Effect of Pavement Friction Factors on Skid Resistance of Highway Pavements using Prediction Models

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Abstract: ***There are many features for road pavements, in which the most significant feature is skid resistance. Skid resistance is referred to as the contact (friction) among the pavement surface and automobile tires. Essentially, this feature is vital to guarantee adequate road secureness and it takes a fundamental part during specific climatic conditions. The aim of this research is targeted at distinguishing the primary attributes that impact skid resistance, so that the rates of traffic collisions that occur as a result of insufficient skid resistance specifically in wet climate conditions, are minimized. Throughout this research, designs to calculate the association of surface texture form, automobile velocity, tire type and the type of asphalt mixture on skid resistance were created and applied to evaluate the significance of each attribute as well as enhancing the secureness of roads. Hence, the attributes influencing skid resistance were chosen and evaluated utilizing the SPSS program. Also, the British Pendulum Skid Resistance Tester was utilized in order to evaluate the skid resistance of various surface textures. The outcomes obtained by this study proved that there is a strong association among surface texture, wheel form, type of mixture and automobile velocity, where R^2=96.5%. Moreover, the outcomes advocated the necessity of applying operating method designs to minimize duration and exertion as well as computing the influence of these attributes on skid resistance. The ingenuity of this research is in its concept which advocates that the manipulation of skid resistance operation method results in enhanced road security and minimizes collisions, which respectively diminishes fatality rates.***

Index Terms: ***Skid resistance; pavement friction attributes; surface texture; British Pendulum Skid Tester; skid resistance prediction models.***

I. INTRODUCTION

Skid resistance is one among several properties of pavement surface, which distinguishes the pavements coarseness, effect on contact forces when the road is subjected to tire loads [1]. For better road safety, it is compulsory to obtain adequate friction among the automobile's tires and the road surface. The contact/friction that occurs is known as skid resistance; which is mandatory to ensure the vehicle is secure during increased speed, decreased speed or alteration in moving directions. Smaller skid resistance quantities are directly associated with wet pavements, which can lead to increased collision percentages [2]. Likewise, the skid resistance of the concrete pavement is a crucial constraint that impacts driving secureness on the highways. Particularly since it has been proven that there are a direct association among road skids and collisions [3]. By manipulating the appropriate extents to maximize skid resistance in specific hazardous sites (like overpasses, turns, and junctions), accident percentages can be drastically reduced [3]. In order to reduce the incidents of wet climate traffic collisions, road organizations who are in charge of preserving highway pavement networks must continuously observe the road's skid resistance. Usually, road organizations use a common method to maintain the safety of pavements in wet conditions which is to set a minimum skid resistance preservation margin [3]. Besides, various researches conducted depicted a drastic inclination of collision risks when the friction values declined under a specific margin quantity [4]. As a result of the various distinctive impacting attributes, skid resistance cannot be a constant, which is the primary cause behind the absence of an absolute skid resistance measurement technique [1]. Skid resistance measurement techniques differ from one country to another. Most countries necessitate the presence of a skid resistance constant measurement, while oppositely in some countries the primary signals are pavement surface macro-texture depth corresponding to the skid resistance constant [5]. Various regions occasionally compute skid resistance throughout road operation and asses the quantities with the design quantities whereas other regions comprise requirements of skid resistance quantities for new pavements or renovated road sectors [6]. Moreover, quite a few researches have studied the various aspects of, as well as some constraints affecting wheel-road friction and skid resistance [3], [7], [8]. Nonetheless, only a handful have deeply acknowledged the impact of road friction attributes such as the form of surface texture, vehicle velocity, type of asphalt mix and tire forms on skid resistance individually. The foremost aims of this research are; determining the attributes which influence skid resistance on the pavement surface, establishing the association among each attribute individually on skid resistance, and they are surface texture, tire type, mixture form, and automobile speed and discovering the relationship between the four attributes all-together on skid resistance.

II. LITERATURE REVIEW

In order to attain the proper friction levels among the vehicle's wheels and the pavement's surface, various factors participate in the process which includes the type of surface texture, the car's velocity, and the damp surfaces [9].

Revised Manuscript Received on July 05, 2019.

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Also, there are other attributes that significantly impact road friction which includes the vehicle features, the pavements surface age, surface type, temperature as well as the existence of pollution [7]. Throughout this research, there were four factors reviewed; which are the texture of the surface, asphalt mix form, type of automobile tires and the automobiles speed.

