DEVELOPMENT OF THE ACTUARIAL PROFESSION IN UKRAINE

National Report of the UKRAINIAN ACTUARIAL SOCIETY
Prepared for ICA 2002, Cancun, Mexico
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Ukrainian Actuarial Society

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1. INTRODUCTION

The development of the actuarial profession should be a priority for Ukraine. As Ukraine continues its transition to a market economy, the need to develop non-bank financial institutions and to develop strong insurance and financial services industries means there will be a need for actuaries. In addition, the government of Ukraine already sponsors a wide variety of social insurance programs – pensions, occupational disability, temporary disability, unemployment, health insurance, etc. – that need the assistance of actuaries in order to prepare proper long-term financial models and projections.

This report discusses the various elements necessary for the creation of the profession, the status of those elements in Ukraine today, and recommendations on how to improve these elements. The key building blocks of the profession are:

- Academic programs in actuarial science
- Certification programs and processes
- Professional standards of practice and their enforcement
- Legal or regulatory foundations for the profession
- Jobs for Ukrainian actuaries under the supervision of experienced actuaries.

2. UKRAINIAN ACTUARIAL SOCIETY

The Ukrainian Actuarial Society - All-Ukrainian Public Organisation
License of the Ministry of Justice of Ukraine №1710 from 19.11.2001

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The Ukrainian Actuarial Society (UAS) was organised on September 17th, 1999 at the First Establishing Congress.
The President of UAS is the Academician of the National Academy of Science of Ukraine Mr. Korolyuk V.S.

The Council of Directors:

Galitsky I. – Chairman of the Council;
Gorenko V. – Director of Finance Department;
Krvavych Yu. – Director of the Actuarial Science & Education Department, Individual Member of the International Actuarial Association;
Mats O. – Director of the Department of Actuarial Methodology & Professional Standards;
Shelest S. – General Secretary of UAS.

The natural persons, having passed two-year Postgraduate Course in Actuarial Science, organised in Ukraine by the Institute of Actuaries (UK), have successfully passed examinations and defended their diploma papers. These persons have obtained the international certificates given jointly by the Institute of Actuaries (UK) and the Committee on supervision of insurance activity of Ukraine. According to the Order of the Ukrainian Insurance Supervisory Committee №12 from 17.02.2000 these persons have the right to perform actuarial calculations in the insurance companies of Ukraine.

The UAS has the status of the All-Ukrainian public organisation and accounts 16 regional branches. There are two categories of membership in UAS, such as fellows and associates. The UAS accounts 42 fellows and 7 associates. All fellows and associate members of the UAS work at insurance companies. Some of them teach students at higher education institutions in Kyiv, Lviv, Kharkiv and Donetsk. Six fellows of the Society underwent training at the Institute of Actuaries in Napier House (Oxford) and Staple Inn (London) and obtained the relevant certificates.

UAS unites natural persons – the specialists in actuarial and financial mathematics, which have the professional actuary’s qualification and are allowed to make actuarial calculations.
The primary problems of the UAS are:

- The maintenance of the professional level of the actuaries’ activity, protection of their rights and interests;
- The introduction of the methods of actuarial and financial mathematics in insurance, investment and bank spheres;
- Working up and implementation of the programs of professional training and the actuaries’ professional skills;
- The information, analitical and methodical maintenance of the actuaries’ activity;

The Supreme Body of UAS is the Conference of its members. The Council of Directors supervises the activity of the UAS at the period between the Conference meetings. The Inspection Committee realises control over the conformity of the UAS activity to its Charter. Between the Conference meetings, the members of the UAS participate in independent working groups with involvement of the League of Insurance Organisations, representatives of insurance companies and Government officials.

UAS is the observer member of the International Actuarial Association (IAA).

The UAS is actively engaged in a variety of activities, including:

- Supervising of actuarial conferences,
- Writing a draft law: “On Actuarial Activity”,
- Educating businesses and the government about the role and necessity of the actuarial profession
- The development of a national certification centre.

