

The effect of geomorphology on the formation and quality of aggregates in Pataq and Qalehshahin catchments

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Extended Abstract

1- Introduction

Among construction materials, aggregates have extensive applications in the production of concrete, mortar, and in the construction of roads, railroads, airports, bridges and dams. Due to weathering, bedrocks are converted to small fragments and then weathered particles would be transported by erosive parameters such as water, wind, glacier and gravity and finally transported materials will be deposited in some geomorphological landforms. Some geomorphological landforms like river beds, river Terraces, alluvial fans, sand dunes, glacial outwash plains and taluses have

large amounts of weathered rocks and sediments that are appropriate for aggregate exploitation. Pataq and Qalehshahin catchments as study area are the upstream subcatchments of Alvand basin in Kermanshah province, and are parts of Folded Zagros structural zone. The aim of this research is to define landforms that are appropriate for aggregate exploitation and to determine the effect of geomorphological processes in the formation and quality of aggregates.

2- Methodology

To achieve the purpose of this study, at first, Geologic map of the study area at a scale of 1:250000 and the topographic maps at a scale of 1:50000 were digitized in ILWIS (Integrated Land and Water Information System) software and used to derive lithology and DEM of study area. Landforms were recognized by Quickbird satellite images and precise field works also have been carried out

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for the identification of landforms and processes. The granulometry test has been done for 4 samples of fans. Two samples of sediment on old fans and two samples on new fans were collected and subsequently the cumulative granulometric curves were plotted. Among geomorphological landforms, alluvial fans and taluses were recognized as appropriate landforms for aggregate exploitation. To examine the quality of study area aggregates, 18 samples of aggregates on alluvial fans and taluses were obtained and then Impact Value tests were carried out based on sieve No. 8.

3- Discussion

Alluvial fans and taluses are of the most significant landforms that have a lot of weathered and crushed materials that can be used as aggregates. A total of 97 alluvial fans have been formed in Qalehshahin catchment. The presence of large boulders with karstic pitting, weathered and varnished clasts and some soil cover on most fans demonstrate that approximately all mentioned fans are inactive formed in more humid periods of Quaternary. Moreover, the results of sediment granulometry show that young fans have finer sediment and old fans have coarser sediments, representing a more humid climate during old fans formation. Results of aggregate Impact Value tests show that mean values of mentioned test in taluses, old and new alluvial fans are 9.57, 9.47 and 8 percent respectively.

4- Conclusion

Among geomorphological landforms of study area, Alluvial fans and taluses have extensive clasts and crushed materials that can be used as aggregates. Landforms and processes are of the most significant parameters that affect the volume, distribution and quality of aggregates. Karstification process especially in northeastern slopes has negative effect on the aggregate quality because it can result in the formation of voids and cavities in rock fragments. Nevertheless, tectonic extension in Noakoh hinge and physical weathering such as thermoclastic and cryoclastic processes in southwestern slopes has appropriate effects in the production of aggregates. Impact Value tests reveal that materials of alluvial fans and taluses have acceptable quality for use as aggregates. This study represents that, in spite of appropriate quality of aggregates of both taluses and alluvial fans, old alluvial fans have aggregates with lower quality because of long term weathering.

Keywords: Pataq, aggregate, geomorphology, process, talus, alluvial fan.

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