

Fire Insurance Rates in Canada

Arthur Pedoe

Volume 5, Number 2, 1937

URI: <https://id.erudit.org/iderudit/1102860ar>

DOI: <https://doi.org/10.7202/1102860ar>

[See table of contents](#)

Publisher(s)

HEC Montréal

ISSN

0004-6027 (print)

2817-3465 (digital)

[Explore this journal](#)

Cite this document

Pedoe, A. (1937). Fire Insurance Rates in Canada. *Assurances*, 5(2), 95–104.
<https://doi.org/10.7202/1102860ar>

Article abstract

C'est avec plaisir que nous donnons ici quelques extraits d'un travail présenté par M. Arthur Pedoe au onzième Congrès international d'actuaire tenu à Paris du 17 au 24 juin 1937. Nous regrettons que le manque d'espace nous empêche de donner à nos lecteurs de plus copieux passages de ce mémoire, dans lequel l'auteur a mis, en particulier, des graphiques très intéressants qui tendent à démontrer l'importance du facteur moral en assurance contre l'incendie. Nous nous accordons pleinement avec lui sur le rôle qu'il joue dans les périodes de crise.

On trouvera ici une étude de la méthode dite Schedule Rating, ou des tableaux de tarification. L'auteur juge celle-ci moins dans l'usage qu'on en fait que dans son exactitude mathématique. Comme il fallait s'y attendre il signale qu'actuellement on accorde encore plus d'importance au jugement individuel pour la détermination de la cote qu'à la répartition mathématique du coût d'assurance. Il expose également la méthode préconisée par M. E. G. Richards, dite « The Experience Grading and Rating Schedule ». Plus analytique et plus précise, celle-ci fournit, note M. Pedoe, une solution aux objections soulevées par le Universal Mercantile System. – A.

Fire Insurance Rates in Canada

par

ARTHUR PEDOE, F.I.A., F.A.S.

Actuary in Canada for the Prudential Assurance Company, Limited

95

C'est avec plaisir que nous donnons ici quelques extraits d'un travail présenté par M. Arthur Pedoe au onzième Congrès international d'actuaire tenu à Paris du 17 au 24 juin 1937. Nous regrettons que le manque d'espace nous empêche de donner à nos lecteurs de plus copieux passages de ce mémoire, dans lequel l'auteur a mis, en particulier, des graphiques très intéressants qui tendent à démontrer l'importance du facteur moral en assurance contre l'incendie. Nous nous accordons pleinement avec lui sur le rôle qu'il joue dans les périodes de crise.

On trouvera ici une étude de la méthode dite Schedule Rating, ou des tableaux de tarification. L'auteur juge celle-ci moins dans l'usage qu'on en fait que dans son exactitude mathématique. Comme il fallait s'y attendre il signale qu'actuellement on accorde encore plus d'importance au jugement individuel pour la détermination de la cote qu'à la répartition mathématique du coût d'assurance. Il expose également la méthode préconisée par M. E. G. Richards, dite « The Experience Grading and Rating Schedule ». Plus analytique et plus précise, celle-ci fournit, note M. Pedoe, une solution aux objections soulevées par le Universal Mercantile System. — A.

The Universal Mercantile System

The Universal Mercantile System has been one of the outstanding contributions to Fire Insurance rate making on

the North American Continent and, as such, a brief outline of the system is of interest. The starting point for the computation of all rates is a *standard* building in a *standard* city, which, according to the combined judgment of the originators of the system and such experience records as were then available, indicated a rate of 25 cents per \$100 of insurance. In framing the schedule the originators aimed to secure a rate on which, — “the fire cost of the past five years per \$100 of insurance would result in such percentage of the premium as, with an allowance for proper expenses and also for accumulation for periodical and inevitable sweeping fires or conflagration, would leave a margin for a moderate profit not exceeding 5%”.

The *standard* city referred to is of a high type defined with reference to the character of the water works, the size of water mains, the existence of a good building law, the absence of dangerous outlying exposures and a previous five-year record, at the time the original schedule was devised, not exceeding \$5 fire loss per \$1,000 of insurance in any one year. A *standard* building is defined with reference to construction, and thickness of walls, area, height, floors, windows, beams, walls and doors.