The UAS is currently working with Taras Shevchenko National University of Kyiv to try to establish a certification centre. The UAS will need to work with the government of Ukraine to discuss how practice standards should be developed and enforced both now and in the future. The actuarial profession does not yet have the necessary knowledge and skills to self-discipline the profession and to establish their own rules of conduct. However, long-range goal should be to have the development and enforcement of practice standards reside with the Ukrainian Actuarial Society.
In the near future, the Ukrainian Actuarial Society is planning to obtain full member status within the IAA. To do this, it must:

- develop a Code of Professional Conduct, and make it consistent with the current law;
- set up a formal discipline process in compliance with the international standards;
- design standards of practice;
- reconcile examination programs for certification with the education requirements and curricula for actuaries in Ukraine.

The Department of Actuarial Science and Education of the UAS administers the actuarial research. The responsibilities of the Department include:

a) support for scientific and research activities of UAS members by:

- publishing scientific articles in the electronic edition of the Ukrainian Actuarial Journal,
- holding scientific conferences and workshops, symposia, roundtables and meetings of the UAS.

b) development of links with actuarial societies in countries with a well developed actuarial profession, international actuarial organisations (IAA), and international education institutions that provide actuarial academic programs, for the purpose of exchanging information and experience, and integration of the UAS into international actuarial life.

The professional activity of the UAS is governed by the Society’s Department of Actuarial Professional Standards Development. Their scope of responsibilities includes:
a) development of a legal definition of actuarial profession and its legitimacy for insurance companies, pension funds and other organisations of the stock exchange and banking sector;
b) development of ethical norms and professional responsibility standards of an actuary, and then assurance of their adherence under supervision of the members of the UAS;
c) development of regulations for legal protection of actuaries at insurance companies and pension funds.

Certification Process

The UAS proposes to set up the Certification Centre at Taras Shevchenko National University. The process of actuarial certification will be unified for all types of actuarial activity, similar to the certification procedures in Great Britain. When the actuarial profession becomes extensively developed, specialised examination programs may be developed.

Today, the certification function is performed by the Insurance Department of the Ministry of Finance (former Committee on Supervision of Insurance Activity). In accordance with Article 9 of the Law of Ukraine “On Insurance”, this Department issues orders listing individuals who are eligible to prepare and sign actuarial calculations of insurance tariffs. The Department does not conduct any exams and there no verification procedures for results of exams passed in other places.

3. LEGAL AND REGULATORY STRUCTURE OF THE PROFESSION

The legal and regulatory structure for the actuarial profession is still in its infancy in all of Eastern Europe and the former Soviet Union. This is not surprising, since the profession did not exist in the planned economies of this region. Consequently, both the profession itself and its legal basis and structure must evolve and grow together.

From a review of the practices of countries in the region, several conclusions can be drawn. First, it is clear that there must be some legislation that includes provisions governing the actuarial profession. In most cases, the relevant legislation is in the insurance company laws, and regulatory responsibility rests with the government organisation responsible for insurance company regulation.
It is very important for Ukrainian law to clearly define:

- Who is permitted to call themselves actuaries – When someone calls himself or herself an actuary, this must mean that the individual has met certain education, experience and testing requirements. Those requirements should be clearly specified by law and regulation. Only those who have met these requirements can present themselves to the public as actuaries.

- What organisations are required to hire an actuary – There should be mandatory requirements for certain types of organisations to employ an actuary. This is particularly true of insurance companies and certain types of pension funds.

- Specific requirements for the chief actuary of an organisation that is required to hire an actuary, and the procedures for hiring, approval, and dismissal of that individual.

- The specific duties and responsibilities of the actuary with respect to each type of organisation – There should be a requirement that certain types of reports, calculations and certifications must be prepared by an actuary. The minimum content of these reports and the format of the certifications should be specified.

- The government organisation responsible for regulating those companies and entities that are required to hire an actuary, and the activities of those actuaries.

