

## REMARKS ON STATISTICAL DISTRIBUTION OF INTENSITY OF CHANCE DAMAGES

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Actuaries of Polish National Insurance are in the happy position that they have at their disposal a wealth of complete statistics which permits study of the level of chance damage (the loss-rate) and its elements such as frequency of occurrence, spread, intensity, etc. This welcomed situation stems from the fact that in Poland there is general insurance in certain sectors of the national economy. For instance, in the case of cooperative and individual (private) farms the entire property (buildings, products, livestock, real estate and machines, household furniture, etc.) is insured according to uniform principles against all hazards—fire, winds, floods, hail, death of animals and others.

This, among other things, makes possible the statistical determination of the intensity of chance damages (i.e. the extent of damage to a given object during one accident) in various elements of farm property.

Studies of this type have been of great practical importance in the activities of Polish National Insurance, first and foremost in the reconstruction of the insurance rates in connection with a change in the system to the “first risk” system (employed almost exclusively at present in farm insurance). Moreover, it is interesting that these studies have also served as auxiliary material in the elaboration of the optimum programme for the utilization of the funds allocated for preventing chance damages.

Studies on the distribution of the intensity of chance damages on insured objects have led to interesting results which have confirmed once again that this distribution is dependent on the structure of the objects insured and on the risks (hazards) covered by insurance protection; any hypotheses concerning these distributions must be verified in each case by trial statistical studies.

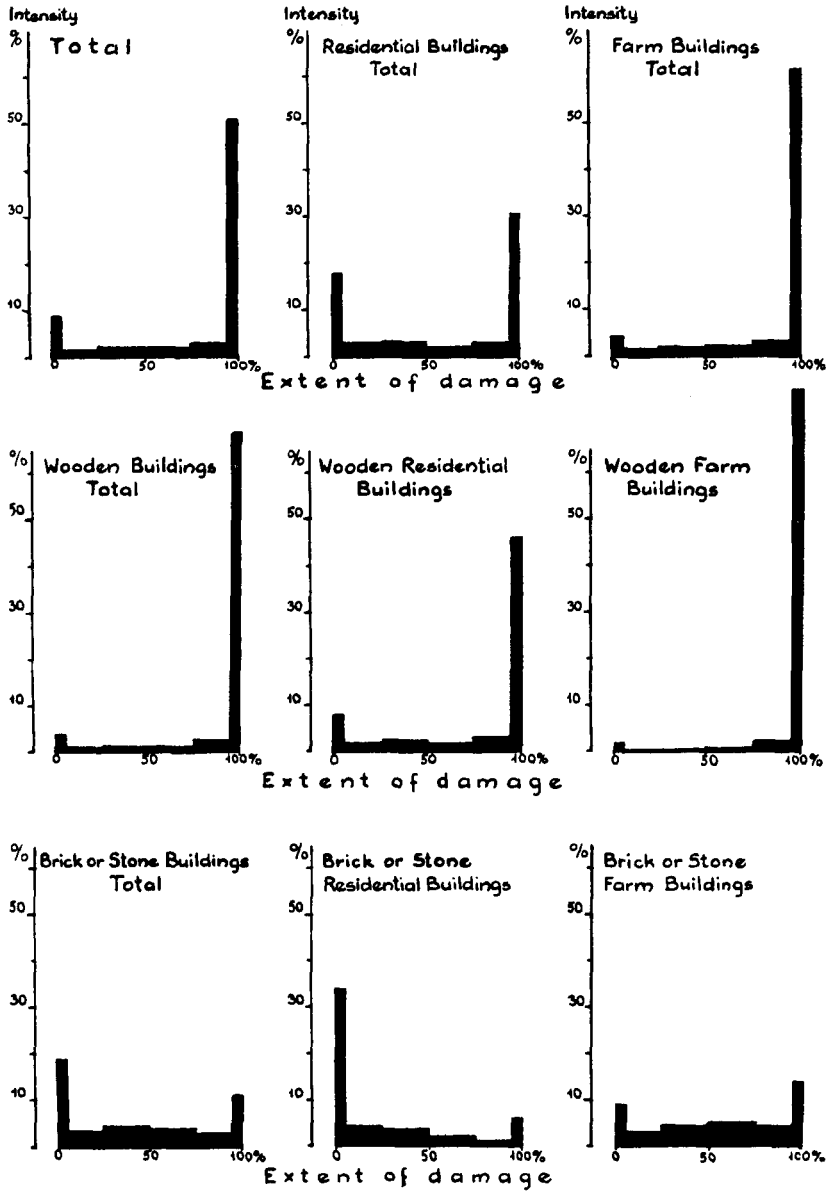
Without going into the theoretical angle of this subject at this point, we wish to present one table containing the results of statistical studies concerning the extent of fire damage to rural buildings in Poland; these buildings are classified according to construction, primarily wood or brick or stone, and according to purpose, residential or farm buildings. In presenting as an example the statistical data for the years 1957-59 on the intensity of fire damage to rural buildings, we refer to similar information published earlier in the reports from the International Congress of Actuaries \*): Comparison of data based on statistical materials for 1957-59

