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INTERNATIONAL CONFERENCE of SCIENTIFIC PAPER
AFASES 2011
Brasov, 26-28 May 2011

THE INFLUENCE OF REINFORCED FIBERS ON CHARACTERISTICS COMPOSITE STRUCTURES

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Abstract: *This subject proposes to treat some theoretical and experimental aspects on obtaining new composites materials with special properties and purposes using reinforced fibers.*

Keywords: *reinforce, composite, fiber.*

1. INTRODUCTION

Composite materials are part of composite materials. Composite materials are the first materials whose internal structural layout design a man, not only in their molecular chain, but giving them preferential directions favorable resistance.

Each class has properties and material characteristics of its own: the metals are generally tough and ductile, but their mass density is often high, plastic, lightweight, have low stiffness and mechanical properties and environments are often fragile, ceramics have modulus and high tensile strength, but they are inherently fragile.

Combining various types of materials that are normally immiscible and controlling the morphology and distribution, to obtain composite materials whose properties are different from those of basic components**.**

In case of composite materials is appropriate to use the concept of synergy, which is the result produced by the combination unit and convenient dosing characteristics of components.

2. THE METHOD

This paper shows the characteristics held by a textual obtained by the conventional laminated steel cladding by explosion. Schematic and principle, this process is shown in fig. 1.

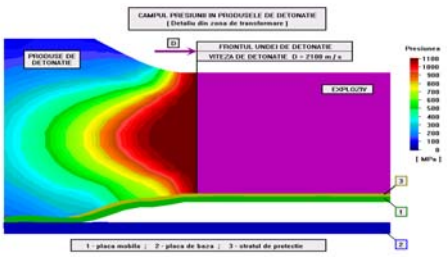

Fig.1. Explosive cladding

Because the two metals to be welded, they must be brought together by the force equilibrium interatomic distance, and because it is necessary to realize that they are not present in the outer layers of oxides and impurities, those which will be welding.

Joint strength will depend on the nature of metal combined, the crystallographic

orientation of the interface, diffusion and recrystallization of metal parts.

The mechanical properties of metallic multilayer structures obtained by the explosive cladding are determined and calculated based on the matrix and fiber properties.

Isotropy properties will be influenced by fiber orientation in relation to outside forces seeking material. Generally, when the composite material is subjected to the action of external forces, because the link between fiber and matrix, produces a load transfer from matrix to fiber. The existence of the link between fiber and matrix is that the traction at the interface between the two components is equal to the matrix deformation of the fiber.

In contrast, the deformation increases with the distance matrix of fiber and, after overcoming the action of the fiber diameter (daf), the matrix deforms freely. Load transfer between matrix and fiber, the difference in elongation of the two components of the composite material are the result of the difference values of elasticity modules of the matrix and fibers.

For example, consider the simple case of metal matrix composites reinforced with long continuous fibers. Follow the model calculation to be presented is not only true for metal matrix composites but for all the composites, regardless of the nature of the matrix, provided only that elemetele continuous fiber reinforcement to be long.

When applying force in a direction parallel to the direction of orientation of fibers, composite material is considered in equilibrium, the total force F is applied to the sum of the forces applied to the force applied fiber matrix.

Usually, when discussing the resistance of a material, uses the term stress (force per unit area) instead of force.

So, the force acting on fiber is voltage multiplied of sectional area perpendicular to the direction of driving force.

3. CONCLUSIONS & ACKNOWLEDGMENT

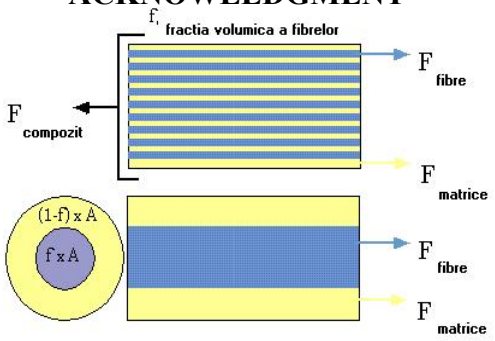

Fig.2 Representing the forces acting on the fibers and matrix

Use Hess's law is possible as long as the voltage is low values (below the elastic) and the behavior of the material is linearly elastic.

Thus, Hess's law can be applied to metals, ceramics and most polymers, but can not be applied elastomers (rubbers).

When applying force in a direction perpendicular to the direction of orientation of fibers, the composite material will behave in a different way than if presented above (Fig. 3).

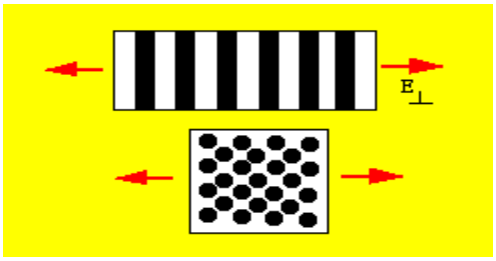

Fig. 3 - Forces acting on the fibers and matrix

The fundamental difference between the two composite load models is that, if the first case we deal with equality of deformations in the second case the law of equal stress fibers and matrix.

If the matrix and fibers have different elastic properties and then they will have different deformations.

In the literature are presented computational models that take into account other problems: fiber orientation relative to the direction of the forces, the compressive behavior of composites, etc.

III. CONCLUSIONS

From the above, it emerges the importance of the explosion cladding process in obtaining new materials laminated with special properties.

Application of the defense industries that process, opens a new way of obtaining new materials with special properties for laminated metal special equipment.

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