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THE REINSURANCE OF THE RISK OF EARTHQUAKE

INTRODUCTION.

During the present session we have analysed, according to experience and investigations, some aspects of evaluating the probabilities of earthquakes, their effects, prevention and mitigation.

It is well known that earthquakes whose radius of action include a relatively important urban center, have major economic and social effects. It is true also, at least in Latin America, that in the capital cities nearly 40% of the country's population lives, and consequently its economic activity represents an equal or major percentage of the GNP. A high percentage of these populations have experienced seismic effects.

It is evident that cities will continue to be affected by earthquakes. That is why we who live in Chile, not only as national insurance officials, but as citizens have to think of what we should do to face up to a phenomenon of this type.

There are many methods of mitigating seismic effects which have been developed and this issue will be dealt with by the participants at this seminar. However, after an earthquake has occurred, the capacity to rehabilitate at the economic level existing before the event depends on potential financial resources, national or foreign, which may be used for the affected zone. World insurance and reinsurance companies according to the nature of their indemnity policies, would channel the flow of compensation to the claimants.

Filomeno Mira in a previous report, touched on the question of seismic insurance. The points raised in this paper could be extended to cover reinsurance.

EARTHQUAKES: CATASTHOPHIC CHARACTER FOR INSURANCE PURPOSES

Earthquakes, as other natural phenomena, have a catastrophic character for the insurance industry because a group of interests ensured within different insurance policies

covers the same event. This situation may endanger not only current risk reserves, but a part or the whole patrimony of insurance companies if these have not been correctly run.

That is why insurance companies in turn have to protect themselves against these risks, i.e. to reinsure.

Insurance for catastrophic losses differs from the habitual, conventional losses such as fire, theft, and car accidents. One case affects one or more concurrent risks. On the contrary, an earthquake may affect the whole regional portfolio.

From a statistical point of view, concerning the cost of insurance for habitual losses it is possible to establish a tariff or calculate the premium on the basis of annual or triannual disaster experiences. Statistics regarding insurance against seismic risks either do not exist or are not consistent.

Nevertheless methodology exists for establishing tariffs for seismic risks, which basically take into account two important circumstances: the possibility of earthquakes and possible damage or losses which they cause to insured interests.

A pure or risk rate is equivalent to the sum of probable average damage weighed against an annual probability of earthquakes. These average quantities for seismic zones can be assigned to every risk giving weight to such factors as design, building norms, materials, use, purpose or activity, contents, nature and others.

Seismic losses or damage can be classified as follows:

1. Direct losses.
   a) loss of life or injury.
   b) destruction or deterioration of goods in a disaster zone.

2. Indirect losses or consequential damage - result of indirect losses.

From the preceding I would like to stress that such losses which cause economic damage, as classified above, amy be and consequently in some cases covered by world insurance.

The earthquake risk is covered by insurance not only by fire policies but also by all risk policies re construction, assembly, equipment and machinery of contractors, electronic equipment, finished civil buildings, transport, and shipping. These policies are mainly oriented to cover physical damage, but more and more tend to cover eventual damage or losses.

SEISMIC RISK REINSURANCE

As pointed out, the management of coverage, which includes seismic risk, represents a superexposure of the insurance company's stability. The responsibility aggregates of policies which cover physical damage or losses and consequential economic losses thus need permanent and strict control.

In those zones of interest, an insurance agent controls the responsibility accumulation. These zones are the regions which must be under a permanent and strict control Where high concentration of values and responsibilities are involved it is desirable to adjust the zonal distribution network, wherever exact statistics of seismic experience exist.

The insurance activity tries to establish the maximum probable losses for a catastrophic event. While on the basis of a specific experience one may calculate an average loss in the market, its influence on the portfolios of every company has been different according to the structure and particular exposure. Equally, in order to manage probable future events one may claim a PML of the market, but this quantity will not be the best estimation for every portfolio of every company.

A premium associated with every total amount, exposed to seismic risk, covered by the insurance company, can help, jointly with the main basic risk, to establish an association of the total amount of premiums in every zone concerning the respective accumulation.

After establishing the maximum possible exposure rate manageable for every zone during the subscription period, and evaluating it according to the PML of every one, one may calculate the capacity of direct management and the need for reinsurance in order to maintain the company's stability.

