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Structural Frame Of Granitoids For Ottimization Of Quarry Evolution

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Until 1990 the Sardinian granite quarry industries covered 40% of the world market. In the last decade the production collapsed in a relentless way, this collapse has been made by both the appearance of new competitive partners both by the low quality of the product.

The cost of the quarries has been become intorrelable because the majority of the production is discarded material because of a total absence of a rationalization procedure before and after the extraction. In these ten years structural-textural studies have been made and these studies have permitted a rationalization of an extraction process. In effect particular attention is refered to the pluton's structural frame, for the individuation of the relations between the textural's defects and the baloon's architecture. The obtained results indicate that it is possible to avoid some of these defects trough the studies of the rocks structural characteristics. The petrographic-structural study permit a deeper definition in a way to the use of explosive and of dynamic splitting.

The Magmatic Foliation (MF) recognizable in the foliated intrusive magmatic rocks is a primary planar surface and it's characterized by the isoorientation of [010] planes of Felspars or femic aggregates and/or by Shape Preferred Orientation (S.P.O) of melanocratic enclaves (MME – Mafic Magmatic Enclaves). On the MF plane it is possible to observe the Magmatic Lineation (ML), due to the Lattice Preferred Orientation (LPO) or by the major axis of the enclaves.

The MF frame allow to define the pattern of the plutonic body: the location of the quarry in relation to its position in the body is fundamental for its economic environment.

It is possible, in fact, to subdivide the “balloon” in three principal zones: the reclimb chimney, the lateral part and the apical part.

In an ideal section of a magmatic pluton we are able to observe that the orientation of MF is sub-vertical to vertical in the reclimb chimney, horizontal in the apical part and with a variable inclination in the lateral parts. It is possible to observe also a band with a different textural distribution.

In the field work we will make a collection of data regarding various orientation of MF. From this data we will make a map of strike lines, that this a map that present the course of the MF in the entire complex. To collect the data of the primary textural homogeneity we will apply the “metodo delle maglie”. This method permit a lithological distinction of various granitic facies, with a utilization of the textural/compositional character of a examinated magmatic rocks in consideration to its primary character. This method also permits us, in correlation with the analysis of the MF course, to give a zoning of textural characteristics present in the pluton. Therefore this method permits to established a certain textural homogeneity and its zoning distribution.

The MF course is fundamental to know the spatial disposition of textural variations within the pluton, therefore at a merceological level the textural variations have a fundamental importance for the quality of product.

In relationship to this consideration, the MF distribution in the pluton and the consequent disposition of a quarry in the pluton, it is possible to define the presence of an ulterior defect also primary also secondary. These defects are intrinsic of the material and make the rocks have a visual disomogeneity.

This primary defects are:

- *Microcrystalline enclaves (Bonin, 1991):*
- *schlieren biotitici (Marre, 1982):*
- *Aplitic-pegmatitic “poket”:* are a compositional disomogeneity derived froma an adunament of K-felspars.
- *Aplitic-pegmatitic dykes:* represent the final manifestations of a magmatic differentation

Some of the primary defect, like biotitic schileren and SPO of enclaves, follow the MF, and from the bibliography they are typical indicator of marginal and/or apical zones. The complex of the totality of this parameter, if these are observed in a zone of

a potential quarry, permit a radical optimization of a quarry activity with a conseguent reduction of cost and ambiental degrading.

The secondary direct are:

- secondary direct intrinsic of rock related to the pluton cooling (primary joints)
- secondary direct with a tectonic derivation (faults) that product a milonitization process of granitic rock.

These secondary defects are important for the orientation of the quarry because these fractures could be cause a problem for the production of a block with standard characteristics.

To explain this concept we propose some examples of quarries characterized by the presence of the absence of the defect.

These two quarries is represent a two characteristic sector of the pluton, in particular the first one is positioned in the apical part and the second one is positioned in the reclimb chimney.

The recognized structural pattern have permitted the positioning of the first quarry in the apical part is In particular the orientation of magmatic foliation that is subhorizonta/horizontal. In this quarry is present also a variety of defect that is are disribuited in the entire pit.

These problems are the cause of abandoning of the quarry because the presence of this defect doesn't permit an economical use of this site.

The second example is a pit where the work has been exhausted of the material. This has been caused from the perfect collocation in the magmatic pluton of this quarry. In effect in this pit the magmatic foliation is subvertical and the presence of the defect is rare.

The structural analysis that this work proposed would permit the recognition of the pluton form and, with a minimal error, the optimal site of the second quarry would be recognized and the negative site of the first quarry wouldn't be recommended.