

# Geological mapping and analysis in determining resource recitivity limestone rocks in the village of Mersip

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# Geological Mapping and Analysis in Determining Resource Resistivity Limestone Rocks in the Village of Mersip and Surrounding Areas, District Limun, Sorolangun Regency, Jambi Province

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**Abstract.** The research objective is to describe potential, to analyze the quality and quantity of limestone, and to know the limit distribution of rocks based on the value of resistivity, the pattern of distribution of rocks by drilling, the influence mineral growing on rock against resistivity values, the model deposition of limestone based on the value resistivity of rock and drilling, and the comparison between the interpretation resistivity values based on petrographic studies by drilling. Geologic Formations study area consists of assays consisting of altered sandstone, phyllite, slate, siltstone, grewacke, and inset limestone. Local quartz sandstone, schist, genealogy, which is Member of Mersip Stylists Formation, consists of limestone that formed in shallow seas. Stylists Formation consists of slate, shale, siltstone and sandstone. This research methodology is quantitative using experimental observation by survey. This type of research methodology by its nature is descriptive analysis.

## INTRODUCTION

Limestone has a resistivity value that is 700 - 100000 ohm m. Rock phyllite, slate, gneiss, values resistivity of 50 - 200 ohm m. Weathering soil values resistivity of 10-200 ohm m. Limestone sediment models based on the value of resistivity of rock and drilling is at the center of the altitude and the steep hill locals - locals to constantly along east - west sites. On the limit distribution, limestone deposited in the plains area covered soil. Phyllite and shale are located in the northern part of the research sites, srisit is scattered in the east, and gneiss is in the western part of the study sites.

Commodities in Sorolangun regency have economically potential value for utilization. Material mining industry define as a mining which because the physical and chemical can be used directly by industry. Geologically, Indonesia has large material excavation. The formation of the process land and sea sedimentation, magma activity in the fire mountain which has been running in the period a long time, are followed by the process of evolution geology that has resulted in the process of forming commodities. As we know, the geology resources are very influential in the process of mineral and coal resources use especially limestone, which being used for raw materials of cement making.

In order to examine the potential limestone and other rocks in the area Bukit Bulan village, Sarolangun regency, Jambi province, as well as doing geological mapping and research survey, geoelectric as one of the methods indicated under surface to examine the potential and the spread of limestone and other rocks.

This research aim to investigate the influence of mineralizing rock (analysis an incision in petrography) and geology condition (characteristic of rocks, cave, the cavity, structure, morphology, and river) in the resistive of research area.

Limestone is the main subject of much needed raw materials industry. This supported the development of business in this area more broadly. In addition, the development of this sector is supported by high selling price in the use of raw materials for cement maker in order to attract once in processing. As for processing activity of limestone first through a process stage research first (exploration) so that in processing be separated extraction of limestone in efficient.

## METHODOLOGY

Based on the field of the treatment, the research is based on exploration. While according to the research purpose, it includes scientific research. Research methodology used in this research was quantitative and observational experiment conducted in the survey. The type of research methodology was descriptive analysis. The survey information and data collection used direct observation in the field. This study will described and analyze process factors of forming limestone.

