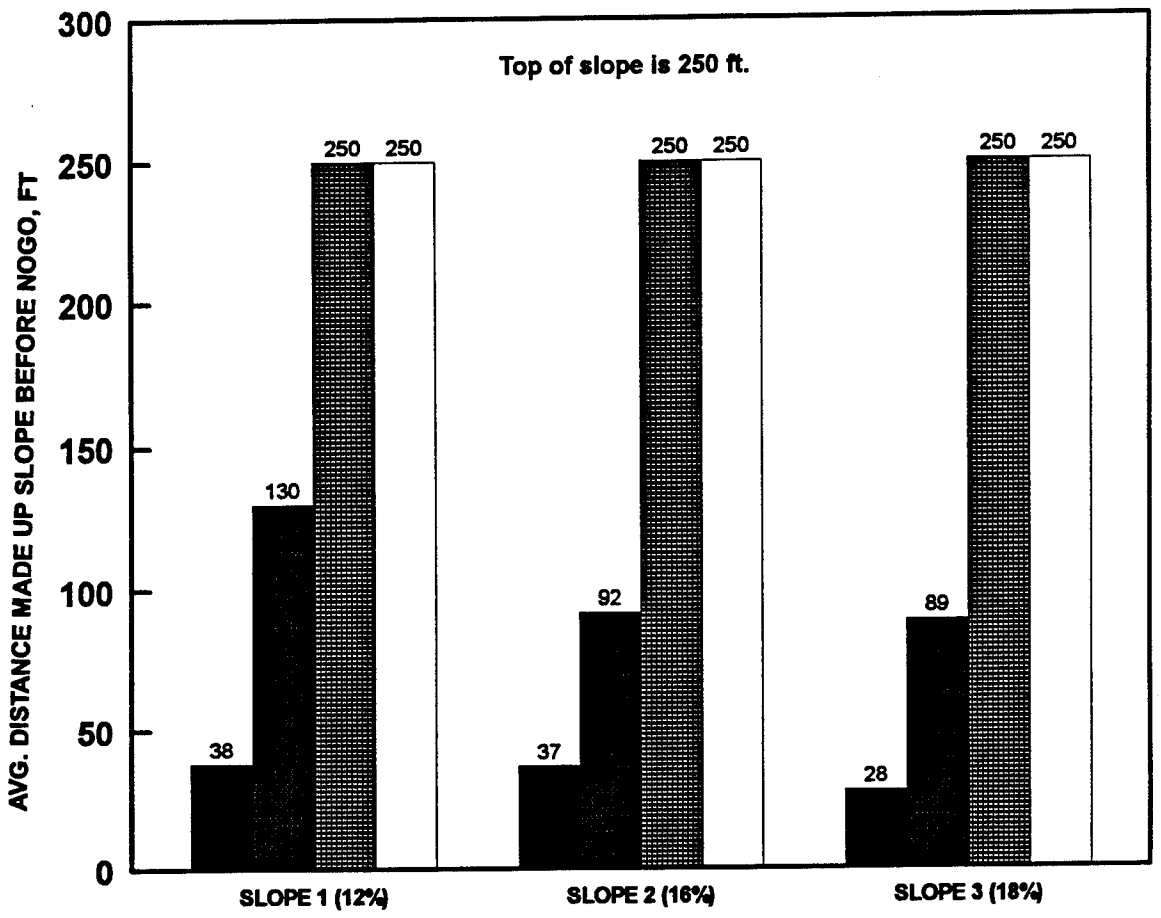
■ — 60/60 PSI ■ — 28/28 PSI

■ — 36/36 PSI □ — 15/15 PSI

* Average includes at least one GO

SLOPE TEST RESULTS
WITH THE
M813
WITH 14.OOR20 SINGLES
CONFIGURATION 23

PLATE 89



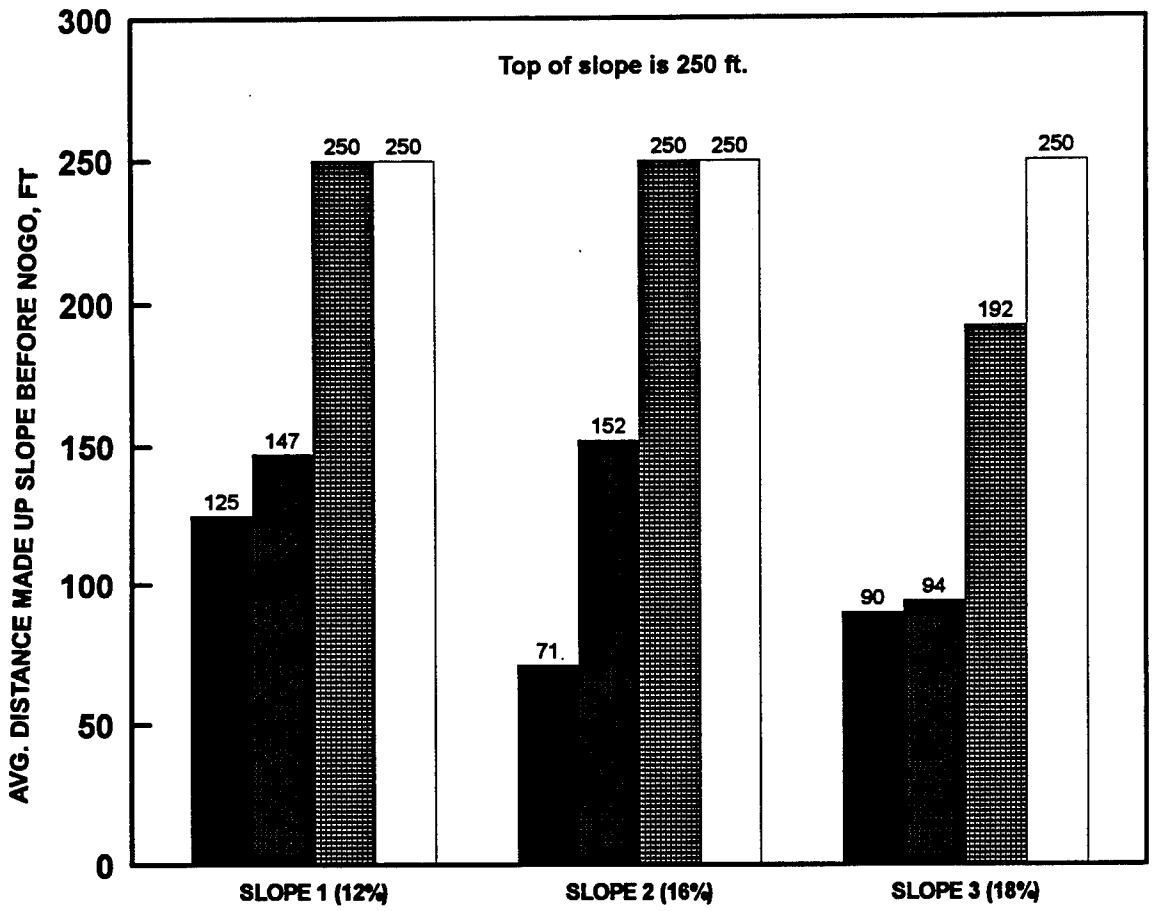
LEGEND

■ — 60/60 PSI ■ — 28/28 PSI

■ — 36/36 PSI □ — 15/15 PSI

SLOPE TEST RESULTS
WITH THE
M813
WITH 14.OOR20 SINGLES
CONFIGURATION 37

PLATE 90



LEGEND

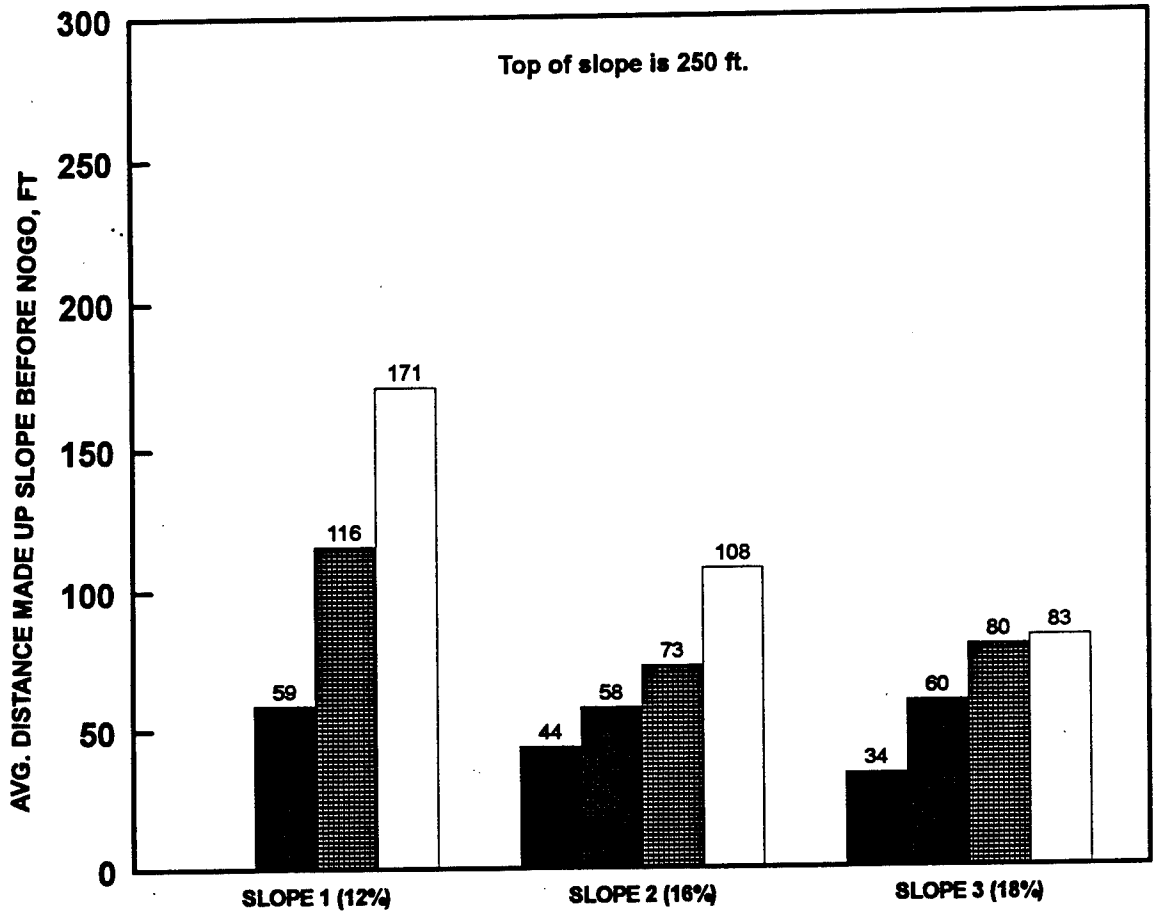
■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI □ — 15/15 PSI

* Average includes at least one GO

SLOPE TEST RESULTS WITH THE M1008 CONFIGURATION 36

PLATE 91



LEGEND

■ — 30/30 PSI ■ — 20/20 PSI

■ — 25/25 PSI □ — 15/15 PSI

SLOPE TEST RESULTS WITH THE M1008 WITH TRAILER CONFIGURATION 36

PLATE 92

Appendix A
Tire Pressure Recommendations

