

REPORTS OF THE SEMINARS HELD IN SKYTOP AT THE  
1960 SPRING MEETING OF THE SOCIETY

THE THEORY OF PRIVATE PASSENGER AUTOMOBILE  
MERIT RATING

(SUMMATION BY HARMON T. BARBER, SECOND VICE PRESIDENT AND  
ACTUARY, THE TRAVELERS INSURANCE COMPANY)

This topic proved to be a popular one and the two sessions scheduled for the afternoon were crowded to capacity. It was found impossible to satisfactorily cover the subject in the allotted time and as a result a continuation session was arranged for the evening. This latter session, best described as a "beer and shirtsleeves session," was strictly voluntary as to attendance and informal in character. Members were free to come and go at will and were free to interject comments at any point in the discussion. The continuation session was also well attended and lasted for hours. Its popularity is recorded here as a precedent to consider at subsequent meetings when a topic of widespread interest is under discussion.

The first question to resolve was the definition of the term "merit rating" for purposes of this discussion. The choice was between the generic or comprehensive concept which includes all elements of risk rating or risk classification, and the more restricted and perhaps more currently popular automobile designations, namely, the measurement of accident-proneness of the operator (or family group) as revealed by accident and conviction records. The election of the broader concept was made to permit discussion of the relationship between traditional class and territory distinctions and risk classification according to driver skill. It is evident that there may be some overlapping in any simple system which involves both of these types of criteria.

The scheduled sessions were opened with brief summaries of the formal papers relating to the subject which were presented at the last meeting of the Society. These papers appear elsewhere in the *Proceedings*\* as do written reviews which also were outlined to the seminars by the authors or their representatives. These writings relate mainly to one phase of merit rating, namely, the measurement of operator driving ability according to the conviction and accident records of the individual driver. One paper analyzes the relationship between the probability of the occurrence of an accident and driving records as revealed by the California Driver Study and the other draws deductions as to the credibility of experience indications of accident-proneness of a single car's operators based on a review of Canadian merit rating data. One paper proposes the application of a negative binomial type distribution as a useful tool and as a replacement for a Poisson type distribution

\* See "Some Considerations on Automobile Rating Systems Utilizing Individual Driving Records" by L. B. Dropkin, CAS, XLVI, p. 165, and Review by R. A. Bailey, CAS, XLVII, p. 152; also "An Actuarial Note on the Credibility of Experience of a Single Private Passenger Car" by R. A. Bailey and L. J. Simon, CAS, XLVI, p. 159, and Review by W. J. Hazam, CAS, XLVII, p. 150.

in the analysis of recorded data. Discussion of the technical development of this point was limited to a few questions as to the theory advanced. There seemed to be agreement that the use of the negative binomial approach was a definite improvement in the analysis of available statistics. In this discussion it was pointed out that there is considerable overlap in contiguous merit rating classes based on driving records. This led to a discussion of the question of whether merit rating of driving ability would ever supplant entirely the customary manual class and territory distinctions. Most proponents of merit rating, based on the driving record of the owner-operator or family group of operators, look upon this phase of rating as a further refinement or extension of traditional manual classifications. However, there was at least one advocate of the thought that if a system of classification based on individual driving records could be perfected, it could largely replace other manual classification criteria such as territory, class, age, etc.

Quite a bit of interest was shown in the problem of how to obtain a prompt and reasonably indicative measure of underwriting results immediately following the introduction of a merit rating plan. The situation is exemplified in Texas where unusual activity in canceling and rewriting policies occurred with the introduction of the plan. Risks with poor records were canceled and rewritten just before the effective date of the plan and risks with good records were canceled and rewritten just after the effective date to secure a premium advantage for the assured. Therefore, a substantial, though temporary, disturbance of experience was created.

There was discussion of the inference in the keynote statement that "merit rating is underwriting by rote." The implication here is that if the potential hazard of each risk can be successfully measured by a complete or comprehensive merit rating system, it might facilitate carriers accepting risks automatically without giving consideration to whether the opportunity for underwriting profit was above or below average as respects an individual risk. Contrary opinion was expressed that a rigorously accurate rating method is unnecessary. All that is required is a plan which approximates the correct premium charge for an individual risk to an extent sufficient to discourage a hot war of competition among carriers and also sufficient to allay any suspicions of the public that someone else is securing an unfair advantage because of the applicable basis of premium adjustment.

There were scattered comments on some suspected points of vulnerability in the theoretical analysis of merit rating, such as, using number of cars rather than premium as a basis for accident frequency measurement; failure to distinguish between the magnitude of claims, accidents, or violations; and the observation that the lack of homogeneity within classes of cars might result in a definite bias in the deductions drawn from a statistical analysis of data.