The next step determines the rate on a *standard* building in any city and for this purpose, according to the original schedule, some 30 odd items of possible deficiencies are examined and, where applicable, additions to the 25 cents basis rate are made. The result of these additions and deductions is the *key* rate for a *standard* building in the city in question and is the starting point of the rating of a building in that city.

Owing to the high type of building adopted as a standard, a very large number of additions to the *key* rate have to be made for deficiencies, as regards thickness of the walls, nature of party walls, type and construction of roof, floors and

ceilings, the areas of floors, number of storeys, elevators (whether enclosed or open), stairways, skylights, lighting, heating, chimneys, width of street. From the rate thus obtained, deductions are made for exceptional features in the construction of the building and the rate of the "building unoccupied" is determined. An addition is then made for the contents of the building or the use to which it is devoted. A schedule, arranged in alphabetical order, gives the charges for hundreds of different occupancies. When the charge for occupancy has been added, the result is the "rate of the building occupied". Deductions are then made for the existence of fire appliances in or near the building. An addition is then made for the fire hazard due to neighboring buildings and, for certain congested business areas, an addition for the conflagration hazard. Further adjustments are made for "faults of management" as, whether there are empty boxes, rubbish, etc. in rear yard, and whether the ash and waste are kept in other than metal cans. The final rate for the building is thus obtained. There are about 130 items to be considered, starting from the key rate in a given city, before the rate on a non-fireproof building in that city can be determined.

97

The rate on the contents or stock is based on the "rate of the building occupied" minus one-quarter or some other fraction of the deficiencies of the building as already included in the said rate. The occupancy table, already referred to, gives, in separate column for each occupancy, the charge for the insurance of the contents. From this point there are additions and deductions similar to that explained above in connection with a building by which the final rate of the contents or stock is obtained.

It follows that the rating of a risk is a specialized business to be carried out by experts. The companies themselves are little concerned with the matter of determining ratings, apart from such minor changes which can be made in a building

and which will reduce the rate according to the schedule of rates published by the C. U. A. The multitude of additions and deductions which are made in Schedule Rating have no statistical foundation. In the main the Universal Mercantile Schedule, adopted at the beginning of the twentieth century, was devised on the same basis as the earliest fire rates, namely, that in the aggregate, the rates obtained covered losses and expenses and provided a reasonable profit to the insurers. Equity as to charges made for the various classes and hazards in the Universal Mercantile Schedule, is based in general on judgment rather than statistical investigation into loss experience.

It may be said that in determining the mortality of an individual in life insurance we do not have the multitude of factors which contribute to the fire insurance hazard of a building. In my opinion a large part of the difference is in the method of approach. The life insurance medical examination may be likened to the Schedule in fire insurance rating, as it deals with the various points affecting the life of the applicant as height, weight, condition of heart, lungs, chest, the urinalysis and blood pressure. But in life insurance we are looking for abnormalities and do not differentiate between minute variations in the characteristics of the applicants.

It is conceivable that in some future era we may have at a central Bureau of Records a complete record of each human being, giving the pre-natal characteristics, obstetrician's report on birth, method of feeding during childhood and mental development. There might also be records of periodic examinations, minor phases of changes in pulse rate and blood pressure, also the results of test meals passed through the system and analysed. A group of experts might then determine as their point opinion of any characteristic that such a minute variation merited an addition of a tenth of one per

cent of the normal mortality or a deduction of three tenths of one per cent. To the actuary this would be analogous to the present system of Schedule Rating in Fire Insurance. In such a hypothetical state of affairs, it would be stated that the multitude of variations in mortality could not possibly be tested by statistical analysis, as is the case with the individual items in Schedule Rating in Fire Insurance. The actuary in life insurance will then find himself in the same intellectual fog as is the case with anyone striving to find a statistical basis for rates in fire insurance at the present time. Why greater analysis of the physical characteristics is not made in life insurance is because it is impracticable to do so. The applicant's memory and knowledge of his illnesses and condition are a different factor to inanimate building, examined by an inspector, whose own patience and knowledge are the only limits to the accuracy by which the details of the schedule can be completed.