- The duties and responsibilities of the Ukrainian Society of Actuaries, and the procedures for establishing and maintaining this organisation.

These items can be specified in a separate law of Ukraine, or it can be incorporated into the legislation governing insurance companies and pension funds.

4. JOBS FOR ACTUARIES IN UKRAINE

One of the most important elements of the development of the actuarial profession in Ukraine is having real jobs for Ukrainian actuaries under the guidance of experienced foreign actuaries. Although there are limited opportunities in Ukraine today for young actuaries, this is likely to change in the next few years. Even today, actuaries are urgently needed in the following areas:
4.1 STATE MANDATORY PENSION SYSTEM

The government needs to quickly establish an Office of the Actuary to manage the State pension system and the government’s other social funds. The Ukrainian public pension program is a defined benefit plan. This means that the benefits paid to individuals from the Pension Fund are based on a formula that takes into account pay and service. Benefits are generally paid for life. Contributions to the Pension Fund are based on a payroll tax. If the contributions are not sufficient to pay for benefits, the Pension Fund is still expected to pay benefits when due.

In addition, the government has a liability that should theoretically be recognised in its balance sheet. The liability is equal to the difference between the value of all benefits expected to be paid to those who are already retired, plus the value of benefits expected to be paid to those who will retire in the future less the value of all contributions expected to be received in the future. If the system is financially sound, expected future contributions should cover all expected benefit payments, and even provide for a small reserve. If the two are not in balance, then corrective action should be taken. This type of analysis is normally prepared by actuaries, since they have special training in all financial aspects of pensions and insurance.

Ukraine’s pension system is in dire need of reform. Consequently, significant financial analysis is needed immediately. Appropriate actuarial and financial model must be built, projections of revenues and benefit payments under the current system must be made, and different reform scenarios must be analysed.

To date, most such analysis has been prepared by the USAID funded social sector reform project. This work will be continued under the new USAID funded pension reform project. However, it is critical for government of Ukraine to take over responsibility for these activities over the course of the next few years. The starting point for this transition is the establishment of an Office of the Actuary, staffed with well-qualified individuals, who have the potential to become excellent actuaries.

The primary ongoing responsibilities of this Office should be to:

• Prepare, publish and present a financial report on the pension system each year
• Prepare fiscal analysis of all proposed changes to the pension system.
• Prepare experience studies regarding actual mortality, disability, retirement rates, etc.
• Make recommendations regarding actuarial assumptions and methods
• Work with government agencies to develop needed statistics and data bases
• Perform special studies for the government as requested
• Assist with pension system administration.

4.2 OTHER GOVERNMENT SOCIAL FUNDS
In addition to the State’s mandatory pension system, the government of Ukraine sponsors a variety of other social programs, each of which has its own pension fund. These include:
• Unemployment fund
• Occupational disability fund
• Social insurance fund (temporary disability)

Each of these funds needs the same type of analysis as the pension fund. Proper contribution rates must be established. In the case of the occupational disability fund, separate contribution rates must be established by industry or type of work, and each company must have its own rate based on its actual claims experience and the efforts it takes to ensure workplace safety. Long range financial projections must be prepared for each fund, financial statements must be produced, actual claims experience must be analyzed, and changes to the system must be recommended to keep the funds in fiscal balance.

In addition to the formal separate funds, the government maintains other insurance programs, paid from the State budget that require analysis as well. Chief among these are health insurance, childcare allowances, the housing subsidy program, benefits for victims of Chernobyl, the pension system for the military and security agencies, and pension plans for various types of civil servants. Whether social insurance benefits are paid from a separate social insurance fund or from the budget, the same type of financial and actuarial projections are needed.
4.3 INSURANCE REGULATORY AGENCY

Insurance companies are currently regulated by the Insurance Department within the Ministry of Finance. In order to properly regulate insurance companies, the regulatory agency must have skilled actuaries. One of the primary roles of the regulatory agency is to assess the financial stability of insurance companies. This involves evaluating the required capital using risk-based capital adequacy standards. It also involves evaluating the sufficiency of insurance company reserves for its open, reported, unreported but incurred, and expected future claims. The regulatory agency also typically approves new policy forms as well.