Rural buildings damaged by fire, 1957-1959, classified according to percentage of damage, construction and purpose

Construc- tion	Extent of damage	Total		Residential buildings		Farm buildings	
		No. of buildings	%	No. of buildings	%	No. of buildings	%
Total	Total	55 922	100,0	18 346	100,0	37 576	100,0
	do 5%	4 628	8,3	3 227	17,6	1 401	3,7
	6 — 25%	4 198	7,5	2 164	11,8	2 034	5,4
	26 — 50%	6 044	10,8	2 995	16,3	3 049	8,1
	51 — 75%	5 972	10,7	2 027	11,1	3 945	10,5
	76 — 95%	6 423	11,5	2 171	11,8	4 252	11,3
	96 — 100%	28 657	51,2	5 762	31,4	22 895	61,0
Wooden	Total	39 004	100,0	11 621	100,0	27 383	100,0
	do 5%	1 418	3,6	935	8,0	483	1,8
	6 — 25%	1 690	4,3	989	8,5	701	2,6
	26 — 50%	2 284	5,9	1 499	12,9	785	2,9
	51 — 75%	2 501	6,4	1 133	9,7	1 368	5,0
	76 — 95%	4 254	10,9	1 691	14,6	2 563	9,3
	96 — 100%	26 857	68,9	5 374	46,3	21 483	78,4
Brick or stone	Total	16 918	100,0	6 725	100,0	10 193	100,0
	do 5%	3 210	19,0	2 292	34,1	918	9,0
	6 — 25%	2 508	14,8	1 175	17,5	1 333	13,1
	26 — 50%	3 760	22,2	1 496	22,2	2 264	22,2
	51 — 75%	3 471	20,5	894	13,3	2 577	25,3
	76 — 95%	2 169	12,8	480	7,1	1 689	16,6
	96 — 100%	1 800	10,7	388	5,8	1 412	13,8

\*) Transactions of the Eleventh International Congress of Actuaries in Paris, Vol. II, O. Einfield (Warsaw): Beitrag zur Statistik der Gebäudefeuer-  
versicherung (pp. 427-434).

**Graphic representation of distribution of intensity of fire damage to rural buildings**



with data for the same country for 1934-39 permits us to draw conclusions as to the time-variation in the distribution of intensity of fire damage. This is a highly interesting problem since it is connected with analysis of the extent of changes in the collectivity of the insured objects (changes in construction, increase in fire safety, changes in socio-economic conditions, etc.) that affects the degree of inflammability and its elements.

Analysis of the presented results of statistical studies of the intensity of chance damages in rural buildings is by-passed here. We merely draw attention to the fact that the distribution of fire damage in wooden buildings is a typical example of extreme asymmetrical distribution, i.e. in the shape of the letter "J", and the distribution of intensity of fire damage in brick or stone buildings is U-shaped.

It is not difficult to explain why the intensity of fire damages is so distributed.