1.4.31. X-RAY THICKNESS GAUGES USED FOR THICKNESS MONITORING OF ROLL STOCK PRODUCTS FROM NONFERROUS METALS

Artemiev B.V., JSC “RII MSIA “Spectrum”, Moscow, Russia;
Potapov V.N., Russian Scientific Centre "Kurchatov Institute", Moscow, Russia

X-Ray thickness gauges have good prospects for use at rolling mills with a wide assortment of processed metals and alloys. For today, as a rule, at nonferrous metals processing facilities, the contact thickness gauges are used. In spite of several advantages, these instruments have a number of disadvantages; some of them (most general) are listed below:

– Necessity of mechanical contact of working edges of a measuring instrument with continuously moving metal sheet.

– Necessity of measuring instrument removing when passing welded joints of metal in a roll, and due to this interruption of measurement process.

– Low operation rate.

– Impossibility of accurate measurements in terms of high roughness of metal surface.

– Impossibility of coating thickness gauging.

The X-Ray thickness gauges are free from all a.m. disadvantages. They are contactless, have high operation rate allowing measuring thickness at any temperature of metal with any roughness of a surface. The main problem, preventing wide industrial application of the given type of instruments at nonferrous metals production facilities, was variations of a chemical composition of processed metals and their alloys. This statement is especially true for nonferrous metals production when at one roll mill they roll a wide assortment of alloys in small quantities. Change of type of tested alloy requires continuous re-adjustment of the instrument and availability of many reference samples, i.e. for each metal type. However, development of digital components and there application in devices of such class has allowed changing the given situation.

Impact of chemical composition changes upon instrument’ readings can be explained by the fact that the metal sheet thickness estimation is carried out on the basis of X-Ray radiation drop in tested object. The radiation fall off is described by nonlinear function presenting relation of material thickness and its chemical composition.