

### **Comparison of design methods for window glass panes**

Nowadays, structural use of glass is widely used as a primary or secondary element of façade structures. Recent development of hybrid glass elements provides remarkable post-breakage behavior so called ductility. Innovative connection techniques are also used to minimize plate and bolt dimensions and to provide more transparency. Besides all these developments, most common use of glass in buildings is as window glass.

This paper discusses the impact of design standard on window glass design methodology. Term of window glass is used for emphasizing that the glass is supported along its edges. Window glass can be made up of monolithic glass, laminated glass, or mixed use of these panes with a number of sealed air spaces. The latter is called insulating glass unit (IGU). There are different design codes and guidelines on structural calculation for window glass panes.

Determination of maximum stress and deflection and evaluation of these values with the limiting stress and deflection are the main goals of the design. All these calculations can be performed by using analytical methods for window glass and it should be noted that analytical methods are indisputably faster than finite element methods.

While accomplishing this purpose combination of actions, determination of external and internal actions, load sharing between glass panes of IGU are the some of the fundamental issues of design. As well known, there are lots of advantages of using large deflection theory in the design which is generally more appropriate theory for glass panes. Another issue is determination of effective thickness of laminated panes. Effective thickness is directly depended on the shear modules of interlayer. Unfortunately, this is the grey area of the design because, interlayers are viscoelastic materials which are affected by the change of temperature and load duration. This material behaviour is taken into account in the standards and guidelines by using shear transfer coefficients. Thus, shear transfer coefficient is the main reason why the results of the standards vary for laminated glass.