Reply to the P.Cornetti note.

A.Neimitz

The note by P. Cornetti which concerns the article published in Newsletter No. 44 (2008) indicates that the author of the note misunderstood the article. The intention of the author of the article was to show that the formula:

$$\text{Critical distance} = \frac{2}{\pi}\left(\frac{K_{IC}}{\sigma_u}\right)^2 \quad \text{or} \quad = \frac{1}{2\pi}\left(\frac{K_{IC}}{\sigma_u}\right)^2 \qquad (1)$$

was derived for the Griffith crack *only.* For other geometries such a simple relation is not obtainable and a critical distance, if exists, is different. However it was applied for a wide range of materials from ceramics, through laminates, polycarbonates, aluminum alloys to steels. It was good for notches and cracks in elements of finite geometries, for fracture under monotonously increasing external loading and for fatigue. Author of the article suggests including in the derivation process the next terms of the asymptotic expansion of the stress field in front of the crack or another formula to define the critical distance.

P.Cornetti is correct that when Eq. (17) was introduced to (10) different limits of integration should be used. In consequence the Eq.(18) is not correct. It should be replaced by:

$$\sqrt{\frac{2\Delta a}{\pi}}\left[K_C + A_C \Delta a\right] = \sigma_m \Delta a \qquad (1^*)$$

and Eq. (20) by:

$$\frac{\sigma_f}{\sigma_m} = \frac{1 - \dfrac{A_C}{\sigma_m}\sqrt{\dfrac{2\Delta a}{\pi}}}{\sqrt{\dfrac{2a}{\Delta a}}}$$

The new forms of these equations do not change the conclusions drawn in the paper. Equation (19) is correct. Eq. (1*) is correct, not Eq.(a) in the Cornettis's note. One is *not allowed* to make assumption that $\sigma_m = \sigma_u$. These two stresses have totally different physical meaning. The stress σ_m is a critical stress in front of the crack, considered often (not always) as a material constant. It follows directly from the Novoshilov's definition. It is usually several times greater than the yield strength. The σ_u is an ultimate strength. Assuming that $\sigma_m = \sigma_u$ is like one has assumed e.g. the Mises yield criterion first and later, after some computations, wrote, because it was convenient, that the yield strength equals the ultimate strength although a material was not perfectly plastic.