The Actuarial Profession in Mexico*

Pablo Noriega and Luis Miguel Rodríguez

Colegio Nacional de Actuarios, México

Actuaries in Mexico form a closely-knit community. They are different than actuaries in Canada or the United States on two main accounts. First they become actuaries through an academic program, not through peer-recognition. Second, they have established a diversified practice where a significant number of actuaries work in non-traditional areas such as Finance, Government, Planning and Informatics.

Nevertheless, mexican actuaries are very much like actuaries in other parts of the world. They are trained in the same skills and techniques, they share the same problem-solving orientations and a similar mind-set.

In an ever more interdependent world, and in face of an eventual signing of a North American Free Trade Agreement, new opportunities to work, collaborate and compete are becoming a reality every day. We, actuaries of the three countries will probably profit from a better knowledge of each other and of each other's perspectives. This article is an attempt to present a succinct description of the actuarial profession in Mexico, its origins, educational environment and associations in hope of providing a useful background for a dialogue that is now just starting.

1. Historical Outline

Statistical and insurance-related activities can be traced back to colonial and even precolumbian times in Mexico, but the first professional actuaries came to this country at the turn of the century. These pioneers of the profession were mainly Europeans, hired by the newly established Insurance Companies. They were soon to be joined by a few Mexican accountants and engineers who under their guidance became trained in classical actuarial techniques.

By 1937, the group was large and active enough to create the "Instituto Mexicano de Actuarios", a professional society which for more than a decade fostered the development of the profession, produced technical studies and promoted education and training in Actuarial Science.

In 1945 --two years after the Mexican Institute for Social Security had been founded-- Congress passed the "Ley General de Profesiones", which regulates the licensing procedures for professionals in different fields. Under this framework -- which follows the French conception of "Profession" -- if actuaries in Mexico were to be recognized as professionals, they would have to be certified as such by a university. Thus, in 1946 a Bachelor's Degree program in Actuarial Science was established in the National University.

There was some discussion as to where the program belonged within the university structure. Some argued that being a profession linked to the Insurance Industry, Actuarial Science should be part of a Professional Division, namely Accounting and Business. However, due to the strong content of Mathematics and Statistics this program required, it became part of the Science Division of the National University. So, actuaries would share classrooms with mathematicians and physicists, but unlike them, actuaries would be entitled to have a "Cédula Profesional" with its inherent privileges and responsibilities.

---

* Society of Actuaries International Section News. N.1 pp7-13. (1992)

The Mexican Institute for Social Security and an expanding Insurance Industry readily absorbed the graduates from this academic program. However, by the mid sixties, the number of students in Actuarial Sciences -- which had grown from four in 1946 to more than two hundred in 1964 -- was showing signs of exceeding the job opportunities then present in the traditional fields of the profession. Moreover, actuaries had been quite successful in applying their skills in non-traditional fields, developing a perception of the actuary as a highly-trained problem-solver. A deliberate decision was made to encourage actuaries to pursue graduate studies in fields related with the basic curriculum, and mexican actuaries started to aggressively position themselves in areas such as Finance, Statistics, Demography, Operations Research and Computer Science.

Two associations of actuaries were born in those years. In 1962, the "Asociación Mexicana de Actuarios del Seguro de Vida" which grouped actuaries in Life Insurance, and later expanded its membership to all actuaries to become the "Asociación Mexicana de Actuarios" in 1980. And the "Colegio de Actuarios de México" in 1967, which became in 1982 the "Colegio Nacional de Actuarios".

The demand for actuaries continued to grow and a second program in Actuarial Science was established, now in a private university, Universidad Anáhuac, in 1969. Another one was established in 1976, at ENEP-Acatlán. And yet two more in 1982, at ITAM and Universidad Anáhuac del Sur.