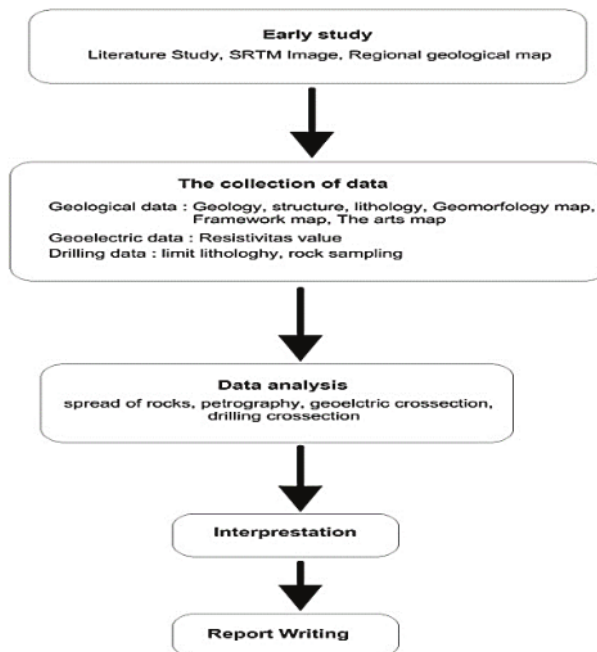


FIGURE 1. The diagram research

## Geological Mapping

A method of mapping geology is a method of studying or making geology maps or reconstructing geology condition, starting from collecting data in map of the skeleton geology to a map of geology, to get pattern of scatter and geology conditions in the surface of research location. As for that, it must be considered in the mapping geology to research:

- The maps of thematic
- A unit of raw international stratigraphic and a unit of map
- Formation, formal -& informal unit, Member, Groups.
- Regional stratigraphy, sedimentation cycle of the period tectonics, the group, the bedrock geology. Regional stratigraphy is a understanding about the state of stratigraphy condition like the character of rocks or the

correlation across coating covering an area on a regional basis, horizontally or vertically. Basically the tectonics period describes events -- tectonics events which summarized at a cross time. The bedrock (bedrock is the hard part, fused parts of the crust of the outermost earth layer, have the thickness of than 20 to 25 mill located on a coat the earth.

- The problems of a geological structure
- Flowing pattern, geomorphology, and indications of geological structures and character of folded rocks.
- Identify the rock with the help of a polarization microscope. Observe composition and components of rocks, due to the limited sight and descriptions of rocks when identify of rock with petrology. Analyzes a mineral of rocks under the polarization microscope (incision thin), to get the characteristics of a mineral to get the data of the body rocks more accurate and detail.
- In classifying rocks, it required the supporting data that is undergone a microscopic rocks petrography in outcrop research location to know minerals of rocks that can be used as data for comparison in interpretation value of rocks regional resistivity investigation.

### Geoelectric Resistivity Method

The measurement of geoelectric with the configuration dipole whose aim is to obtain information regarding the price of a kind of specious rocks below the surface, that reflects the different types of layer of rock.

Resistivity apparent ( $\rho$ ) in parts ohm meters set of the volt primary  $v_p$  and exerted between the potential and electric current (I) given to the earth, determined by equation:

$$\rho = \frac{\Delta V}{I} \times K \quad (1)$$

$$K = \pi \cdot a(n+1)(n+2)n \quad (2)$$

If an electric current injected into the earth in the current 2 electrodes, then measured at potential posed by the injection of the current on potential 2 fruit electrodes, will be obtained apparent price of based on the composition of electrodes dipole. The calculated resistivity does not have any value below the surface, but has apparent value that is resistivity of the earth considering homogeneous of grades assignment of the same resistance for the same electrodes. The relationship between apparent resistivity and actual resistivity is very complex (loke, 2000), so as to determine the value of resistivity beneath the surface which is a really necessary calculation in inversion using help of computers.

### Standard Operational of Drilling

Drilling is conducted to gather picture and minerals image; and the spread of the lithology under surface of the general ground. A method of gas drilling is gas drilling of the nucleus coring rock (lithology).

Kinds of drill apparatus is used the type of long year 01, to plan the depth of gas drilling varying from the depth of 15 to 42 meters. To the gas drilling scope as follows:

Core Drilling, Document (a photograph) sample of the results of gas drilling in core box. Describing rocks results of gas drilling and measuring the thickness of rocks and make bor-log / cross section drill 2d.