In order to provide supportive data for determining tire pressures, WES used the NATO Reference Mobility Model (NRMM), in a tactical standard scenario (85 percent on-road and 15 percent off-road), to generate computer predictions of the expected performances in a representative Middle-Eastern environment of the M1009 CUCV and M813 5-ton. All of the terrains that WES currently has mapped in Kuwait and Saudi Arabia are either flat or insufficiently processed to determine whether or not they can be considered representative of the Mid-East in general. The 1:50000 scale Mafraq quad in Jordan is available, however, and is considered a more representative sample of those areas that would cause mobility problems. While many of the soils in these countries are fine-grained, sandy soils are also abundant in many areas. Therefore, areas of interest in the Mafraq quad in Jordan were combined with abundant areas of sloping terrain and sand to generate a representative terrain data base that would generally describe most of the area in the Mid-East. A dry sand condition was added to better represent the sandy conditions or dunes found in Saudia Arabia, Iraq, and Kuwait. Thus about 85 percent of the terrain data base used for this study consisted of fine-grained soils with the remaining 15 percent coarse-grained (sand) soils.

Based on results of traction and slope testing by WES, maximum traction and slope climbing capabilities were used as inputs in the NRMM. Also used as input were the maximum speed allowed based on the thermal limits of each tire. These speeds were determined from the thermal profile test data provided by Nevada Automotive Test Center (NATC). Predictions were made for the dry and wet seasons in the fine-grained soils and a dry season for the sand, noting that the dry sand condition most probably represents the off-road Kuwait/Saudi theater where mobility problems would exist.