4.4 GUARANTEE AGENCIES

Today, the government does not have any guarantee funds for non-bank financial institutions. There is a very limited government guarantee program for bank deposits. Sophisticated financial projections for this program should be developed. In the future, it is likely guarantee funds for non-bank financial institutions may be created. This could be for insurance companies, for investment guarantees in the private pension system, for annuities purchased through the private pension system, etc. To the extent these guarantee funds exist, careful evaluation of the required funding and expected claims level under various economic conditions must be evaluated.

4.5 PRIVATE SECTOR

Private sector entities that may require actuaries include:

- Casualty insurance companies
- Life insurance companies
- Corporate or professional defined benefit pension fund
- Defined contribution pension funds offering guarantees

A variety of private sector companies require actuarial support. The primary demand for actuaries will come from insurance companies. Currently there are about 100 insurance companies in Ukraine (there are only 9 life insurance companies). Most of the companies in Ukraine today are small casualty insurance companies, with limited premium volume and questionable stability. However, the situation should change dramatically in the future.
Ukraine desperately needs foreign insurance companies to set up subsidiaries or joint ventures in Ukraine. Once this happens, the insurance companies will bring experienced personnel to the country and will hire talented local employees to work for them. This is by far the best way of developing a viable actuarial profession in Ukraine. Young actuaries need to work on real projects for an experienced senior actuary in order to learn their profession.

Ukraine needs disability and survivor insurance, and annuity products to support the development of a private pension system. However, insurance companies are unlikely to come to Ukraine until there are viable capital markets and products here. A significant component of all pension insurance products is investment income. Insurers need long term, highly rated, fixed-income instruments to purchase with premiums received. At this time, there are no such instruments in all of Ukraine. Even government bonds have problems. The duration is too short and is too lowly rated. Once the market for their products exists and there are viable capital markets and instruments, and a proper legal basis for the industry, insurance companies will quickly flock to Ukraine.

5. ACADEMIC PROGRAMS

In order to develop a viable actuarial profession, it is necessary to have academic programs to teach students the required skills for the profession. In fact, training in most countries consists of a combination of academic programs, self-study or courses related to certification examinations, and practical on-the-job experience.

Fundamentally, solids backgrounds in advanced mathematics in the absolute prerequisite for an actuarial career. Many actuaries in the West have degrees in mathematics only. However, those with the proper mathematical skills can easily be taught all the other disciplines that are needed for a successful career. Also, there now exist a wide variety of undergraduate and graduate degree programs specifically in actuarial science, and it is more common now than in the past for students to pass a number of the certification exams while attending university.

This section of the report will first describe the academic programs in actuarial science that exist today in Ukraine.
5.1 UKRAINIAN ACADEMIC PROGRAMS

Currently, courses in actuarial science are taught by the mathematics faculties of Taras Shevchenko National University of Kyiv (Kyiv Shevchenko University), and at universities in Lviv, Kharkov and Donetsk. The first actuarial specialists have already graduated from academic programs at Kyiv Shevchenko University and Donetsk University. Lviv University has recently resumed the teaching of actuarial science, that was suspended in 1939. At the National Conference entitled “Perspectives on the New Mathematical Statistics Profession” held on February 1 – 2, 2001, deans and faculty leaders were told that the Ministry of Education of Ukraine has already adopted a decision to introduce a major “Actuarial and Financial Mathematics”, as a specialisation of the profession “Statistician”. This program is the responsibility of the mathematical faculties.

The program in the Mathematics and Statistics department of Kyiv Shevchenko University is discussed in more detail below.

5.1.1 Institutional History

Kyiv Shevchenko University is the prominent university in Ukraine, and one of the best-known and oldest institutions of higher education in Ukraine. It was founded in 1834, and since that time, faculty members, scholars and scientists of Kyiv Shevchenko University have become well known throughout the world. To protect both staff as well as future specialists from unnecessary government control, Kyiv Shevchenko University is an independent educational establishment, and its Rector has a status equal to a Minister. The major tasks of the University are training specialists and participating in creating a National State Policy in Educational and Science spheres.