Increasing criticism of fire insurance rates and the challenge of unfair discrimination by insurers, has been met by more detailed analysis of the fire insurance hazard. It appears to me open to question whether this has had the effect of making the system more reliable or more accurate. When all these additions and deductions have been made, what relation has the final rate to the risk? Omitting for the moment any consideration of the measure of the minor and minute variations, the success of Schedule Rating, even in the aggregate, can only be determined by an examination of the experience, class by class, namely, a comparison of premiums charged and losses paid on the various classes of risks.

Schedule Rating has been defended as a factor in fire loss prevention. As certain structural improvements are made it follows that certain reductions are made according to a predetermined scale. As the fire prevention equipment or

water supply of a town is improved so the key rate is reduced. But so long as the relative charges have no statistical basis so long can the rates charges be challenged as inequitable. Changes are continually being made in reduction of ratings or increases in allowances or additional allowances for new features but it might be challenged that interests with influence can, by their agitation, obtain such allowances at the expense of the great body of insurers.

100

All insurance losses are paid out of a common fund to which all insureds contribute and thus equity is of vital importance. The fire insurance companies have a duty in seeing that no individual or group of individuals obtain any advantage over the other contributors to the common fund. On the North American Continent the Governments for many years have exercised the closest supervision of the insurance business and this trend has been spreading throughout the world. It is thus essential, if insurance companies are to be allowed to continue to operate, that they be able to justify their rates and rules.

There is one criticism of the Universal Mercantile System which is of interest in the calculation of fire rates. All additions to the key rate in the Universal Mercantile System are in the nature of flat extras and the same extra applies irrespective of the key rate. Thus the addition for an open staircase is the same where the key rate is 25 cents per \$100 sum insured as where it is 50 cents. The additional hazard of an open staircase would appear to be a function of the key rate and thus should be dependent on it. Additions for deficiencies should thus be in the nature of percentages of the key rate and not flat additions.

Experience Rating

The influence of the United States on Canadian practice is the justification for referring here to a suggested plan where-

by the rates for different classes of risks could be calculated on an actuarial basis. The originator is Mr. E. G. Richards, formerly President of the National Board of Fire Underwriters. The plan was originally suggested in 1915 and is outlined in his work, "The experience Grading and Rating Schedule" (New York, D. Van Nostrand Co., 1924 Edition). The details of the plan are tentative and are not complete. Briefly, the risks are divided according to grade of city and town (10 classes) and each of these groups into 430 occupancy classes of the National Board Classification. Each occupancy is then subdivided by construction into three classes, namely, Fireproof, Brick and Frame. The quality of the risk is then determined according to five classes and each subdivision is further divided according to "Inherent Hazard" (danger from fire within a risk which is inseparable from it regardless of surroundings), "Internal Exposure" (presence of risks in building other than the risk under consideration) and "External Exposure" (surroundings hazards outside the building). The data was to be obtained from the whole of the United States and the rates were to be adjusted for each State subsequently. The Richards' plan should have serious consideration as it has been put forward by an eminent fire insurance underwriter and further as certain suggestions of Mr. Richards have an immediate practicability.

Mr. Richards suggests that grades be determined by allotting points for various deficiencies similar to the Schedule Rating of a risk and to grade the result according to the final net total, as, Excellent (1-20), Good (21-40), Average (41-60), Indifferent (61-80), Poor (81-100). His "grading of a risk" must be distinguished from the "rating of a risk" but to my mind it indicates a possible solution of many of the objections to Schedule Rating. If the rates charged for a risk were according to its grade and the multitude of deficiencies and deductions were for the purpose of determining

the grade, the judgment which decided that one cent or 1% should be added for a certain deficiency would not be questioned to the same extent. A slight error one way or the other would not necessarily change the grade and hence the rate would be unchanged. It might then be possible to analyze the experience of each grade of the risk and thus indirectly check the additions for deficiencies and deductions on which the grading was based. Out of this might arise a simplification of Schedules which would concentrate on material variations in the fire hazard and omit entirely many of the present trivialities. Ultimately the experience by grades would be of real significance in checking the basis by which the grading was made. Changes in the rate of a risk by improvements in the hazard would only arise, if such improvements changed the risk materially and so changed the grade.