In order to compare each vehicle configuration, the speed for each configuration when challenging 100 percent (V_{100}) of each road type was computed and the speeds when challenging the best 80 percent (V_{80}) of the off-road (cross-country) terrains were also computed. Finally, the area, in percent, of the Mafraq quad which was a NOGO for each configuration and soil/seasonal condition was computed. The recommendations of WES, as furnished to YPG for durability testing are reproduced in the following paragraphs.

Results of Predictions

M1009

The vehicle configuration which generally presented Desert Shield/Storm with many mobility problems is the M1009 with 31X10.50R15LT tires at 35/35 psi. As shown in Table A1, this vehicle configuration should (and did) operate without much difficulty on good roads. On trails and cross-country terrain, the vehicle's mobility problems increased, with dry sand areas often projected to be a NOGO. The NOGO in dry sands is projected as high as 22.3 percent for this configuration in these representative Mid-East terrains.

Table A2 represents the expected performance of the same vehicle with slightly larger 33X12.50R15 Desert Dog tires, manufactured by Armstrong. Selection of this tire was based on traction/slope performance tests conducted by WES in dry, loose, tilled sand. The performance of the M1009 in this configuration at 35/35 psi is slightly better than the standard vehicle. On-road speeds are about the same, and the expected performance in fine-grained soils is still about the same. In the dry sand, however, the vehicle with larger tires performed much better off-road with a V_{80} of 11.6 mph versus 2.5 mph for the standard vehicle. The percent NOGO decreased from 22.3 to 16.8. The advantage of using a larger tire is that the tire pressure can be lowered to improve performance. This can be accomplished because the larger tire can carry the same load at a higher deflection (lower pressure). As shown in Table 2, the performance for both on- and off-road operation improves with increased deflection, with the tires at 15/15 psi producing a percent NOGO of 8.7, or about one-half that at 35/35 psi. The disadvantage of operating at such a low pressure is that the on-road speeds decrease to keep tire temperature build-up at a safe acceptable level. Based on the data shown in Table A2, the 30/30 psi or 20/20 psi pressures appear most acceptable. The performance at 30/30 psi allows better on-road speeds, but at reduced off-road speeds. The vehicle with 20/20 psi pressure provides off-road performance near that with 15/15 psi, but at slightly lower on-road speed than with 30/30 psi. Mission rating speeds, shown in the far right column of both tables, for the M1009 with the larger tires in a tactical standard scenario are also better.

The data obtained from NATC's testing with this tire indicate that if 60 mph extended highway use is required for several hours, the 30/30 psi pressure would by necessary. If, however, limited operation at 60 mph and extended operation at 50 mph is acceptable, the 20/20 psi pressure is desirable. Although the 20/20 psi pressure pushes the thermal envelope to a limit, it still provides good off-road mobility for the M1009. WES would recommend the 20/20 psi pressure for the M1009 with the larger 33X12.50R15LT tires, if at all possible, to improve its off-road mobility and reduce immobilizations.

In most cases, highway operation will be limited and the generally poor road network would indicate the need for better off-road performance in the Mid-East. By decreasing the pressure from 35/35 psi to 20/20 psi, the expected NOGO of the M1009 with the larger 33X12.50R15LT tires will drop from 22.3 to 10.9. This equates to improving the average off-road speed from 2.5 mph to 12.2 mph. As an added advantage, this reduced pressure would also increase the off-road mobility performance capabilities of those drivers with limited off-road experience.

In summary, the results of the WES and NATC testing indicate that the 33X12.50R15LT Armstrong Desert Dog will significantly improve the mobility of the standard M1009 at 7250 GVW. The data also indicate that the best overall mobility will be achieved with the M1009 at 20/20 psi tire pressure. The premise for this single tire pressure recommendation is that tire pressures will not be changed at the on-road/off-road interface.

M813 5-ton

For the M813 with the standard 11.00X20 bias ply tires, inputs were obtained from the vehicle data base on file at the WES. For the M813 with the Goodyear 14.00R20 radial tires, the NRMM-required data were interpolated from NATC tire tests conducted at 50, 37.5 and 25 psi. Results are shown for the M813 with the standard bias ply 11.00X20 and larger radial 14.00R20 tires in Tables A3 and A4 respectively.