A. Surface Texture

To obtain the proper friction level, surface texture develops an essential component of contact among the vehicle's tires and the road surface. Pavement friction features are linked to its texture attributes and they are macro-texture and micro-texture. For the pavement surface, macro-texture denotes to the greater irregularities or "coarse-scale texture", and it measures the canals among the coarse aggregate components in the pavement surface. Also, macro-texture enables water drainage away from the surface of the pavement and is crucial at mid/ high speeds above 40 kilometers per hour [10]. Macro-textures also limit the contact/friction among the automobile wheels and the surface during inclined speeds of the automobile [11]. Alternatively, micro-texture refers to the irregularities among the aggregate components of the pavement surface, or "fine-sale texture". They regulate the friction among the automobile wheel and the road surface [12]. It is essential along dry pavement surfaces and at low velocity reaching 40 kilometers per hour [10]. It can be summarized that micro-texture is accountable for pavement friction during declined speeds, while macro-texture is in charge of pavement friction at inclined speeds [13].

B. Type of Tires

Research has shown that the majority of the accidents that tape place annually are a result of the kind, value, and life of the tires. Tires are designed geometrically along with 'their shape-shifting throughout its utilization on the road. Efficient tire designs should be able to endure any climatic or natural condition such as rainy/snowy weathers, sand/dirt roads, low/high temperatures and so on. The majority of the automobiles released from the factories are released with all-season tires, which means that they are appropriate for all seasons. Nevertheless, in cold and snowy/wet regions, winter-tires must be used, and as for warm/dry regions, summer tires should be utilized. The tires are composed of several various rubber complexes, lots of numerous kinds of carbon black, chemicals, minerals and fillings such as silica and clay. Various tire forms exist, which include treaded tires, ribbed tires, smooth tires, etc. Each individual form possesses its own features that differentiate them from one another. For example, a treaded tire signifies the mold of grooves sculpted in the rubber, whereas a smooth tire indicates that the tire has no groove mold. The grooves patterns within the rubber are created to permit water drainage from below the wheel and to avoid hydroplaning. The tread molds on the wheels assist in preventing this incident from taking place and as a result, the majority of the enforcing organizations established a minimum tread depth constraint for automobile wheels [14]. Typically, the deeper molds regularly improve secureness, then again simpler patterns are less expensive to manufacture. Moreover, the tires designed for warm/dry climate condition have minimum mold designs in order to maximize the friction region. Nevertheless, tires that have no tread patterns, or known as smooth tires, are usually only utilized in racing seeing that they are very hazardous to be used on wet surface roads. For tires that acquire the adequate mold tread, the friction of coefficient is 50% higher than that of the smooth tires. The capacity of the tire's channels is larger which allow more water drainage from the friction region by the wheels in a shorter amount of time [15]. It is particularly crucial for tread depth to be available on certain vehicles, specifically those driven over thick sheets of water at inclined speeds [16].

C. Vehicle Speed

There are many factors that influence friction among the tires of the vehicle and the road surface, and it should be noted that there are some factors from the vehicle itself that impact such friction. These factors include the vehicles acceleration, the skid ratio and the degree between the tires and the driving direction [7]. Furthermore, the friction constant among the vehicles wheels and the pavement fluctuates with changeable skid, where it vastly inclines directly with inclined slip to an ultimate quantity that typically happens around 10-20% slip [16]. Nonetheless, the most crucial attribute is considered to be the vehicle acceleration due to the fact that the friction constraints for an automobile to halt among a certain distance inclines with the square of the velocity. Accordingly, the skid resistance of wet pavement surface declines while driving acceleration inclines [1].

D. Type of Asphalt Mixture

Due to the high association among the road skid resistance and collision percentage, it necessitates an enhanced system for all-inclusive material selection and admixture design. The mixture designers are constantly encountered with the task of choosing the proper aggregates. Moreover, it is essential to acknowledge the frictional traits of aggregates and their capability to endure the refining act of the ensuing traffic [17]. Taking into consideration these significant features, they prevent the possibility of extra expenses for surface management. The preservation and restoration budget of pavements may be minimized through enhancement of an all-inclusive structure for aggregate selection established on a quantitative assessment of the physical attributes of aggregate correlated to the skid resistance of the road [17]. Accordingly, the skid number does not signify the halting features of the vehicle, motorist, or weather conditions, nevertheless, it is an advantageous tool that can be utilized in assessing the surface friction traits depending on the aggregate forms, asphalt mixture design and the road structure techniques [18].