Kyiv Shevchenko University is made up of many Schools and Departments, among them Biology, Geography, Geology, Economics, Foreign Philology, History, Cybernetics, Mechanics and Mathematics, Radio physics, Sociology, Psychology, Physics, Philology, Philosophy, Chemistry, and Law. Within the structure of the University there is also a zoology museum, botanical gardens, Institutes of Journalism, International Relations and Ukrainian Studies, a computer centre, libraries, departments of military and physical training, plus a lot more.
About 20,000 students study at 15 faculties, the Institute of International Relations, the Institute of Journalism, and the Department of Oriental Studies. Almost 2,000 lecturers train the students. For full-time students, the term of training is 4 years for a bachelor’s degree and 5 years for a master’s degree. For part-time students, it is respectively one year longer: bachelor’s degree - 5 years, and master’s degree - 6 years. Post-graduate training is also available.

Many professors are Academicians and Members of the National Academy of Sciences of Ukraine. Many of the staff are also members of international scientific bodies such as the American Mathematical Society, Bernoulli Society for Mathematical Statistics and Probability, etc. Textbooks written by lecturers have been translated into many languages, and been published in many countries throughout the world.

Kyiv Shevchenko University maintains tight contacts with more than 50 famous universities and research centres in more than 30 countries throughout the world. Among them are University of Kyoto, Shtutgardt, Wiener, Versale, and Iel Universities. It also maintains contacts with key corporations in the high-tech industry such as DEC, IBM, Oracle. Also, the University takes an active part in the development and realisation of many international projects.

The departments of Probability Theory, and Mathematical and Applied Statistics are known world-wide as a centre for high-level specialists and scientists studying probability theory, the theory of stochastic processes, and mathematical statistics and their applications. Issued since 1970, the magazine “Probability Theory and Mathematical Statistics” is translated by the American Mathematical Society, and is in top 10 list of most cited magazines.

Professors and research workers of these Departments made important contributions to science, and had a considerable influence on the formation of Ukrainian Mathematical School. The results of their research work have been integrated into the educational process. The scientific seminars delivered by professors of Kyiv Shevchenko University, as well as by famous Ukrainian and foreign scientists, have been sponsored by these Departments. Annually professors
and research fellows take part in different international scientific conferences and symposiums, and publish about 100 proceedings.

The school admits 25 students per year to the actuarial program. The first graduation was occurred in the last year. A Masters program in actuarial science was commenced in the beginning of current year.

5.1.2 Actuarial courses and textbooks
The basic courses offered in actuarial science are shown below, along with a brief description of course contents. A more detailed description is contained in an Appendix to this report.

Subject 1: Probability theory
Subject 2: Mathematical Statistics
Subject 3: Stochastic processes and stochastic modelling
Subject 4: Foundations of actuarial mathematics
Subject 5: Actuarial mathematics in non-life insurance
Subject 6: Foundations of micro and macroeconomics
Subject 7: Financial analysis and calculations
Subject 8: Practical finance, finance analysis, and financial economics

Subject 1: Probability Theory
This course addresses the central concepts of probability theory such as: stochastic experiments, random variables, random vectors, distribution function and probability density function, notion of independence of events and random variables, expectation, variance, and the main probabilistic laws and theorems, as shown below:

1. Main concepts and probability theory axioms.
2. Conditional probabilities, independent events
3. Random variables, distribution of random variables.
4. Expectation, variance and moments of random variables.
5. Random vectors and values, joint distribution functions.
6. Probability generating function, characteristic functions and their properties
7. Convergence of sequence of random variables
8. Central limit theorem

**Subject 2: Mathematical Statistics**
The aim of the Mathematical Statistics course is to study the main notions of mathematical statistics, the problem of statistical analysis of data and statistical inference, and to provide an introduction to statistical modelling relevant to actuarial work. The course includes the methods of processing statistical data, estimation of distribution parameters, construction of point and interval statistical estimates, testing of hypothesis, regression analysis, and the least square method.