By 1980, actuaries were small in numbers, (still less than 500 certified actuaries) but were becoming prominent in private and public affairs. Prominent enough to institute a National Prize in Actuarial Science the following year, which on a biannual basis is awarded by the President of Mexico.

In 1982 the Colegio Nacional de Actuarios issued the "Code of Ethics and Professional Conduct" to which all certified actuaries are subject. That same year, a third association, the "Asociación Mexicana de Actuarios Consultores en Planes de Beneficios para Empleados" was founded.

Two more undergraduate programs in Actuarial Science were established, one in the city of Puebla, at the Universidad de las Américas in 1983, the other at the Universidad Autónoma de Guadalajara in 1986.

In this last decade, the number of certified actuaries reached 1,800. Almost 90% of all actuaries practice in the Metropolitan Area of Mexico City, the rest are concentrated in Guadalajara, Aguascalientes, Monterrey and Puebla. The profession was, up to the mid-sixties, predominantly male, now it is evenly distributed.

Mexican actuaries are employed in Insurance Companies, Actuarial Consulting Firms and the Social Security Institutions of our country, but a significant number of actuaries may also be found in Banking, Government, Stock-Brokerage Houses, Computer Firms and Academia.

2. Licensing, Regulation and Professional Studies in Actuarial Sciences.

To be able to work as an Actuary in Mexico -- or even to call oneself an actuary -- an individual must receive an actuarial degree from an officially recognized Mexican institution. This, in turn is achieved only by satisfying three basic requirements: First to undergo a four year undergraduate program in Actuarial Sciences fulfilling all credit requirements (including translation from at least one foreign language and 480 hours of unpaid socially valuable work). Second, write a dissertation. Third, defend the dissertation in front of an examination committee.

Recently, though, three of the seven universities offering a degree in Actuarial Science have started to offer alternatives to requirements two and three above, such as doing graduate work in an acceptable program and passing a comprehensive written and oral examination in front of a committee. But still, most students opt for the traditional alternative.

Only when the three requirements (or its approved alternatives) are satisfied, is the degree granted. The degree, issued by the university is then certified by the Ministry of Education and a "Cédula Profesional" is in turn issued by the Ministry. This "cédula" is required in order to sign any official document legally requiring the signature of an actuary --such as the adequacy of reserves in insurance companies' annual statements. All dully certified actuaries are publicly sworn to uphold the code of ethics of the profession, but they are not required to become members of the Colegio or any other association of actuaries.

Presently there are seven undergraduate programs in Actuarial Sciences. Together they have produced more than 1,800 certified actuaries and close to four times that many "Pasantes" (i.e. students who have fulfilled all their credit requirements, but have not yet been fully certified as actuaries). (Cf. Table 1).

The academic programs in the seven universities are quite similar (Cf. Table 2). They are all quite intensive in Pure and Applied Mathematics, Statistics and Actuarial Science proper. As is the case with professional education in Mexico --in sharp contrast with the "Liberal Arts" tradition-- the program is geared towards educating a specialist, therefore it leaves little room for non-actuarial material.

A quick comparison with the educational curriculum of the Society of Actuaries shows that the material covered by the Mexican undergraduate program is very close to that required by the SOA (Cf. Table 3). Thus, 56% of the Mexican curriculum accounts for 175 of the 200 credits required by the "Associate" level of the SOA. The rest of the Mexican curriculum covers material that correspond to some of the requirements in the "Fellow" level of the SOA --such as legislation, Theory of Insurance and Pensions-- and other general or complementary material (Economics, Accounting, Philosophy).

The quality of the undergraduate programs in Actuarial Science in Mexico, although generally recognized as one of the highest in the country, is not uniform. Nevertheless, the seven universities, supported by the Colegio Nacional de Actuarios, keep close contact and for the past four years have agreed on common contents and standards for most of the courses.