III. RESEARCH METHODOLOGY

The site evaluations were performed to gather the skid number quantities. The statistical evaluation was implemented to acquire the association among the factors which influence skid resistance and the friction quantities establish by each significant constant. The intensity or feebleness of the associations was denoted by the value of R^2.

A. Surface Texture Measurement

The measurements of surface texture determination were done on Jordan road net. Two samples site were selected. Sand patch method was used to determine the micro and macro texture diameters by spreading known volume 50Cm3 of standard sand (-300µm, +150µm) using ASTM E 965 ‘‘Standard Measuring Pavement Macrotexture Depth Using a Volumetric Technique ’’ [19].

The used volume of the standard sand is sufficient in case that the surface texture depth is between (0.3 to 2.0 mm). Equation (1) was used to find the mean texture depth for each spot (ASTM E 965).

$$Texture\ depth\ (h)mm = \frac{4V}{\pi D^2} \quad (1)$$

Where;
D: Average diameter of sand patch circle (mm)
V: Volume of sand used (cm^3)

B. British Pendulum Test (BPT)

The determination of pavement friction for micro and macro texture was done by using the British Pendulum Tester. The procedure for measuring frictional properties using the BPT is specified in ASTM E 303 ‘‘Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester’’ [20]. The test procedure was conducted on wet and dry surfaces with 20 attempts at different temperatures (27C◦ and 28C◦), the surface temperature was measured by using a mini surface thermometer with battery for both textures. According to the stiffness of the rubber slider for BPT is vary at different temperatures. Equation (2) was used to correct the temperature at 20C◦ [21].

$$SRV_{20} = \frac{SRV_t}{(1-0.00525\ (t-20))} \quad (2)$$

Where;
SRV_{20}: Skid resistance value at 20C°
SRV_t: Skid resistance value at (t) C°
t: Surface temperature in C°

C. Linear Regression Test for Factors

Using the established insights, it was considered that skid resistance (SR) is mainly determined by the type of surface texture (TST), type of tire (TT), vehicle speed (VS), and type of mixture (TM). Each factor was tested separately by using linear regression. Equation (3) was applied to find the strength of the relationship and the effect of each factor on the values of friction.

$$Y_n = \alpha + \beta_1 (X_n) + \mu \ (Y_n) = \alpha + \beta 1\ (X_n) + \mu \quad (3)$$

Where;
Y_n: Dependent variable (skid resistance)

β1: Beta coefficient

X_n: Independent variables will be the X-values (a type of surface texture, type of tire, vehicle speed, and type of mixture)
µ: Error terms

D. Multiple Linear Regression for Factors

The effect of the -factors was studied combined to check the significant impact on skid resistance, the multiple linear regression was used to develop this correlation. The Co Linearity is a measure and indicator of the extent of correlation of independent variables between them and the lower the value of five is better, it is required that the correlation between independent variables is weak to justify the Co linearity. The skid resistance regression model in this study is based on pointed out that the regression analysis makes it feasible to determine both the association and the magnitude of effect between variables. As a result, a constant (α), coefficients (β1- β4) and error terms (µ) were incorporated into equation (4).

$$SR = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu \quad (4)$$

Where;
SR: Dependent variable (skid resistance)
β1, β2, β3, β4: Beta coefficient for type of (surface texture, tire, vehicle speed, asphalt mixture)
X1, X2, X3, X4: Independent variables will be the X-values for type of (surface texture, tire, vehicle speed, and asphalt mixture).
µ: Error terms

The Variance Inflation Factor (VIF) provides an index that measures how much the variance (the square of the estimate's standard deviation) of an estimated regression coefficient is increased because of collinearity. If values of VIF less than a value of 10 considered to express low Co linearity among the parameters that were used to investigate the skid resistance. Equation (5) was used to find the VIF values [22].

$$VIFi = \frac{1}{1-Ri^2} \quad (5)$$

Where:
Ri^2: Is the coefficient of determination of the regression equation.

IV. RESULTS AND DISCUSSION

A. Surface Texture Measurement

The final results of MDT (Mean Texture Depth) for macro and microtexture illustrate in Table 1 after applying equation 1.

Table I:Final results of the sand patch method

Parameters	Surface Texture	
Surface Texture Type	Micro-texture	Macro-texture
Volume of Sand(cm^3)	50	50
Average Diameter (cm)	44.25	30.5
Average Texture Depth(mm)	0.33	0.68

By conducting a volumetric technique micro and macrotexture depth was determined, the microtexture depth was 0.33 and that refers to (fine-scale texture) and the texture depth for macrotexture was 0.68 and that indicates to (coarse –scale texture).

