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CANADIAN POLICE RESEARCH CENTRE



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CENTRE CANADIEN DE RECHERCHES POLIÉIÈRES

TM-05-94 ***Accident Investigation - Drag Sled***

By: Sgt. B.L. Linklater
Traffic Services Section
Royal Canadian Mounted Police

TECHNICAL MEMORANDUM

Submitted by
Canadian Police Research Centre

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NOTE: Further information about
this report can be obtained
by calling the CPRC
information number
(613) 998-6343

Executive Summary

The Canadian Police Research Centre learned that traffic accident analysts were using a specific device to assist in determining speeds from skid marks at accident investigations. This device or piece of equipment was often constructed with whatever material was available, and there seemed to be no consistency to the actual construction other than certain requirements necessary to create the desirable measurements.

A representative of the Canadian Police Research Centre suggested that it would be advantageous if a standard product could be developed as opposed to having traffic analyst investigators making, or having made, their own device, or drag sled. Consequently, Sergeant Brian Linklater, then an instructor in accident investigation at the Canadian Police College, provided specifications for the construction of a drag sled taking into consideration size, weight, portability, and ease of use. A company in Renfrew, Ontario was approached to make a prototype drag sled. The Canadian Police College provided the expertise for evaluations. Much credit and appreciation must be given to the accident investigator participants, and instructors. The results were very positive. The end result is that a standard drag sled has been developed, and is now being marketed in Canada and the United States of America.

Résumé

Le Centre canadien de recherches policières a appris que les analystes d'accidents de la circulation utilisaient un instrument particulier pour déterminer la vitesse des véhicules accidentés d'après les traces de freinage. Cet instrument était souvent fabriqué à l'aide d'un matériau d'occasion et il ne semblait y avoir aucune constance dans la fabrication comme telle, outre l'existence de certaines caractéristiques nécessaires à l'exécution des relevés.

Un représentant du Centre canadien de recherches policières a suggéré qu'il serait avantageux de mettre au point un produit standard, au lieu de laisser les analystes d'accidents de la circulation fabriquer ou faire fabriquer leur propre traîneau de résistance au frottement. Le sergent Brian Linklater, alors instructeur spécialisé dans les enquêtes sur les accidents au Collège canadien de police, a donc fourni des spécifications concernant la taille, le poids, la portabilité et la facilité d'utilisation, en vue de la construction d'un traîneau. On a ensuite demandé à une société de Renfrew (Ont.) de construire un prototype. Le Collège canadien de police a fourni les compétences techniques pour les évaluations. Il faut reconnaître le rôle joué par les enquêteurs et les instructeurs en matière d'accidents dans cette initiative. Les résultats obtenus ont été très positifs. On a réussi à mettre au point un traîneau standard qui est maintenant commercialisé au Canada et aux États-Unis.

DRAG SLED

Determining the coefficient friction of a road surface where a motor vehicle collision occurs is an important ingredient of the investigation. The coefficient of friction is a ratio of the vertical weight and the horizontal forces required to move an object across that surface. The horizontal forces must act through the center of mass of the object being moved. There are two types of friction involved:

- ▶ the static friction, and

- ▶ the dynamic friction.

Traffic Collision Analysts/Reconstructionists are concerned with the dynamic friction which is slightly less than the static friction. The coefficient of friction is identified with the Greek symbol mu (μ) and is represented by the formula:

$$\mu = \frac{F}{W}$$

F = force required to move the object, and

W = weight of the object.

COMMENTS

The drag sled produced by ETM Industries, Renfrew, Ontario is a well constructed professional looking piece of equipment. The horizontal force passes through the center of mass. The weight of the sled is correct, being 28 pounds (12.70 kg). It cannot be any lighter, however, can increase in weight providing it is no more than 32 pounds (14.5 kg). This would cause the dimensions of the sled to increase slightly but is of no concern. The weight of the sled will not change through use of the equipment because of the material with which it is constructed. If the weight is decreased, the sled will ride on top of dirt particles which act as ball-bearings and the resulting coefficient of friction will be artificially low. This results in inaccurate speed calculations. Any heavier than 32 pounds is simply inconvenient to work with.

The tire tread is securely attached to the sled.

The coefficient of friction is the area in which traffic collision analysts and reconstructionists are most attacked because the determination of that value is dependant upon the equipment used, the skill and technique used.

AVAILABLE FROM

The drag sled is available from:

ETM Industries Inc.
P.O. Box 610
266 Hall Avenue E.
Renfrew, Ontario K7V 2E4

telephone (613) 432-6136 or 432-9689
fax (613) 432-9547

