

# History, progress and prospects of Polish-Ukrainian-German Summer Schools on Fracture Mechanics and Structural Integrity

V. V. Panasyuk\*

Trzebnica, 3–6 th September 2013

Dear colleagues! Dear participants of our (ten plus three) Summer School on Fracture Mechanics.

Let me congratulate cordially all participants of this Summer School with its opening today and wish all of you good health and success in scientific activity.

Our summer schools have their own history rich in important scientific events, in particular, they have gained the status of scientific-training schools of the European Structural Integrity Society (ESIS) and they have certain scientific-lecturing experience which is presented in corresponding publications, in particular see the book in Slide 1. (I have some books for our young participants).

I think it is worth mentioning here some events from the history of formation of our summer schools, our achievements and also to express some proposals concerning the prospective topics of future summer schools.

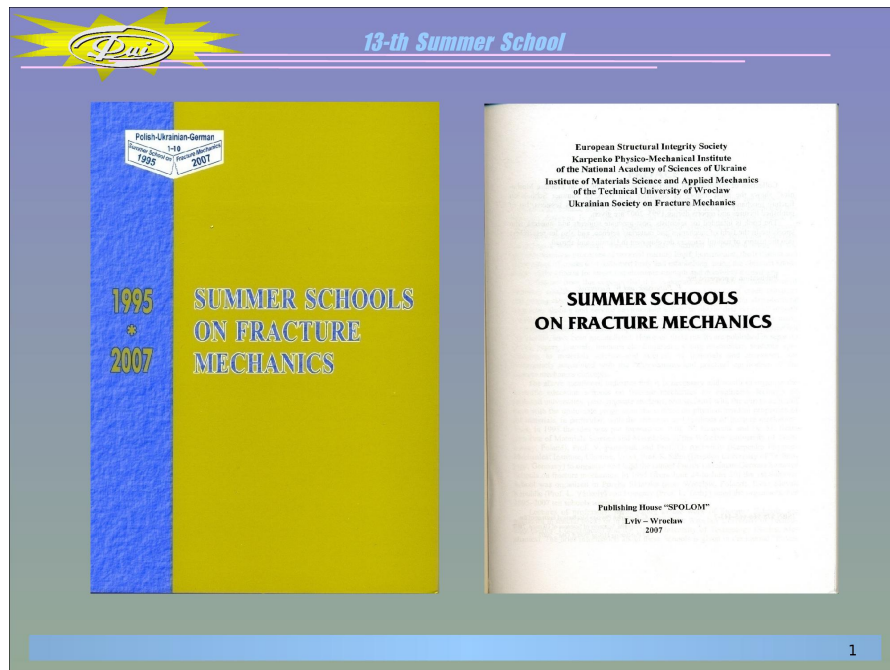
1. So, firstly, I would like to speak about conditions that led to the decision of Polish, Ukrainian and German scientists to organize summer schools on fracture mechanics and strength of constructions.

In the second half of the 20-th century the researches into the problems of fracture mechanics started rapidly. The reason of that was the catastrophic failure of constructions, in particular military technique (for example American ships “Liberty”, some English aircrafts, some pipelines etcetera.). The failures were caused by the crack propagation in the material of structures. In many world countries the national groups of scientists were formed who worked on the solution of different scientific and applied aspects in this filed of science.

In 1965 the International Congress on Fracture (ICF) was initiated by Japanese Prof. T. Yukobori. Since 1965 ICF organizes every four years the International (World) Conferences on this problem. The European, Japanese, American groups of scientists on this topic were also organized. The European group on this problem was given in the second half of the 20-th century a new name “European Structural Integrity Society

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Slide 1

– ESIS”. Under this name exists now the European scientific community, based on the national groups of scientists from Europe who deal with this problem.

Kaprenko Physico-Mechanical Institute (further PhMI) and Paton Electric Welding Institute (EWI) of Ukrainian Academy of Sciences were the initiators of foundation of ESIS Ukrainian National Group on this problem. On November 24, 1992 the Ukrainian Society on Fracture Mechanics (USFM) was created and its members formed the Ukrainian national group of ESIS.