B. British Pendulum Test (BPT) on Surface Texture

The skid resistance values obtained from the site beforetemperature correction illustrate in Tables (2 and 3).

Table II: Skid resistance values for dry and wet Micro-texture surfaces

Parameters	Trial	Skid No.	Trial	Skid No.	Parameters	Trial	Skid No.	Trial	Skid No.
Micro-texture Dry surface at 28C◦	1	44	11	46	Micro-texture Wet surface at 28C◦	1	32	11	34
	2	45.4	12	47.1		2	33	12	28
	3	46	13	48		3	34	13	35
	4	47.3	14	49		4	35	14	29
	5	48	15	44.5		5	33	15	28.2
	6	45	16	45		6	32	16	22
	7	44	17	46		7	33	17	27.3
	8	48	18	47		8	33	18	25.4
	9	44	19	48.6		9	30.2	19	26
	10	45.2	20	49.6		10	31.3	20	30.6

Table III: Skid resistance values for dry and wet Macro-texture surfaces

Parameters	Trial	Skid No.	Trial	Skid No.	Parameters	Trial	Skid No.	Trial	Skid No.
Macro-texture Dry surface at 27C◦	1	65	11	64	Macro-texture Wet surface at 27C◦	1	60.4	11	60
	2	66.8	12	65		2	61	12	59
	3	64	13	66		3	62.2	13	60
	4	64	14	65		4	59	14	63
	5	60	15	66.5		5	55	15	58.5
	6	65	16	64.3		6	58	16	59.5
	7	66	17	67		7	59	17	55.3
	8	67	18	66		8	58	18	58.6
	9	65	19	64		9	60.5	19	60
	10	64	20	65		10	60.5	20	60

Table 2 and 3 show the results of skid resistance that obtained in site depending on microtexture (fine scale texture) and macrotexture (coarse scale texture) for both dry and wet surfaces at 28C◦ and 27C◦ respectively , to get a wet surface the water was added to the road surface and slider.

C. Linear Regression Test for Factors

1. Impact of Surface Texture on Skid Resistance

To study the relationship of the effect of the type of surface texture on skid resistance values, simple linear regression was performed.

Table IV: Simple linear regression for testing the impact of surface type on skid resistance

Independent variable	*β*	*Se*	*T*	*Sig(t)*
Surface Texture	-11.977	0.364	-32.88	0.00

* R^2 = 0.933, adjusted R^2 = 0.966; F-stat =1081.59(0.000),
Skid resistance = 82.308 – 11.977ST

The quantity of F (1081.59) was substantial since the associated sig quantity (0.000) which is less than 0.05 implying an important correlation among the type of surface and skid resistance. Additionally, the beta coefficient contemplates the influence quantity within the independent constant, which was the surface texture. The value came to be (-11.977), which expressively contributed to the dependent constant since the weight of the t statistics was (0.000) and is less than 0.05. The value of R^2 denotes the quantity of disparity which was seen in the dependent constant (skid resistance) that is clarified by or implied to the independent constant. The value of the R^2 constant was equal to 93.3%, which represents a vastly large clarification of the disparity within the dependent constant.

The skid resistance quantities were modified and adjusted reliant on the temperature through the implementation of equation (2).

Table V: Means and standard deviations for skid resistance according to surface type

Surface Texture Characteristics	Mean of Skid Resistance	Standard Deviation (**δ**)
Macro-texture Dry surface at 27C◦	67.46	1.63
Macro-texture Wet surface at 27C◦	61.64	2.00
Micro-texture Dry surface at 28C◦	48.42	1.84
Micro-texture Wet surface at 28C◦	31.94	3.69

In Table (5), the mean quantities of skid resistance correlated to the surface type were given. From the provided table, the outcomes presented show that the macro-texture depicts greater skid resistance quantities than micro-texture. In turn, macro-texture results in effective skid resistance at inclined acceleration, whereas micro-texture at low acceleration results in improved skid resistance. The wet pavement surface, reduces skid resistance, allowing it to become a probable hazard to road secureness, specifically during inclined speeds. Dry surfaces, on the other hand, portray bigger skid resistance quantities when compared to the wet surfaces of similar texture form. Hence, the type of surface texture is deemed to be a crucial element in ensuring adequate road skid resistance for longer durations. Moreover, various criteria should be acknowledged to guarantee enhanced surface texture; choosing the suitable form of aggregate compounds; the mixtures of asphalt as well as the pavement layer placement technologies, all of which are crucial to ensure appropriate skid resistance for pavements for a longer time span.

