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THE MANUFACTURING OF THE CAST SAMPLE PIECES WITH THE HELP OF CAVITY MODELS – CRUST TYPE

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ABSTRACT

The actual models for development are massive, generally heavy and whit a large consumption of fabrics and they can indicate waste casting (piping, inadequate surfaces, dimensional inaccuracy etc.) The disadvantages and manufacturing of the massive sample pieces from "plastic", with a laborious technology and with a large consumption of fabrics, needs auxiliary devices because they are made only in specialized workshops adapted to the model.
It is proposed the making of a reinforcing synthetic resin, such as a crust, with an adequate thickness for the size of the piece and molder pressure, light and easy to make -even handicraft- models

1. CURRENT MATERIALS USED IN PATTERN-MAKING [1 , 4]

Nowadays in the casting, forming technology are used sample piece made from different materials such as: wood, (different tips), mixed metal (aluminum, copper, iron) and synthetics resin.
Generally these samples are massive, and they have disadvantages like: massy weight, big consume of materials, difficult manufacturing and a sophisticate technology. It is possible the manufacturing of light samples made from different tips of composite materials, crust tip models which fulfill all the forming needs.
In the attempts made by " Transilvania" University of Brasov , U.T.S.M. , some current synthetic resin –matrix and complementary materials –glass fiber were tested.

1.1. Synthetic resin

Norsodyne resin – it is a standard ortophtalic polyester resin of general usage; it has a good transparency and it has auto baking of resin whit or without fortifying.
Sirca resin – it is an isophthalic resin of general usage, it has auto baking of resin whit or without fortifying.

1.2. Glass fiber

- Glass fiber – woven fabric – roll weight 500g/m^2
- Glass fiber – chopped strand mat – roll weight 300g/m^2
- Glass fiber – net type –roll weight 125g/m^2

1.3. Auxiliary materials

- Fortifying – cobalt compounds 1%
- Composite shield – Finish Kare 333MR wax – wax extraction
- Other various fabrics
- Thinning agent : nitro D 209
- Brushes, coated abrasive and other tools (utensils)

It was not possible to achieve all the physical – chemical properties of the materials, because these are not aloud to the public being of confidential matter (only general dates like properties, utilization).

2. ACHIEVING TECHNOLOGY [2,3,4]

There were attemps to obtain composite materials trough the variation of the reinforcing and resin layer number thus:

- Norsodyne resin with reinforcing strand mat (3, 5, 7 reinforcing layers) (fig.1.)
- Sirca resin with reinforcing woven fabric (3, 5, 7 reinforcing layers) (fig.2.)

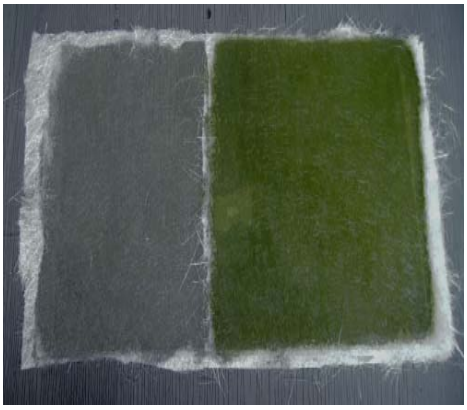

Figure 1. reinforcing plate with 3 layers (left) and 7 layers (right)

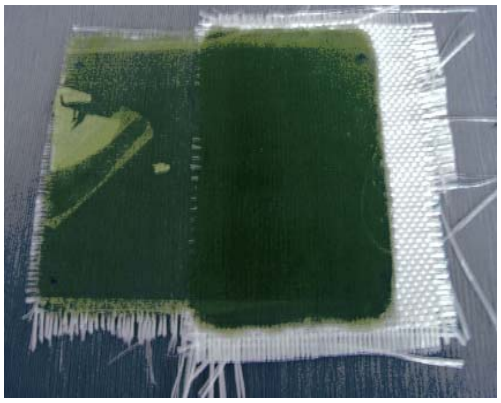

Figure 2. reinforcing plate with 3 layers (left) and 7 layers (right)

- Sirca resin with reinforcing net type (3, 5, 7 reinforcing layers) (fig.3.)

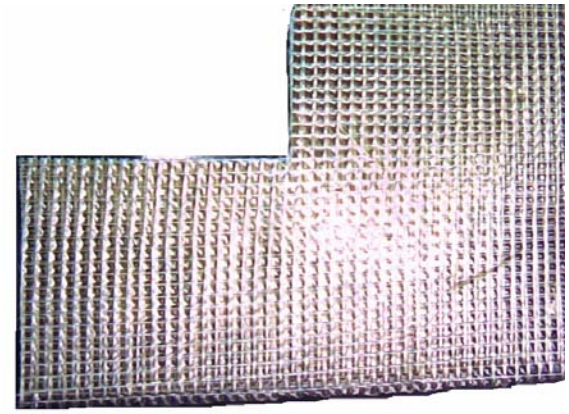

Figure 3. Reinforcing plate with 7 layers

The fabrics were tasted using the physical-mechanical properties measuring resistance to: traction, bending (curving) ,impact resistance (resiliency) and static ball indentation test. The composite materials from Sirca resin, reinforcing net type with 5 layers achieved the best results .

