The ever-accelerating changes in the requirements of the global market with regard to structural materials are associated with the need to go beyond standard manufacturing and testing methods. As a result, scientists are constantly developing new engineering solutions that can meet different application needs. One of the directions is the design of new functional materials, which is particularly difficult in the case of metal materials. Metal matrix composites constitute a new class of materials, now starting to make a major industrial impact in fields as diverse as aerospace, automotives and electronics. In this case, more and more often multilayered materials are used, which can offer a unique combination of functional properties, significantly exceeding the properties of the constituent materials. On an industrial scale, various technologies for the production of multilayer materials have been developed, especially in the form of sheets and strips. At the same time, other multilayer or heterogeneous systems have been proposed and effectively implemented for production, e.g. products manufactured by rotary swaging, wire drawing or extrusion. Numerous processing methods were identified and the resulting multilayered materials forms can be broadly classified into three groups - bonded, deposition, and spray formed laminates. Each processing approach produces material with unique microstructures and macrostructures and thus unique properties. Additional control of properties can be obtained through the properties of component materials, as well as component volume fraction and layer thickness. In this project, one more area of influence on the properties of multilayer materials will be investigated, i.e. the quantitative and qualitative influence of the hard material particles in the ductile matrix. The particles were produced by fragmentation of the hard material layer. This effect will be obtained as a result of intense metal forming i.e. Deep Wire Drawing (DWD) or Additive Angular Drawing AAD, that is, multi-stage, with a strong accumulation of deformation, the process of wire drawing without intermediate annealing. The low ductility of high strength structural materials most often is attributed to the lack of work hardening caused by their inability to accumulate dislocations because of their microstructure morphology and saturation of dislocations. Therefore, the basic idea to improve the ductility of high strength materials is to regain the work hardening (dislocation accumulation capability), which is often accompanied with sacrifice of strength. This raises a question: Is it possible to design new structural materials that have both high strength and good ductility? Since the mechanical properties of metals and alloys are determined by its deformation mechanisms/behavior, any material design should be based on modifying by multiplication of the deformation as well as strengthening mechanisms. Hence, the conclusion that when in the process of deformation accommodation, the material has at its disposal a greater number of deformation mechanisms, mostly by slip and twinning, the longer it will remain in the uniform deformation area, without loss of coherence (Considere criterion). It is known that the combination in a multilayer system of two metallic materials that differ significantly in their plasticity, as a result of, crystal lattice - the number of possible slip systems, stacking fault energy (SFE), chemical composition, phase composition, morphology and the degree of microstructure refinement of the microstructural components, make it possible to obtain an attractive combination of mechanical properties. This project goes further, i.e. it proposes to produce the incoherent metal-to-metal composite materials based on a multilayer system, the materials with dispersed hard phase particles in a soft phase matrix. Hard material particles are obtained as a result of the loss of cohesion of the hard material layer as a consequence of a robust accumulation of the metal forming effects (wire-multilayered composite drawing). The key factor in this case is the difference between the plasticity i.e. high of the matrix material and low in the "hard" layers. In the proposed solution, the matrix material will be microalloyed steel, which, as shown in previous projects, is characterized by high strength and good plasticity in the drawing process. The layers of limited plasticity will be formed by Ti or Mg. The main advantage of the material with such a structure is the synergistic effect of the coexistence of the hcp phase, in the form of fine particles, in the matrix of the bcc ductile phase, i.e. microalloyed steel strengthened by precipitation and by refining the ferrite grains. Appropriate rheological models will be developed, used in a multi-scale computer simulation of the interaction between incoherent components of the microstructure. The result will be a significant increase in strength, improved plasticity and a change in the physical properties of new materials. This opens the possibility of wider application of these materials in innovative industries, such as the automotive, aviation, energy and bioengineering industries, wherever high strength, ductility and low weight of structural material are important. The possibility of obtaining such new materials in the form of multilayer wire-composites, due to the attractive combination of mechanical and physical properties and their controlled heterogeneity, made in accordance with the proposed methodology, cannot be overestimated in the production of such products as wires, strands, cables, ropes, braids, etc.