The proportional reinsurance transfers a certain share of the original quantum of responsibilities and the same share of the associated premium. The reinsurance company, in accordance with its proportional share, will be involved in every indemnifeable loss. There are mechanisms of transfer, so called facultatives and automatic shemes or contracts which

establish that one part is giving up an another is accepting all the cases or policies, which comply with pre-established conditions.

The non-proportional reinsurance, on the contrary, is the portfolio insurance exclusively for events resulting from these catastrophic risks. This kind of reinsurance establishes the responsibility of the reinsurance company, binding it to compensate for part of a catastrophe, in this case earthquake, which exceeds an agreed amount, called priority or excess point. To determine whether the reinsurance company will participate, and only to the extent of the excess of the agreed priority, depends on the scale of the catastrophe.

Due to losses through catastrophy caused by earthquake, the portfolios which cover the risks, reinsure proportionally a part of the portfolio and the rest with the excess of loss, getting better combination of such aims as capacity, stability and protection.

Information on insurance in the case of earthquake and economic development lead more and more to concentrate values in exposed zones, which in turn means more demand for insurance and reinsurance

Due to this evolution, the control of correct and updated cumulus by the direct insurer is an important way in which to plan the control the management of assumed seismic responsibilities and the need for reinsurance. This information will be of the same importance for the reinsurer.

As reinsurance is used internationally, it is very important to work out information standards for managing seismic risks. To meet this need, and due to seismic experiences in Managua and Guatemala, the insurers and reinsurers created an international group named CRESTA (Catastrophe Risk Evaluating and Standardizing Target Accumulations). Its goal is to give impetus to identification, quantification and the correct and efficient control of the commitments covering catastrophical danger in insurance and reinsurance. Efforts have been concentrated principally on earthquakes:

- General aspects of a country with regard to earthquakes, experience and present danger potential.
- Market information about seismic coverage.
- Zone maps of seismic cumulus.
- Standard forms of registering cumulus.

EARTHQUAKE INSURANCE AND REINSURANCE IN CHILE

Chile has much experience in the sphere of insurance and reinsurance.

First of all. the coverage of earthquakes is totally voluntary with the exception of some mortgage portfolios. The existent incentive is freeing premiums corresponding to this coverage from the aggregated value tax.

As to developments in this area, I would like to mention the investigations carried out by the Caja Reaseguradora (Reinsurance Company) on theearthquakes of March 1960. Study of the insured amounts and the damage caused, on the basis of our files on the seismic occurrences in Concepción y Valdivia (the last considered as one of the largest in the world), demonstrated that the damage amounted the equivalent of E- 48,200,000. For zones IV and V, which include affected areas, this signified only 4% damages against the total amount insured.

As an anecdotic detail, taking into account the exchange rate, in the case of Valdivia, which was then an important industrial city, there were no covering seismic risk policies for the earthquake of March 1985, the largest in the Central Zone, which affected San Antonio, Valparaíso y Santiago, and the strongest in magnitude over the last 80 years, the insured losses amounted up to US$ 85,000,000, approximately 7% of the total losses estimated at US$ 1,200,000,000.

The coverage was less than 2% of the total amount insured.

It is an equivalent of joint exposure of the Zone II and Zone III, near US$ 5 blns. in March 1985.

Due to the efficient indemnity service of the insurers and given the damage resulting from the earthquake, there was a permanent increase in insurance against such risks. Now our estimates, only for Zone III, are between UF. 11 to 12 blns.

Areas for limits of cessation in the contracts:

CHILE	Zone 1	North
	Zone 2	Valparaíso/Aconcagua
	Zone 3	Santiago
	Zone 4	Centrales
	Zone 5	Australes
	Zone 6	Flotantes (Not indicated on the map

EARTHQUAKES				
Country	*Date*	*Region*	*Deaths*	*Global Damage (millions US$)*
Chile	1906, Aug 17	Valparaíso	3,800	260
	1928	Talca	220	
	1939, Jan 24	Chillan	28,000	38
	1960, May 21/22	Concepción Valdivia	3,000	880
	1965, March 28	Santiago	400	80
	1971 July, 9	Salamanca, Coquimbo Valparaíso	85	137
	1983, March 3	Valparaíso	200	1,200

EVOLUTION OF SEISMIC INSURANCE CHILE (US$)				
Year	*Patrimony of Companies*	*Number of Policies*	*Seismic Premium*	*Cumulus Zones III*
1984	107,197,650	13.620	8,058,372	
1985	108,544,710	20.521	14,330,320	5,117,000,000
1990	128,877,083	47.903	28,586,324	12,000,000,000