Another interesting point of Mr. Richards' plan is to make the Commercial Rating (Capital and Credit) of the risk a feature of the fire insurance rating. From the charts of this paper it will be agreed that there is much to be said in its favour. At the present time an incorporated concern with large capital and surplus, generally has to pay the same fire insurance rate for the same type of building and contents, as a small concern where fluctuations in the commodity price of their goods might introduce a substantial moral hazard. In Canada and the U. S. A. such Commercial Credit Ratings are readily available and widely used for other purposes. Reports as to the standing of firms are used in fire underwriting now but only to see if there is an obvious existing moral hazard on the basis of which the risk would be declined outright.

Under the Richard's plan the fire rate would be determined by calculating the rate of loss per \$100 exposed under each factor. This would appear to be the only correct measure. Present classification systems by taking the ratio of losses

to premiums are unsatisfactory. A scientific system should allow for the expense, loading varying according to the type of business. Thus on residential property it would differ from mercantile and manufacturing risks. Further, on sprinklered and fire-proof structures, where the rate is very low, the inspection costs might be better treated as a constant per \$100 insured rather than a percentage of the premium. A sprinklered building, at a rate of, say, 12 cents per \$100 yields a premium of \$240 a year for a \$200,000 sum insured. Inspection costs, say, at 5% of the premium (taking the business of all classes) would only yield \$12 which would not cover adequate inspection over the year for a sprinklered risk where frequent inspection is essential. Thus an Earned Loss Ratio of 33% as shown in the Dominion Classification on Sprinklered Risks might not be so profitable as this ratio might indicate.

The problem of fire insurance rating as it appears to me, is not to pretend to compute the rate on any piece of property to the exact cent or even five cents but to segregate insurable values into such classes and divisions, that each class can be looked upon as a fairly homogeneous unit, to which the losses of that class can be apportioned in the proportion of the value insured. A risk in any city may part of the total risks in that city and part of that class of risk throughout the country. If a grading system were adopted it should be possible to obtain a check on the equity of the rates charged from both angles. If the data in Canada were insufficient for an elaborate classification, classes could be grouped. The trained investigator is aware what valuable information can often be obtained from quite limited data.

It must be admitted that no scheme for the rating of fire risks by actuarial or statistical processes has been put into force in Canada or the U. S. A. although the latter country represents the largest aggregate of insurable values in any country

in the world and, unfortunately, none is contemplated. In countries where fire rate are very low the problem may be unimportant so long as equity, in a broad general sense, is carried out and the buyers of fire insurance are satisfied. But in Canada where fire rates are so high and there is evidence of dissatisfaction by the public, the problem is one of importance. This paper only pretends to point out the need for some attempt to a closer approximation to the rating of risks. It is a subject on which so little has been written that every discussion should be of value. A proper system of rating will not make the underwriting any more automatic than it is at the present time but it will make for greater equity between different classes.

1824

*Plus d'un siècle de service
aux agents et assurés.*

1937

**THE YORKSHIRE INSURANCE COMPANY
LIMITED**

ET

**THE LONDON & PROVINCIAL MARINE &
GENERAL INSURANCE COMPANY
LIMITED**

INCENDIE

AUTOMOBILES

ACCIDENTS

L'actif total dépasse \$82,000,000.

Surplus de l'actif sur le passif en Canada \$4,480,875.

Bureau principal au Canada

ÉDIFICE YORKSHIRE - MONTRÉAL

Gérant pour le Canada
F. E. DUFTY

Surintendant du
Département des Accidents
O. L. DUNCOMBE

Surintendant des Agences, Québec et l'Ontario Est
LOUIS PAUL CARON