The results for this version of composite materials are presented in table nr.1 and in the graphic from fig.4.

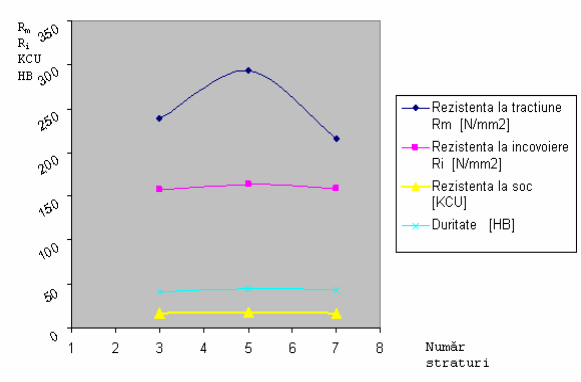

Figure 4. The results of the composite materials from Sirca resin and the reinforcing net type transposed in graphic .

Table 1. Physical-mechanical properties for the composite materials from Sirca resin and the reinforcing net type with 5 layers.

Test data / Layers	UM	3	5	7
Resistance to traction	N/mm^2	238	293	215
Resistance to bending	N/mm^2	157	163	159
Resistance to impact	KCU	17/2	18/2	17/2
Hardness	HB	41	45	44

For the tested proof samples made by simple plates was established a grate ruggedness and in consequence changes were made for minimizing the ruggedness (they put an additional resin layer and the results were positive).
There were achieved usable cavity samples in molding from the composite Sirca resin + reinforcing strand mat (fig.5.) and Norsodyne resin + reinforcing woven fabric (fig.6.)

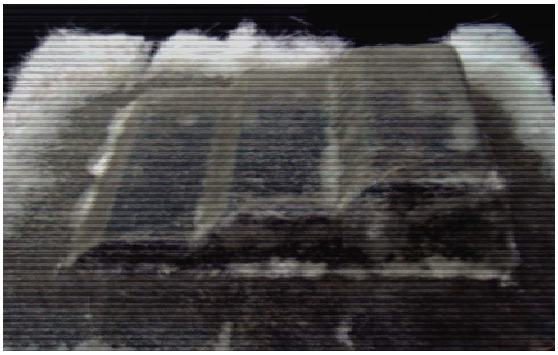

Figure 5. Sirca resin + reinforcing strand mat

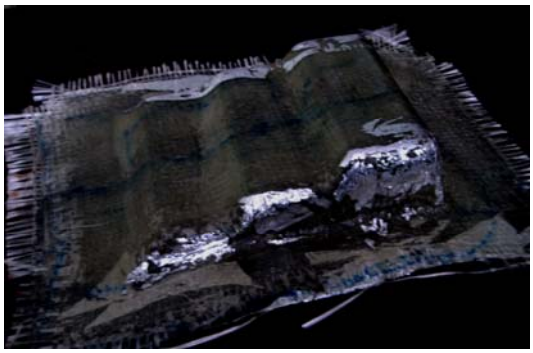

Figure 6. Norsodyne resin + reinforcing woven fabric

The samples presented in fig.5. and fig.6. were photographed immediately after the manufacturing, the exterior ridges not being worked out.
The samples were mounted on a die holder plate, tasted at many mechanized moldings – on a shaking and classical compression molding machine (MF11), which develops a 600 MPa force at pressing..
It was used a unique molding mixture (sand NO5 – 84,5%, activated bentonit 1 %, culm 4,5% with properties like humidity 2,8…3,5%, permeability 150 u.a.p., σ_c=10…15 N/cm^2).There weren't observed visible distortion which could alter the dimensions of the cavity of the forms even after 10 moldings.

The presented sample was relatively small, but in the case of large samples under the pressure of the molding mixture is possible to detect some alteration of forms but they can reinforce them with some ribs glued inside which can be used to anchorage the sample to the die holder plate (fig.7).

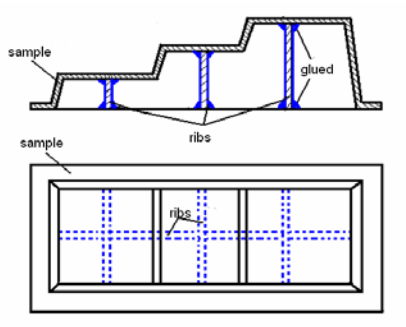

Figure 7. Sample with ribs glued inside

3. REFERENCES

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