2. Impact of Type of Tire on Skid Resistance

The relationship between the type of tire and skid resistance was expressed by using simple linear regression as illustrates in Table (6),the values of skid resistance were determined based on the type of vehicle tire.

Table VI.Simple linear regression for testing the impact of tire type on skid resistance

Independent variable	*β*	*Se*	*T*	*Sig(t)*
Tire Type	-6.793	0.870	-7.80	0.00

* R^2 = 0.701, adjusted R^2 = 0.837; F-stat =60.97(0.000), Skid resistance = 53.250 – 6.793TT

The F value (60.97) was significant because the related sig value (0.000) was (< 0.05) suggesting a significant relationship between tire type and skid resistance. The beta coefficient reflects the impact value in the independent variable (tire structure). It was (-6.793) and significantly contributes to the dependent variable as the significance of t statistics was (0.000) < 0.05. The t statistics test the linearity importance of the beta coefficient obtained representing the impact magnitude by the independent variable. The value of R^2 is shown a strong effect of type tire on skid resistance.

Table VII: Means and standard deviations for skid resistance according to tire type

Type of Tire	Mean of Skid Resistance	Standard Deviation (**δ**)
Treated Tire	46.46	2.61
Smooth Tire	39.66	1.95

Table (7) depicts the mean values of skid resistance depending on the type of tires. From Table (7), it can be seen that the mean quantities of skid resistance for treaded wheels were greater than those of the smooth tires. Tires have a significant part in enhancing road safety. The quantities of the treaded tires, from the table, have better quantities of skid resistance, which implies those tires composed of grooves molded within the rubber so as to allow water drainage from under the tire and avoid hydroplaning from happening. Typically, tread wheels are utilized to facilitate water drainage from the contacted surface. Additionally, tires of high-performance usually have smaller void proportions in order to allow more rubber friction on the pavement, leading to larger adhesive friction. On the other hand, smooth tires which have no tread designs, are really harmful to use on the wet pavement surface. The FN, or level of friction number, required at each location relies on the traffic needs and geometrics of that location. The larger the friction number is, the better the skid resistance. Most importantly, each location must be individually examined.

3. Impact of Vehicle Speed on Skid Resistance

To study the relation of vehicle speed on skid resistance simple linear regression was conducted. The results are included in Table (8).

Table VIII:Simple linear regression for testing the impact of vehicle speed on skid resistance

Independent variable	*β*	*Se*	*T*	*Sig(t)*
Vehicle Speed	-0.184	0.017	-11.13	0.00

* R^2 =0.742, adjusted R^2 =0.862; F-stat =123.97(0.000), Skid resistance = 45.319 – 0.184VS

Table IX:Means and standard deviations for skid resistance according to vehicle speed

Speed(Km/h)	Mean of Skid Resistance	Standard Deviation (**δ**)
35	34.50	0.00
40	38.00	0.00
50	36.10	0.00
60	33.90	0.00
65	33.00	0.00
80	32.00	0.00

90	31.40	0.00

From Table 9, it should be stated that reduced acceleration results in bigger skid resistance quantities. The duration of wheel contact against the pavement becomes less at inclined speed, which may have a significant impact on the safe motion of the automobile. The friction coefficient on wet/dry pavement becomes less with inclined speed. The association among skid resistance and acceleration is undeterminable without constant measurements of the same pavement section of the road at various speeds, due to the fact that the evaluations are performed at only a single speed which is one of the troubles of the locked-tire tester technique, which was implemented to obtain the skid resistance quantity dependent on the acceleration of the vehicle. Yet, the outcome of the skid values was low in association to the locked tire test that was done on a sector of the highway. Usually, the outcomes attained from devices are primarily influenced by the speed of the measuring device, as well as the tire type being measured. In general, if the automobile's acceleration inclines, the skid resistance and the friction coefficient will decline, in which this relationship is clarified by the quantity of R^2, and that is 74.2%. The value of R^2 expresses a large clarification of the differentiation of the dependent variable (speed).

4. Impact of Type of Asphalt Mixture on Skid Resistance

To study the correlation between asphalt mixture type and skid resistance, simple linear regression was performed. The results are shown in Table (10).