### DISCUSSION

The spread of limestone in research located in the middle location to the direction of the spread of northwest - south eastern. The visibility limestone scatter of hills kars and surface. As for in megascopic of limestone in the study areas, has worn out ashes whitish grey, fresh grey bright - grey dark to blackish grey, compact, hard, crystalline, luster dull, there are fracture filling quartz vein of 1 - 2 cm. Limestone includes a member of mersip formation which precipitated in shallow sea environment in the end of Jurassic - late cretaceous

A crystalline limestone is in the middle location, western and eastern research locations; filit is on the northern part of research locations; slate is at the east area research locations and gneiss is on the western part of research locations.

The results of geoelectric aimed to examine the potential limestone in the area research or profile a unit of interpretative geology in general as follows:

A unit of land weathering (1); has depth 0 - 7 m with depth value of 10 - 200 ohm m.

A unit of limestone (2); has various depth and is main unit in the area research, with the highest height 700 - 100,000 ohm m.

A unit of limestone (3); has various depth and especially in the north and south with the lowest depth 50 - 200 ohm m. A unit of it are shale, flakes, slate, filit and gneiss.

The boundary conditions of lithology we located under surface of the basis on gas drilling of the thickness of top soil at the depth of 1 to 10 meters, top soil with the thickness 1 meter has relatively drill point at a position slope, while the depth of 5 - 10 meters relatively the drill point is in the surface area. At the point of drill is in the middle part of the BH-01x, BH-04x, BH-05x, BH-07x and BH-08x lithology rocks of sandstones. On the other hand, in the drill point, other limestone found under soil. In correlation, a unit has the cardinal directions in west – east direction in the research area.

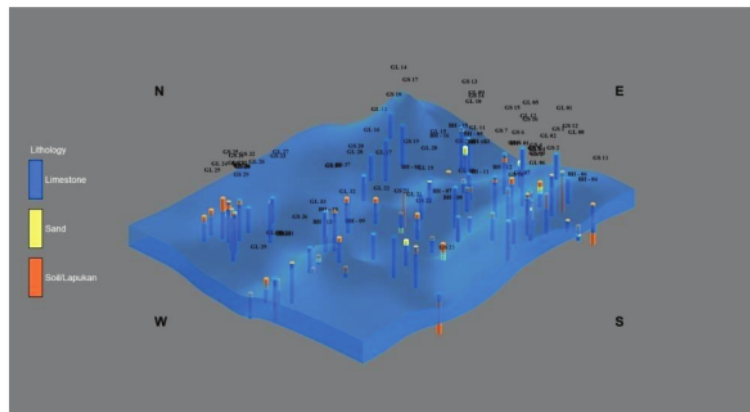
The influence of precipitate mineral is on the resistivity rocks which is very influential on the value of resistivity rocks: limestone composed by crystals - crystalline carbonate mineral namely calcite which compacted so as to have value of larger kinds of rocks others are 700 – 100.000 ohm m. As for rocks of filit, slate, gneiss where rocks are composed by a group silicate minerals (non-ferromagnesium) the mineral quartz , muscovite, feldspar have bright colors and do not have an iron element so as relatively having value kind of 50 - 200 ohm m. Meanwhile land weathering (soil) of clays and the process of lateralization are zone which oxidized iron and roots so trapped small species 10 - 200 ohm m.

Model precipitated limestone based on value of resistivity rocks and gas drilling which is in the middle of research locations formed at an altitude of two parallel east - west research locations, while in bigian sides precipitated limestone in surface area which relatively enclosed by soil. Rocks of filit and flakes spread on the northern part of research locations, and stones slate spread at the east area while gneiss is on the western part of research locations.

Volume reserve limestone in the area research can be resumed as follows:

Limestone in the study areas

Area	: 12.465 km <sup>2</sup>
Volume limestone	: 415 215 427 m <sup>3</sup>
Tonnage Limestone	: 1 000 669 179 ton



**FIGURE 2.** Picture block diagram lithology limestone the results of interpretation geoelectric and logging drill

The results of the analysis example laboratory showed the quality of limestone meet the standards of quality as the raw material for cement maker.



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