The vehicle configuration which generally presented Desert Shield/Storm with many mobility problems is presented in Table 1. As shown in Table 1, the M813 with standard tires at 80/50 psi should (and did) operate without much difficulty on good roads. On trails and cross-country terrain, the vehicle problems increase, with dry sand trails almost a NOGO. The NOGO in dry sands is projected as high as 22.1 percent for this configuration in these representative Mid-East terrains.

Table A4 represents the expected performance of the same vehicle with larger Goodyear AT-2A 14.00R20 radial tires. Selection of this tire was based on traction/slope performance tests conducted by WES in dry, loose, tilled sand. The performance of the M813 in this configuration at 36/36 psi is slightly better than the standard vehicle except on primary roads. Most on-road speeds are about equal, and the expected performance in fine-grained soils is still about the same. In the dry sand, however, the vehicle is much better off-road with a V_{80} of 7.1 mph versus 2.7 mph for the standard vehicle. The percent NOGO decreases from 22.1 to 15.5. The advantage of using a larger tire is that the tire pressure can be lowered to improve performance. This can be accomplished because the larger tire can carry the same load at a higher deflection (lower pressure). As shown in Table A4, the performance for both on- and off-road operation improves slightly with increased deflection. In dry sand with the tires at 28/28 psi, the M813's percent NOGO decreases about 5 percent from that of 36/36 psi. The disadvantage of operat-

ing at such a low pressure is that the on-road speeds decrease to keep tire temperature build-up at a safe acceptable level. Based on the data shown in Table A4, the 36/36 psi or 28/28 psi pressures appear most acceptable. The performance at 36/36 psi allows better on-road speeds, but at reduced off-road speeds. The vehicle with 28/28 psi pressure provides good off-road performance but at slightly lower on-road speed than with 36/36 psi. Mission rating speeds for the larger-tired-vehicle in a tactical standard scenario are also generally better. These speeds are shown in the far right column of both tables.

The data interpolated from NATC's testing with this tire indicate that if 60 mph extended highway use is required for several hours, the 60/60 psi pressure (highway pressure) would be necessary. If, however, limited operation at 60 mph and extended operation at less than 50 mph is acceptable, the 28/28 psi pressure is desirable. Although the 28/28 psi pressure pushes the thermal envelope to a limit, it still provides good off-road mobility for the M813. WES would recommend the 28/28 psi pressure for the M813 with the larger 14.00R20 tires, if at all possible, to improve its off-road mobility and reduce immobilizations. The 28/28 and 36/36 psi pressures are incorporated into the Central Tire Inflation System (CTIS) and can be adjusted at will by the driver to make use of the advantages of each pressure.

In most cases, highway operation will be limited and the generally poor road network would indicate the need for better off-road performance in the Mid-East. By using the 28/28 pressure in the larger tires, the expected NOGO of the M813 will drop from 22.1 to 10.8 in dry sand. This equates to improving the average off-road speed from 2.7 mph to 7.1 mph. As an added advantage, this reduced pressure would also increase the off-road mobility performance capabilities of those drivers with limited off-road experience.

In summary, the results of the WES and NATC testing indicate that the 14.00R20 Goodyear AT-2A will significantly improve the mobility of the standard M813 at 31,230 GVW. The data also indicate that the best overall mobility will be achieved with the M813 at 28/28 psi tire pressure. The premise for this single tire pressure recommendation is that tire pressures will not be changed at the on-road/off-road interface.

Table A1
Results of NRMM Predictions for the M1009 with 31X10.5R15LT Uniroyal Laredo A/T Radial Tires in the Mafraq Quad in Jordan

Tire Pressure Front/ Rear, psi	On-road V_{100} Speed, mph			Off-road V_{80} Speed, mph	Percent NOGO	Mission Rating Speed, mph
	Primary	Secondary	Trails	Cross-Country		
Dry Normal (fine-grained)						
35/35	47.9	42.5	11.3	13.4	11.6	17.52
Wet Normal (fine-grained)						
35/35	47.9	42.5	8.3	13.4	11.6	14.50
Dry Sand						
35/35	47.9	42.5	0.5	2.5	22.3	1.29

Table A2
Results of NRMM Predictions for the M1009 with 33X12.5R15LT Armstrong Desert Dog Radial Tires in the Mafraq Quad in Jordan