It was observed that fines, license suspensions, and even confinement for violation of traffic laws are justifiable only on the premise that unsafe driving habits can be corrected. The use of driving records in merit rating is incompatible with this, since merit rating, being prospective in character, tacitly assumes that the bad driver of the past will be a bad driver in the immediate future. Contrary comments were that merit rating does not necessarily deny that a convicted violator may be an improved driver after punishment. It

merely assumes that the violator is a less desirable risk than the driver with a clean record and reflects this in the premium charged.

There was a discussion of the varying degrees of law enforcement which might exist in different territories of a state. However, it was pointed out that the average rate for a given territory should reflect the degree of law enforcement in the area and a merit rating plan based on violations would measure departures from that average.

The thought was raised as to whether some sort of psychiatric test might be devised ultimately which would provide a means of measuring the characteristics of individual operators which indicate a propensity toward accident-proneness. In this connection mention was made of several research studies in progress by various state motor vehicle and other state and university authorities in an effort to shed more light on what causes automobile accidents.

A suggestion was offered that the Society might undertake a detailed study of the causes of automobile accidents and duration of personal injury disabilities as revealed by claim records which would parallel the mortality investigations which have been found so useful in the life insurance field. Presumably this thought will be considered by the Research Committee of the Society.

In summary, it appears that various driver-record merit rating plans have been initiated recently, some of which probably have been designed on a cut-and-try basis, some of which are definitely experimental in nature and with features and values which may have been slanted toward competition for desirable business. Whether the theory of merit rating in the form of the statistical analysis of data will keep pace, or will lead, or will follow, the evolution of these plans as amendments are made largely dictated by practical reasons, remains to be seen. Thus far there is definite statistical support for the existence of accident-proneness in some individuals. There seems to be justification at the present time for the philosophy that moving traffic law violations are sound evidence for merit rating when they are viewed as accidents that almost happened and therefore amenable to combination with accidents that actually did occur. Further, the reasoning that every accident is either the basis for a claim or a very close approach to a claim, may likewise be accepted as pertinent in risk rating. The successful identification and measurement of these components presents an inviting field for serious research in the subject of merit rating. The problem of tying together in appropriate proportions measurements of driving skill with other more tangible and directly related classification data bearing on the occurrence or avoidance of personal injury or property damage claims represents another area for future investigation. This entire subject is definitely one for continued study.

*The following outline was provided to suggest to those present some of the areas which might be productive of discussion:*

Text: Merit rating is underwriting by rote.

A. Driving skill of the operator (individual or family group) as revealed by records of convictions, accidents and claims.

1. Is accident-proneness a myth or actuality?

2. How successfully can drivers be classified as to degree of driving skill?
  3. How reliably can the future accident record of classified drivers be predicted?
  4. Can elements other than frequency be adequately assessed in classifying drivers, e.g., willful vs. inadvertent violations; fault vs. non-fault accidents; extent of resulting injuries or damage?
- B. Is driver-skill rating properly a supplement or substitute for manual class and territory distinctions?
- C. Importance of other merit rating considerations (may or may not be part of special class or rule which calls for rate adjustment).
1. Size of Car—compact or regular.
  2. Equipment (or lack)—power brakes, safety belts, safety glass, padded dash, depressed-center wheel, windshield cleaner, etc.
  3. Use of Car—transport to work, other business, pleasure only, touring.
  4. Mileage—average in past; anticipated.
  5. Operators—occupation; age; sex; marital status; proportionate use; years licensed; financial responsibility certificate; assigned risk; physical impairments; use of alcohol.
  6. Multiple Cars—number of cars vs. number of operators.
- D. Statistical Data.
1. Presently available—California Driver Study, Canadian merit rating statistics, Swiss sample and others.
  2. Future—What provisions should be made for additional essential information not presently recorded?—(Cause of accident study. An accident table for Automobile Injuries.)
- E. Cross Examination.

You are invited to submit written statements of the “true or false” variety, which are designed to elicit discussion of any doubts, inaccuracies, or deficiencies in the theory of merit rating as thus far developed—to be discussed by volunteers.

## PRACTICAL ASPECTS OF AUTOMOBILE MERIT RATING

(SUMMATION BY WILLIAM S. GILLAM, RESEARCH DIVISION, NATIONAL BUREAU OF CASUALTY UNDERWRITERS)

I think it is very true that in any discussion of either the theoretical or practical aspects of automobile merit rating you tend to get involved in the other aspects. Several people mentioned, after our discussion on the practical aspects, that some of the things that were discussed should have been in the other seminar. Of course, when you're discussing something like merit rating,