1. Introduction to mathematical statistics.
2. The estimation of unknown parameters of random variables.
4. Confidence sets and intervals
5. Estimators for a distribution function of a random variable.
7. Elements of regression analysis, and the least-square method.
8. Analysis of variance.

**Subject 3: Stochastic Processes and Stochastic Modeling**
The aim of the course is to present the main properties of stochastic processes, to classify them, and to apply these models to actuarial work.

1. Introduction to the theory of stochastic processes.
2. Stochastic processes with discrete time.
3. The properties of the trajectories.
4. Stochastic processes of the 2nd order.
5. Stationary sequences and processes.
10. Time series models.
11. Gaussian and Lévy processes.

**Subject 4: Foundations of Actuarial Mathematics**

The aim of the Foundations of Actuarial Mathematics course is to provide an introduction to mathematical techniques that are of particular relevance to actuarial work in life insurance, healthcare and pensions.

1. The main characteristics of life, mortality and survival functions
2. Analysis of life insurance.
3. Life annuities.
4. Net premiums for some types of insurance.
5. Net premium reserves.
6. Multiple decrements
7. Insurance on multiple lives
8. The total claim amount in a portfolio
9. Expense loading
10. Multiple state models for life and other contingencies (the continuous time approach).
11. Multiple state models for life and other contingencies (time-discrete approach)
12. Determination of the value of benefits under a disability insurance contract.
14. The technique of asset shares, and the calculation of benefits on early contract termination
15. Estimating mortality rates
17. Graduation of select/ultimate mortality tables.
18. The principle forms of heterogeneity within a population

**Subject 5: Actuarial mathematics for non-life insurance**

The aim of the course is to provide an introduction to the mathematical techniques that are of particular relevance to actuarial work in non-life insurance.

1. The elements of choice, decision theory and applications.
3. Probabilities and moments of loss distributions with and without simple reinsurance arrangements.
4. Risk models for short term insurance contracts. Moments and moment generating functions for the risk models with and without simple reinsurance arrangements.
5. Calculation and approximation of the aggregate claim distribution for short term insurance contracts.
7. The fundamental concept of credibility theory.
8. The fundamental concept of simple experience rating systems.
9. Delay triangle and projecting the ultimate position.
10. Fundamental concepts of a generalised linear model (GLM).

**Subject 6: Foundations of Micro and Macroeconomics**

The aim of the microeconomics and macroeconomics course is to provide an introduction to the main concepts of microeconomics such as: demand theory, preference and choice, choice under uncertainty, theory of production, market equilibrium, competitive market, monopoly, oligopoly, welfare analysis; and an introduction to the main concepts of macroeconomics such as: gross domestic product, gross national product, structure of public finances, goods, labour and credit markets, fiscal policy, consumption and investment, international trade, inflation, and unemployment.

1. Main concepts of economics.
2. Analysis of demand and supply.
3. Demand theory.
5. Production.
7. Main macroeconomic indices.
8. Aggregate demand and aggregate supply in the economy.
9. Equilibrium in some markets in national economy.
10. Employment and governmental social policy.
11. International trade and exchange rates in the economy.

**Subject 7: Financial Analysis and Calculations**

The aim of the Financial Analysis and Calculations course is to provide an introduction to some aspects of financial mathematics such as: simple interest and compound interest financial models, cash flows, rents and annuities, evaluation of assets, simple stochastic models of assets value, and elements of the financial mathematics of derivatives.