However, there is an indicator of quality that can be illustrative of the level to which the courses are taught. Starting in 1989 Anáhuac encouraged students to take SOA exams, and organized workshops to prepare for those exams. These workshops are independent of the regular academic workload, thus requiring additional time from students to prepare for them. Furthermore, students submit to the exams on a strictly voluntary basis, i.e. no rewards (academic or otherwise) are received. A number of students from Anáhuac and other universities have enrolled in the workshops and presented the exams. The results for Anáhuac students so far are presented in Table 4.

Mexican actuaries start to work young, many while still at school, but many pursue graduate work. Starting last year, ITAM offers a one-year graduate program in Insurance and Anáhuac a two-year Master's Degree in Actuarial Science.

3. Actuarial Associations

There are three actuarial associations in Mexico, the Colegio Nacional de Actuarios (CONAC), the Asociación Mexicana de Actuarios (AMA) and the Asociación Mexicana de Actuarios Consultores en Planes de Beneficios para Empleados (AMACPBE).

The three associations share a common interest in the development of the profession, so they all promote different activities and events to elevate the technical expertise of practicing actuaries, to strengthen the communication among professionals and to serve society as a group. Differences between the three organizations stem from their area of specialty and, in the case of CONAC, its official role.

Most actuaries are affiliated to CONAC, which is an exclusively actuarial organization. AMA's membership is mostly actuaries (the majority of whom also belong to CONAC), although from its original orientation to Life Insurance it also has as members a few non-actuaries who are prominent in the Insurance Industry. AMACPBE groups those actuaries in the consulting area, mainly private Pension Funds and Employee's Benefits; to be a member of AMACPBE one has to be a member of CONAC.

CONAC is a professional membership, non-academic, independent organization for all actuaries licensed to practice in Mexico, regardless of their specialty area. However, in addition to its natural role as a professional organization, CONAC is recognized by government authorities as the representative organization of actuaries. As such, CONAC is responsible for issuing and supervising the code of professional conduct, supervise professional education, advice on all matters of its competence and provide expert opinion upon request of any National or Local authority.

In this capacity, CONAC has been consulted in issues ranging from the recently approved Retirement Savings System by the Ministry of Finance, to a new mortality table and a project on compulsory Automobile Insurance by the National Insurance Commission, or the evaluation of risk in the liabilities of "Patrimonio del Ahorro Nacional" (a government-sponsored savings institution focused on low-income individuals), to cite typical recent examples.

Three bodies form CONAC's leadership. It has an Executive Board which is elected every two years by direct and secret vote of all its affiliates. It also has an Advisory Council, appointed by the Executive Board and divided in Committees by specialty areas. Finally, there is a "Junta de Honor", an overseeing body formed by distinguished actuaries elected by the General Assembly. This Junta de Honor serves as a consulting body of the highest level to the Executive Board, supervises its actions and upholds the Ethical Code for Professional Conduct and Practices of the profession.

CONAC's Advisory Council has committees specializing in Life Insurance, Pensions, Finance, Computer Science, Statistics, Demography, Operations Research, Social Security, etc. There is also an Academic Committee, whose members represent the seven universities where Actuarial Science is taught, and an Editorial Committee. These committees reflect the diversity of the profession in Mexico and are also an effective liaison between the Colegio, its members and society at large.

The relationship among the three associations is rather tight, both AMA and AMACPBE presidents hold a chair in CONAC's Advisory Council and many activities are cosponsored. Among these, there is an annual Meeting of Actuaries, a biannual Congress of Actuaries, a biannual "Foro de Escuelas de Actuaría" and a biannual Premio Nacional de Actuaría. The three associations promote continuous education through conferences, seminars and courses and have sponsored different publications.

4. Closing Remarks

Looking back at the development of the Actuarial profession in Mexico, one can distinguish three major stages in its development. The first one, from the 40's to the mid-sixties, was a foundational period where the profession was defined and became useful to a society whose economy was rapidly changing from a rural to an industrialized economy. The second, that lasted until de early eighties, a period of rapid expansion and diversification. Finally, a period where the profession consolidated its institutions and its role in society.

