This paper treats an identification of material properties of multilayered structures and functionally gradient materials (FGM) from data obtained by indentation testing. Axisymmetric indentation problem for multilayered systems is first analyzed on the basis of three-dimensional axisymmetric elasticity theory. It is supposed that mechanical properties for FGM can be expressed approximately as a function of the distance from the surface of materials. The measurement informations collected from the penetration force-depth curves are employed for identifying elastic moduli of thin films. Then, an analysis for an elastic contact problem which an elastic axisymmetric indenter is penetrated into an elastic half space coated multilayered thin films is presented. Furthermore, an analysis for the indentation of FGM is performed by using the formulation of multilayered materials with a stepwise variation of elastic moduli. Next, an inverse procedure for identifying Young’s moduli, Poisson’s ratios of the thin films and radii of the contact area is described under the condition where the elastic moduli of substrate and indenter, and thicknesses for layers are known. For FGM, the functions for Young’s modulus, Poisson’s ratio and radii of contact area are determined under the condition where material properties for surface and substrate of FGM are known. In performing an inverse analysis using complex method, the effective sampling for data obtained by penetrating indenters with various radii of curvature into the multilayered materials and FGM is presented. It is hard to identify accurately Poisson’s ratio of multilayered materials, so data for inverse analysis is necessary to be prepared for various radii of indenter.