Especially important scientific and scientific-organizing events in this field of science occurred in Kyiv from June 8 to 14 1993, 20 years ago! These events were related with the preparation and holding of the 8th International Conference on Fracture Mechanics of Materials – ICF-8. Such conferences had been organized before ICF-8 (in Kyiv) in Japan, France, Canada, Germany, Italy, India, and USA. The Conference on such level in Kyiv was organized for the first time in Eastern Europe, in Ukraine. The Congress decision to hold ICF-8 in Kyiv was made in Huston (USA) in 1989 on the initiative of PhMI, Presidium of the Academy of Sciences of the Ukrainian Soviet Republic and Academy of Sciences of the Soviet Union (at that time such was the procedure of realization of PhMI initiative).

During 1989-1993 great political changes occurred in the world. Ukraine became the independent state with Kyiv as a capital. In this connection the preparation and holding of the conference were the problems of Ukraine solely. This required the solution of many questions on the level of the Academy of Sciences of Ukraine and of the highest



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government institutions. A special role was played by the Academy of Sciences of Ukraine and in particular of its President Academician B. Paton and also PhMI (in Lviv) and Paton Institute (in Kyiv). To organize this conference the Organizing Committees were formed by the Academy of Sciences of Ukraine. These Organizing Committees (see slide 2) overcame significant difficulties but the Conference ICF-8 was a success. At this Conference I presented the honorary lecture (see slide 3). This lecture was one of the topics of our future Summer Schools.

Just after ICF-8 in 1994 an important meeting was organized in Wrocław by Prof. W. Kasprzak together with me and scientists of PhMI: Prof. O. Andreikiv and Dr. N. Kuzniak. Prof. W. Kasprzak received the consent to organise Summer Schools on fracture mechanics from Prof. Zahn (Germany). This meeting was devoted to the organization of Polish-Ukrainian-German Summer Schools on Fracture Mechanics (slide 4). Today we have here the 13th Summer school. The role of Prof. W. Kasprzak in the organization of our Schools was many times marked by the participants of Schools (slide 5). Today we can thank him once more for this great work and congratulate him with 80-th anniversary of the birthday that he celebrated not long ago (see slide 6).

2. The second important event in our history was the session of the scientific committee of these schools in Wrocław on September 6, 2002. The ESIS President Prof. K. Miller (Great Britain, see slide 7), Prof. L. Toth (Hungary, he is present here), Prof. J. Świątek, vice-rector of Wrocław Polytechnic Institute (Poland) took part in this meeting as honorary guests. The members of the Summer school scientific committee:

*13-th Summer School*

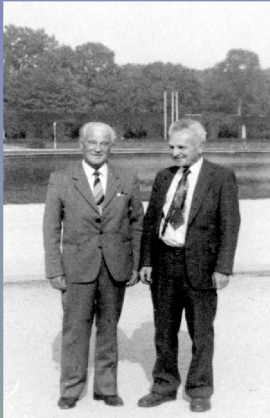



**Prof. V. Panasyuk delivers ICF-8 Honour lecture  
“Deformation criteria in fracture mechanics of  
materials”**

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Slide 3

*13-th Summer School*



**Prof. W. Kasprzak and Prof. V. Panasyuk after  
the coordination of the program of Summer  
Schools activity ( Wroclaw, 1994)**

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Slide 4

**13-th Summer School**



**Participants of the 3d Summer School (1997) honored Prof. Wacław Antoni Kasprzak – one of the organizers of Summer Schools on Fracture Mechanics – on the occasion of his 65th birthday**

