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## **John Stevenson's influence on advancing seismic safety in Eastern Europe**

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I met John 24 years ago, November 12, 1991. It was one of my first visits abroad after Iron Curtain failed and my first visit to the United States in the framework of the US/USSR Center for Civil Initiatives (CCI).

Dr. Paul Smith former vice president of EQE invited me to get acquainted with the work of American private engineering companies. He made an advertisement that for him came a strange Russian engineer who was interested in protection of Nuclear Power Plants against earthquakes and other external hazards.

John found out about it and invited me for a week in his office. From sunny San Francisco, where it was 75F, I landed at night in the snow littered Cleveland with 15F.

In the morning Gary Thomas and Rudy Masopust brought me into S&A office and said - here is John. But I did not see anybody in the office by the first look beside mountain of papers from floor to ceiling. Somewhere in there in the den sat a very large man, not paying attention to anything and with his face shadowed with a pile of papers. Gary Thomas called John; he raised his big head and smiled: Welcome Victor to our Noah's Ark said John, and I always fell under the spell of this beautiful man and an outstanding engineer.

After almost 25 years November 2014, I was back in Cleveland to say good bye to John, and again entered his office has been already orphaned. And again there was a mountain of papers from floor to ceiling, but there was no John and no one could break away from the next draft of Codes and Standards or articles and say, Hi, I am John Stevenson welcome on board.

It so happened that just before meeting with John, I lost an older brother who was a naval officer. He died before at the age of 49 years, received a large radiation dose at nuclear submarine in refueling in accidental conditions, replacing by himself a young sailor. My brother was also born in May 1933, and John shared a birth date just 4 days with my brother.

Since John became not only my teacher, but also the older brother.

John certainly was an outstanding engineer with dignity continuing the tradition of his famous ancestor - one of the inventors of the steam engine, but he was the owner of amazing human qualities - crystal honest, open, friendly and generous

person. He loved life, family, engineering, travelling and good food. In all cities of the world he knew good restaurant with some story and beloved Pino Grigio.

Life and scientific principles of John were very simple, but difficult to implement in real life: true or false, decent or indecent, corresponds to scientific truth or does not match. Despite the enormous John's tolerance, his patience and respect for different opinions and even misleading, John was absolutely intolerant of hypocrisy and academic impropriety and sometimes could direct and public call things by their proper names.

As an outstanding traveler John unselfishly gave his knowledge, judgement and love to people worldwide, though his big family had been at the first place always.

Office in Cleveland at that time - in the early 90s was really like a Noah's Ark, where representatives of many engineering schools of the former communist and other developing countries were interned, - from Czech Republic (Rudy Masopust), Romania (Ovidio Coman), China (Zhao) and hosts like Tim Adams and Gary Thomas. From S&A Woburn this team was supported by Wally Djordjevich and others.

All of these names are now widely known in the world and it is John's legacy and the school. This is his legacy and the school, in all countries of the former Soviet Bloc used the most advanced in the world Codes and Standards, ensuring the safety of Soviet Design NPPs.

This happened because John hold unique and principal position in the world Engineering Society being member of ASME, ASCE, IASMiRT, IAEA and many other organizations. John is the real author of many codes and standards having worldwide application, especially connected with seismic and external hazard issues.

To serve his outstanding role in safety upgrading of Soviet Design NPPs John founded three overseas Stevenson and Associates offices in Eastern Europe:

S&A, Czech Republic headed by Rudy Masopust,  
S&A, Romania, headed by Ovidio Coman and  
S&A, Russia, headed by this author

The last one company still exists under the same name. Others changed the name due to new ownership.

All these three companies under John's scientific and engineering managing took a leadership in seismic re-evaluation of all Eastern European NPPs and NPP in Armenia including participation in special IAEA programs.

The first stage of John's involvement in the seismic re-evaluation of NPP in Eastern Europe was due to the "Kozloduy" NPP in Bulgaria in 1991 as part of a special program to improve the safety of Soviet Design NPP. In the pioneer document "Terms of Reference" developed for Kozloduy NPP Load Combinations and Seismic Criteria for NPP units with VVER reactors had been formulated for the first time.

This was not an easy job, and not without mistakes in application of Western Safety Criteria to the so-called Soviet Practice.

It should be noted that in early 90s Soviet design NPPs either did not have any seismic qualification, or it had been reduced to a minimum without any verification and peer-reviews, like for example simple stamp at the drawings "seismically protected" with no other explanations. All NPPs did not meet some of the basic IAEA seismic safety requirements and recognized practice.

Later, with John's Leadership was developed pioneering IAEA document: "Technical guidelines for the seismic re-evaluation programme of the Paks Nuclear Power Plant, IAEA / WWER / RD-067, 1996".

This document has become a classic of the genre, and subsequently copied and specified for many other nuclear power plants with VVER units:

Technical guidelines for the seismic re-evaluation programme of the Mochovce nuclear power plant, IAEA / RU-5349, 1997.

Technical guidelines for the seismic re-evaluation programme of the Bohunice nuclear power plant-Unit V-1, IAEA / RU-8951, 1996.

Technical guidelines for the seismic re-evaluation programme of the Armenian nuclear power plant-Unit 2, IAEA / RU-5869, 1997.

In 2001, John developed seismic criteria for nuclear power plants with Chernobyl/Bank type reactors:

"STEVENSON & ASSOCIATES, Russia  
a structural - mechanical consulting engineering firm  
SEISMIC MARGIN ASSESSMENT METHODOLOGY  
Prepared by John D. Stevenson for Use at the  
Leningrad Nuclear Power Plant  
August - 2001  
Rev. 0 12/08/01"

An example of John's highest judgement as an engineer, is the depth of understanding of nuclear safety in general and in details and, at the same time, his selflessness is the case happened at one of Northern NPPs. As part of a large program to improve the seismic safety of nuclear power plants located in the zone of very low seismicity with a planned big budget, John, examining the safety state

of the plant, offered not to spend such a big money for the seismic issue but to resolve first the problem of precipitation and flooding, and just to clean the flat roof of the turbine hall more often and check its drainage especially in spring season with melted snow. This activity that time had no budget at all.

In 1994 and then in 2011 John presented a number of lectures and training for application of modern SMA approaches in Ukraine. The consequence of this was an essential safety upgrading of Ukrainian VVER NPPs against external hazards.

Totally John's engineering activity seriously affected safety upgrading around 45 NPP Units with VVER reactors in Eastern Europe, Ukraine, Armenia and Russia.

John's last official position was the Head of the IAEA External Events Scientific Committee but he had taken this position in engineering community informally decades before.

We will always remember John - a big Man and Engineer.