Tire Pressure Front/ Rear, psi	On-road V_{100} Speed, mph			Off-road V_{20} Speed, mph	Percent NOGO	Mission Rating Speed, mph
	Primary	Secondary	Trails	Cross-Country		
Dry Normal (fine-grained)						
35/35	47.9	42.5	11.3	13.4	11.6	17.52
30/30	47.9	42.5	11.3	13.4	11.6	17.52
20/20	42.5	40.5	11.3	13.4	11.6	17.52
15/15	36.2	36.2	11.3	13.4	11.6	16.80
Wet Normal (fine-grained)						
35/35	47.9	42.5	11.3	13.4	11.6	16.27
30/30	47.9	42.5	11.3	13.4	11.6	16.54
20/20	42.5	40.5	11.3	13.4	11.6	16.74
15/15	36.2	36.2	11.3	13.4	11.6	16.60
Dry Sand						
35/35	47.9	42.5	0.6	11.6	16.8	1.64
30/30	47.9	42.5	0.7	11.8	13.2	1.90
20/20	42.5	40.5	0.7	12.2	10.9	1.89
15/15	36.2	36.2	0.9	12.5	8.7	2.39

Table A3
Results of NRMM Predictions for the M813 with 11.00X20 Standard NDCC Tires in the Mafraq Quad in Jordan

Tire Pressure Front/ Rear, psi	On-road V_{100} Speed, mph			Off-road V_{80} Speed, mph	Percent NOGO	Mission Rating Speed, mph
	Primary	Secondary	Trails	Cross-Country		
Dry Normal (fine-grained)						
80/50	42.5	21.7	8.3	8.9	8.0	12.16
Wet Normal (fine-grained)						
80/50	42.5	21.7	4.8	8.9	8.0	8.80
Dry Sand						
80/50	42.5	21.7	0.5	2.7	22.1	1.28

Table A4
Results of NRMM Predictions for the M813 with 14.00R20 Goodyear AT2A Radial Tires in the Mafraq Quad in Jordan

Tire Pressure Front/ Rear, psi	On-road V_{100} Speed, mph			Off-road V_{80} Speed, mph	Percent NOGO	Mission Rating Speed, mph
	Primary	Secondary	Trails	Cross-Country		
Dry Normal (fine-grained)						
36/36	38.8	23.1	6.5	7.1	5.7	10.25
28/28	36.2	22.0	6.5	7.1	5.7	10.14
Wet Normal (fine-grained)						
36/36	38.8	23.1	6.5	7.1	5.7	10.18
28/28	36.2	22.0	6.5	7.1	5.7	10.07
Dry Sand						
36/36	38.8	23.1	6.5	7.1	15.5	1.59
28/28	36.2	22.0	6.5	7.1	10.8	1.84

Table A5
Inputs for NRMM

Vehicle Weight, lbs	Tire	Tire Type	Tire Size	Tire Pressure, psi		Percent Deflection	
				Front	Rear	Front	Rear
M1009							
7,250	Uniroyal Laredo AT	Radial	31X10.5R15	35	35	17.0	20.0
7,250	Armstrong Desert Dog	Radial	33X10.5R15	35	35	13.7	15.1
7,250	Armstrong Desert Dog	Radial	33X10.5R15	30	30	13.2	17.5
7,250	Armstrong Desert Dog	Radial	33X10.5R15	20	20	19.1	24.0
7,250	Armstrong Desert Dog	Radial	33X10.5R15	15	15	25.4	32.7
M813							
31,230	NDCC (duals in rear)	Bias	11.00X20	80	50		
31,230	Goodyear AT-2A	Radial	14.00R20	36	36	18.6	18.2
31,230	Goodyear AT-2A	Radial	14.00R20	28	28	23.0	22.2

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Thirty-six vehicle\tire configurations (thirty-five commercial tires and one military tire) involving eight manufacturers were used in drawbar pull and slope climbing tests. The tests were conducted with a group of eight wheeled military support vehicles in a single loose sandy soil condition at Yuma Proving Ground, Arizona. The soil condition was somewhat analogous to loose sandy soils in Middle Eastern (ME) desert terrain. This loose, low-strength sand was considered to be a worst-case trafficability condition. Several tire pressures were used on the same vehicle/tire/soil configuration to allow mobility comparisons of tire/pressure variations during expected off-road missions of the vehicles. Several tires of each size tested by the U.S. Army Engineer Waterways Experiment Station were selected for thermal profile tests conducted by Nevada Automotive Test Center. Results of these tests and their subsequent effects on mobility will ultimately lead to the selection/recommendation of commercial replacement radials for use on wheeled support vehicles operating in ME terrains.

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