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Slide 5

**13-th Summer School**

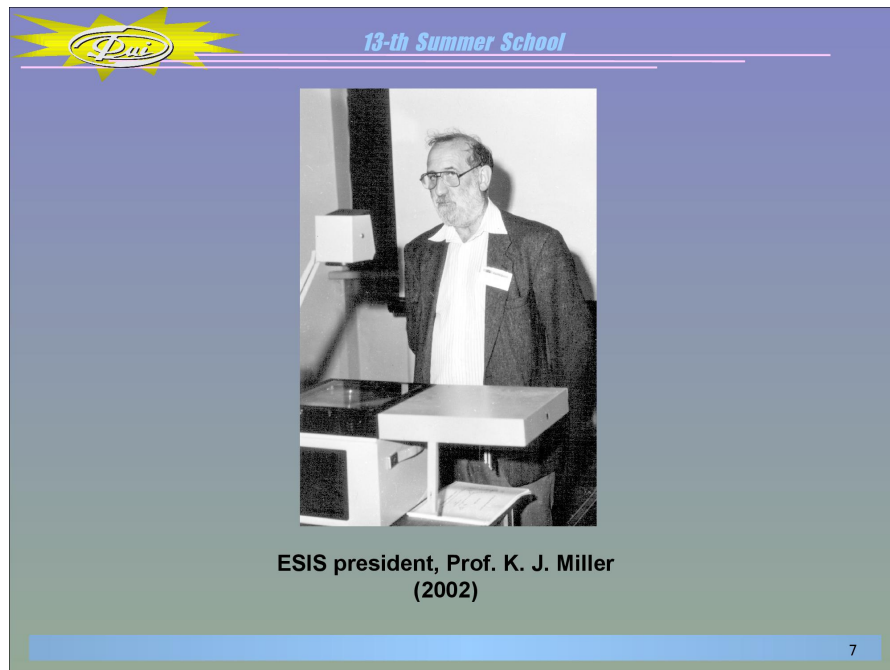




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Slide 6






Slide 7


Prof. W. Kasprzak, Prof. V. Panasyuk, Dr. I. Dmytrakh , Dr. M. Szata and other also participated in the meeting.

The Session was opened by Prof. W. Kasprzak (slides 8 and 9) and after that I took the floor and characterized the structure and activity of summer schools and presented the proposal of the organizing committee of summer schools to give schools the status of training summer schools on fracture mechanics and strength of constructions as schools of ESIS in Central and Eastern Europe. The ESIS President Prof K. Miller accepted the application and told that the question would be presented to the ESIS Council for adoption during ESIS Conference on Fracture-14 in Krakow. The ESIS Council considered those problems on September 12, 2002 and supported the activity of our schools as the schools of ESIS. Documents on this problem were published in the book "Summer Schools on Fracture Mechanics", prepared by V. Panasyuk and W. Kasprzak in 2007 (Slide 1). In this book the information materials about 10 Summer schools held till 2008 are collected and the best lectures presented during such schools are gathered and published. These lectures form a good educational material for improving the qualification of young specialists on fracture mechanics.

Now we should prepare materials about next summer schools and publish the book before the 15th summer school about the results of our work after 10 summer schools, namely: the 11th school in Lviv (2009), the 12th School in Warsaw (2011), organized thanks to the support of Prof. Kurzydłowski (Slide 10), the 13th school in Wrocław this year, thanks to great efforts of Prof. J. Kaleta and Prof. Shata, the 14th summer

 *13-th Summer School*


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**Meeting of the ESIS president Prof. K. J. Miller with organizers of Polish-Ukrainian-German Summer Schools on Fracture Mechanics (2002)**

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Slide 8

 *13-th Summer School*

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**In Wroclaw after the session of Program committee that took place on September 6, 2002. From left to right: Professors L.Töth, V.Panasyuk, K.J.Miller, W.Kasprzak.**

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 13-th Summer School



Organizers of 12th Summer School (Warsaw, 2011).  
From left to right:  
H.Nykyforchyn, V.Panasyuk, K.J.Kurzydłowski, A.Zagórski

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Slide 10

school is planned to be held in Lviv or in some other town of Ukraine in 2015. Regarding the 15th summer school venue (2017) it will be decided later.

3. Now I would like to speak about future prospects of our summer schools and the improvement of their work. First of all we should prepare the actual and prospective topics on the problem of fracture mechanics to consider them at our schools and acquainting young specialists with achievements and prospective tasks in this field of science. I think, for example, that one of such directions can be the science about hydrogen materials and hydrogen use as the technological environment to obtain materials with high physicochemical characteristics. At present this topic is very topical. There can be some other topical directions of scientific development on fracture mechanics and engineering practice (for example, problems on fracture toughness testing). This must be discussed and our strategy must be developed, proposals from the school participants are welcome.

One more question. The first organizers of our Summer schools are not young people and we must involve young active scientists who can work on organizing and modernization of Summer schools and develop their successful strategy in future.

At the end I would like to congratulate all once more with the opening of our school!  
Thank you for your attention!