1. Financial market environment.
2. Simple and compound interest financial models.
3. Cash flows, and accumulated and discounted values of cash flows.
4. Repayment of debts.
5. Comparative financial analysis of investment projects.
6. Valuation of assets.
7. Forward and futures contracts.
8. Bonds and interest rates.
9. Options market
10. Option valuation models
11. Hedging positions in options and other derivative securities

**Subject 8: Practical finance, financial analysis and financial economics**

The aims of the course are: (a) to provide a basic understanding of corporate finance, and the instruments used by companies to raise money and manage financial risk; (b) to interpret the accounts and financial statements of companies and financial institutions; (c) to develop the necessary skills to construct and apply asset-liability models.

1. Finance and financial reporting.
2. Basic principles of personal and corporate taxation.
3. Financial instrument issued by companies.
4. The strategy of a financial company with respect to its capital and dividend policy.
5. Company’s cost of capital.
6. The main types of financial institutions operating in financial markets.
8. Calculation of accounts and their interpretation

II. Financial economics.
1. Asset pricing and portfolio selection models.
2. Stochastic asset models.

5.1.3 Strengths and weaknesses of Kyiv Shevchenko University program
Kyiv Shevchenko University is one of the prominent universities in the country. It is fortunate to be blessed with a large and talented faculty, and very strong programs in mathematics. Unlike the United States or European Countries, it appears the curriculum is oriented toward applied mathematics and not just to theoretical mathematics. It is refreshing to see courses in finance, corporate structure and other topics located within the department of mathematics.

The general course structure seems to cover the major topics included in examination programs around the world. More specific courses related to Ukrainian law, accounting procedures, government programs, government organisations, etc. need to be added to the curriculum. These can’t be borrowed from other countries since they need to be Ukraine-specific. In addition, practical courses on the different types of life insurance policies and different types of pension programs are needed.

The program at Kyiv Shevchenko University suffers from several difficulties that are largely an outgrowth of the total lack of an actuarial profession in the country.

- Professors need training in some courses, particularly those that are not part of a general mathematics or finance curriculum. This is particularly true of the courses in actuarial mathematics, the structure of life insurance companies, and courses on private pension funds. Professors have made trips to Sweden and Finland for training. There is a good size Ukrainian Diaspora teaching in
those countries. For the past three years, there have also been a Ukrainian actuarial conferences.

- Textbooks used for actuarial mathematics and related areas have been financed through the three (1998-2000) year TEMPUS - TACIS Project - 10353-97 (more information on this project is shown below). The University also wrote its own textbooks, financed through a grant provided by USAID under the project of support of higher economic education in Ukraine managed by the Eurasia Foundation. These texts are largely based on Swedish and German texts (Grandell J., Gerber H., Straub E., Bühlman H.). There are not enough textbooks in any language, and certainly not enough in Ukrainian. The school needs funds to finance translation and publication

- There are a very limited number of jobs for graduates of the actuarial program at this time, though this situation will likely be very different in five to ten years. Internship programs need to be established to allow students to gain practical work experience abroad. The government of Ukraine must also be encouraged to set up structures that allow graduates of the actuarial program to earn salaries that are commensurate with what they can be paid in the private sector

5.1.4 The TEMPUS - TACIS Jep - 10353-97 Project

The purpose of this project is to assist educational institutions with training of professors, the development of new courses of study, and translation of textbooks. Assistance is provided by the European Union through the TEMPUS - TACIS Program. The Department of Probability Theory and Mathematical Statistics is involved with a project on “Statistical Aspects of Economics” in co-operation with the Universities of Stockholm (Sweden), Umea (Sweden) and Helsinki (Finland).

The goal is the introduction in Kyiv Shevchenko University of a 3-level educational system (bachelors, specialists and masters) in financial mathematics, actuarial insurance mathematics, econometrics, mathematical economics and applied statistics.
6. CONCLUSION
What is needed to develop the actuarial profession in Ukraine? We believe the following organisations must work in partnership to develop the profession in Ukraine:

- Department of Insurance of the Ministry of Finance
- Pension Fund of Ukraine
- Ministry of Labour and Social Protection
- Ukrainian Actuarial Society
- T. Shevchenko National University
- Verkhovna Rada (Parliament of Ukraine)
- International donors.