Analysis of Geological Risk Affecting the City of Toquepala, Southern Peru

Recuay – Ancash

Authors: Manrique Contreras Sergio Luis, Bravo Coronado Fidel Henry

Course: Geología Aplicada a las Construcciones
Escuela de Geología
Facultad de Ingeniería Geológica, Minera y Metalúrgica
Universidad Nacional de Ingenieria

ABSTRACT

The town of Tapacocha is located on a sliding floor, that is a paleorelieve modeled by ancient glaciers, It was affected by the earthquake of May 1970 the old church built in the year 1780 was destroyed and with the rains of the year 1983 was flooded,

The investigation will allow evaluating the vulnerability and proposing mitigation activities to reduce the damages cleaning of the drainage located to the sides of the urban area:

INTRODUCTION

In the Andean region, on the western slope, civil constructions is built on unstable soils, vulnerable by internal and external geodynamics and climate change.

The town of Tapacocha District (Fig 1) is built on a sliding ground, consisting of materials unstable due to landslide erosion and sediment transport and rubble from the highlands

The study is carried out to identify the type of soil, on which the town of Tapacocha has been built; Reconstruct the mechanism of soil formation and identify the problems that could affect due to natural phenomena

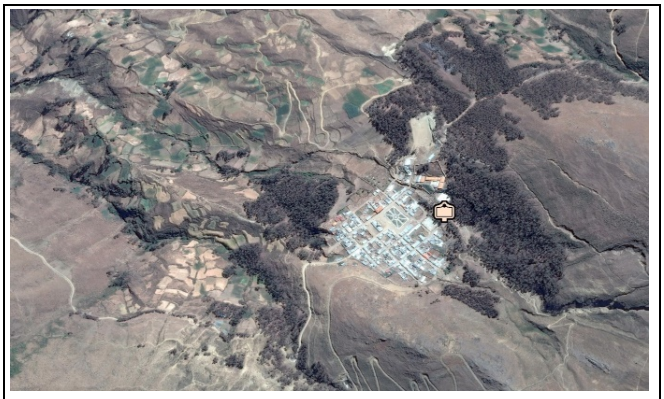

Fig 1 Tapacocha (Google Earth)

PRESENTATION OF THE PROBLEM

The town of the Tapacocha District is built on a slipped terrain, made up of unstable material caused by erosion landslides and transport of sediments and rubble from the highlands. The inhabitants mitigate with annual communal cleaning work to the areas of drainage and runoff located on the sides of the urban area. There were rainy seasons in 1983 that flooded part of the village, the fracture of the soil caused by the earthquake of 1970 (communication of the settlers). If the earthquake had occurred in the rainy season, it is very likely that large landslides were being lamented with considerable human and economic losses.

Fig 2. Tapacocha soil: clasts and debris of heterometric size and poorly classified

OBJETIVES

General objective:

Verify the type of land on which the town of Tapacocha is built, then reconstruct the soil formation mechanism and identify the problems that could affect due to natural phenomena

Specific objectives:

To determine the stability of the town of Tapacocha determining the Factor of security.

To elaborate geological profiles in order to identify the type of rock in which Tapacocha is located

DESCRIPTION OF THE SOLUTION

From the preliminary knowledge through the inhabitants of the town of Tapacocha about the vulnerability of the town center by fluvial effects and earthquake of the year 1970, verifying the geomorphology on the satellite images was analyzed and proceed to perform the study in the logical sequence:

- Geomorphological interpretation on "Google Earth".
- Validation of the regional geology of INGEMMET.
- Obtaining Field Data: Geological mapping.
- Soil sampling and shipping to the laboratory.
- Interpretation of soil analysis.
- Systematization and analysis of information.
- Analysis of the field data.
- Elaboration of geological sections.

RESULTS

For the respective results, the soil of Tapacocha was analyzed according to the sections shown (Fig.3) finding their respective safety factors.

Fig 3. Tapacocha

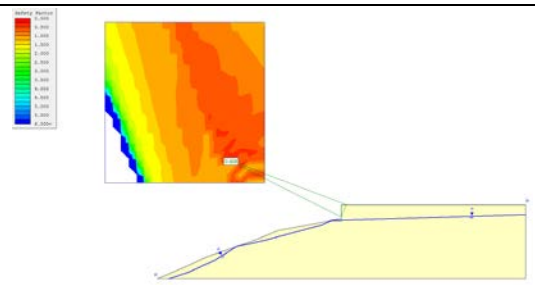

Fig 4. Side A. F.S= 0.408

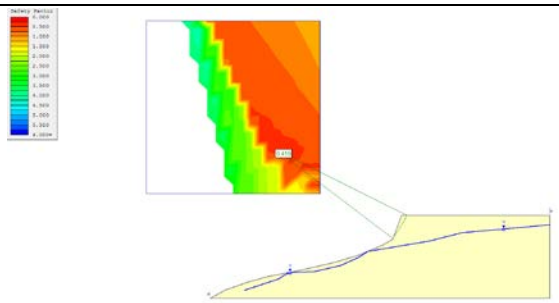

Fig 5. Side. F.S= 0.419

CONCLUSIONS

- The village floor is on an intensely tectonized sedimentary base.
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- The town center is built on unstable terrain, highly vulnerable due to natural phenomena: rain, earthquakes ...
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- The soil is permanently in the process of erosion due to rainfall.
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- Reforestation with eucalyptus trees has led to the extinction of native plants that generates constant soil degradation.

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ATTACHMENTS

Fig 6. Geomorphological interpretation of Tapacocha Area

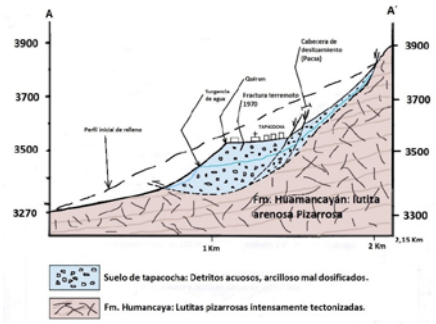

Fig 7. Tapacocha geodynamic interpretive section.