Table X:Simple linear regression for testing the impact of asphalt mixture type on skid resistance

Independent variable	*β*	*Se*	*T*	*Sig(t)*
Type of Asphalt Mixture	0.304	0.121	2.51	0.000

* R^2 = 0.184, adjusted R^2 = 0.429; F-stat = 6.29 (0.018), Skid resistance = 74.614 + 0.304TM

The results of skid numbers for the different asphalt mixes were tested. The value of R^2 which is explained by or referred to the independent variable. This value was (18.4 % expressed a percentage). This value expresses a low explanation of the variation in the dependent variable and that might be because the samples were laboratory prepared. Since the value of R^2 is low, the multiple linear regression was done to re-evaluate the relationship.

D. Multiple Linear Regression for Factors

The results of the independent variables using the variance inflation factor (VIF) were shown in Table (11).

Table XI. Multicollinearity diagnostics test

Parameters (Factors)	VIF	Tolerance
Surface Texture	3.815	0.384
Tire Type	3.977	0.253
Vehicle Speed	4.692	0.831
Mixture Type	3.946	0.254

Values of VIF mentioned in Table (11) were less than the standard value of 10 and were considered to express low collinearity among the parameters that were used to determine skid resistance. Usually, a value that is less than 10 is considered leads to pose less multicollinearity issues. All the VIF values were noted to be below 5 and conclusions were made that the skid resistance model is free from multicollinearity problems. Once the condition been met, the application of linear regressions becomes appropriate. Table (12) provides a description of the estimated skid resistance model.

Table XII. Multiple linear regression for testing the impact of selected factors on skid resistance

Independent variable	*β*	*Se*	*T*	*Sig(t)*
Surface Texture	-0.262	0.427	-0.614	0.545
Tire Type	- 0.207	0.394	-0.526	0.604
Vehicle Speed	-0.011	0.019	-0.581	0.567
Mixture Type	**0.176**	**0.027**	**6.412**	**0.000**

* R^2 = 0.965, adjusted R^2 = 0.982; F-stat =156.69(0.000), Skid resistance = 51.356-0.262ST - 0.207TT-0.011VS + 0.176MT

Table (12) shows the results of multiple linear regression for selected factors on skid resistance. The F value (156.69) was significant because the related F value (0.000) was statistically significant (< 0.05). The results show that surface texture was (-0.262), tire type (- 0.207) and vehicle speed (-0.011) had negative effects on skid resistance. Which implied that an increase in surface texture, tire type and vehicle speed by 1 percentage point will result in a decline is skid resistance by 26.2%, 20.7%, and 1.1% respectively. The results also showed that Improvements in mixture type by 1% will result in an increase in skid resistance by 17.6%. This also implied that only mixture type contributes significantly towards improving skid resistance. The value of R^2 expresses the predictive strength of the independent variables in explaining changes in the independent variable. It was found to be 96.5 % which implied 96.5% of the changes in skid resistance are explained by surface texture, tire type, vehicle speed, and mixture type.

V. CONCLUSION

Skid resistance is considered to be the most important. It is the friction that occurs between the vehicle tires and the road surface. This research was targeted at identifying the main factors that influence skid resistance, from which the outcomes obtained proved that the surface texture is the most influential factor. Below is a summarized list of the results attained from conducting this research.

1. One of the crucial elements that guarantee secure travel on highway roads is skid resistance. In order to enhance the insufficient road secureness condition in Jordan, which is primarily due to the majority of the population using old automobiles which are usually driven with either old or worn-out tires. One solution may be the implementation of road pavements that possess large and lifelong skid resistance.
2. To minimize duration and exertion, the developed models may be directly implemented for managing procedures instead of conducting lab evaluations.
3. For comparison of skid functioning of the various pavement textures, the British Pendulum Skid Resistance Tester may be implemented.
4. The development of a skid resistance regulations in Jordan is crucial, and it should not be limited to the acceptance evaluations but as well as the skid resistance monitoring routine all over the road network in the country and encompass skid resistance measurement information within the pavement administration organisations.
5. Due to the lack of experience and absence of periodical skid resistance measurement within Jordan, the margins should be established based on collision statistical information and hypothetical computations. It is also advocated to identify greater skid resistance margins for probable hazardous sites.
6. When establishing pavements of great skid resistance, it is critical to be harmoniously created from the tire-road friction as well as the type of asphalt mix. All of these attributes are crucial and associated with the texture of the pavement surface.

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