During these years, the profession has been shaped by its academic imprint and its diversified practice.

However, we are entering a new phase, a period of internationalization of the profession.

Mexico has seen dramatic changes in the past three years: productive activities were privatized and deregulated, bureaucracy shrunk, markets liberalized and opened to competition from abroad. Alliances and joint ventures are being forged, specially with North-American but also European Firms.

Professionals --and actuaries are no exception-- are adapting rapidly to this new environment. We are already working in closer contact with colleagues from the rest of the world and the trend is unlikely to change.

If anything, the eventual signing of a North American Free Trade Agreement will increase and enrich these interactions. Issues such as temporal internation of professionals, professional consulting and even standards of professional conduct will then have to be addressed and agreed upon.

We, mexican actuaries, are confident that this new phase, challenging as it is, will also be very productive for us and for our colleagues from other countries. After all we, as all other actuaries, have been trained to evaluate the risk and opportunities of contingent events.

Table 1

Actuarial Programs in Mexican Universities

University	UNAM	UA	ENEP	ITAM	UAS	UdlA	UAG
Location	Mexico City	Mexico City	Mexico City	Mexico City	Mexico City	Puebla	Guadalajara
Type	Public	Private	Public	Private	Private	Private	Private
Established	1946	1969	1975	1982	1982	1983	1986
Current Enrollment	600*	130	477	310"	52	84	19
Pasantes ~	4000*	472	1572	970"	65	36	9
Certified	1307	279	141	26	26	36	0

~ "Pasantes" are students who have fulfilled all credit requirements but have not been certified as actuaries.

* Estimated

" Actuaries are not distinguished from Applied Mathematicians and Statisticians

Table 2

Courses *in the Actuarial Undergraduate Curriculum

AREA \ UNIVERSITY	UNAM	UA	ENEP	ITAM	UAS	UdlA	UAG
Mathematics	11	11	10	8	11	9	11
Applied Mathematics	5	7	6	8	8	7	5
Actuarial Mathematics & Other Actuarial Topics.	7	8	6	12	12	6	7
Finance & Economics	4	5	5	4	8	6	4
Administration & Accounting	2	2	2	2	3	1	2
Computer Science	1	3	2	3	4	4	1
General	-	5	2	7	3	8	-
Electives	8	7	10	2	-	5	10
TOTAL	38	48	43	46	49	46	40

* Contents and scope vary among universities.

Table 3

SOA Associateship Requirements vs. Mexican Curriculum

Exam	TOPIC	Credits	Type#	No. of Courses~
100	Calculus & Linear Algebra	30	R	9
110	Probability & Statistics	30	R	4
120	Statistical Methods	15	R	2
121	Intensive Seminar on Applied Statistical Methods	10	E	-
130	Operations Research	15	E	2
135	Numerical Methods	10	E	1
140	Mathematics of Compound Interest	10	R	3
150	Actuarial Mathematics	40	R	3
151	Risk Theory	15	R	1
152	Intensive Seminar on Risk Theory	10	E	-
160	Survival Models	15	R	G*
161	Mathematics of Demography	10	E	1
162	Construction of Actuarial Tables	10	E	G*
165	Mathematics of Graduation	10	E	G*

"Required" or "Elective" in SOA's examinations

~ Number of Courses included in the undergraduate curriculum. Some may be elective in some universities.

* Courses offered in Anáhuac's Graduate Program in Actuarial Science

Table 4

Performance of Anáhuac Students in SOA Examinations

Exam	TOPIC	#Students	#Passing	Success Rate
100	Calculus & Linear Algebra	36	31	86%
110	Probability & Statistics	6	6	100%
130	Operations Research	7	3	43%
135	Numerical Methods	6	4	67%
140	Mathematics of Compound Interest	8	4	50%
151	Risk Theory	6	5	83%