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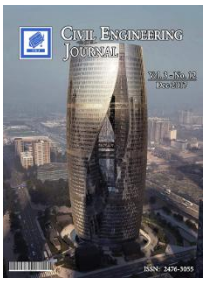

# Protecting River Environment through Proper Management of Material Mining by Matrix Method (Case Study of A'la River in Iran)

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**Abstract**

Regarding the importance of rivers, appropriate management of aggregate mining is of great significance. Mining of river materials has a direct impact on environmental conditions of the river. Today, aggregate mining management represents a crucial topic in river engineering. Often selected based on the pattern of the considered river, matrix method provides a suitable approach to improve the river aggregate mining management. The present research aims at presenting the application of the matrix method in river material mining location evaluation. Given the capabilities of the matrix method for determining potential of mine area and aggregate mining method, this method can be seen as a suitable solution for reducing negative environmental impacts of river material mining. A'la River is one of the most important rivers streaming in Khouzestan Province (Iran), with its sediment load and mining potential being of critical importance. In this research, the reach of A'la River at the intersection of Rood-Zard River and Rahmhormoz diversion dam was studied for aggregate mining and application of matrix method. The main purpose of this work is to study the application of matrix method to A'la River. The results indicate braided pattern of the river and appropriateness of the matrix method. Available volume of aggregate for mining within the mentioned reach of A'la River was estimated as 50,000 $m^3$, and scraping method at a maximum depth of 1 m was proposed for mining of the aggregates.

*Keywords:* Aggregate Mining; A'la River; Braided River; Matrix Method; Scraping.

## 1. Introduction

Rivers are among the most important natural resources, so that it is critically important to have them protection and preserved. During recent years, changes in river systems have resulted in environmental and morphological damages which have drawn the attention of water and environmental managers. River status studies in terms of erosion and sedimentation conditions comprise a major topic in any river-related engineering project [1]. In other words, morphological and geometrical changes in rivers are influenced by erosion, sediment transport, and deposition [2]. Population growth and subsequent physical extension of cities has increased the demand for river aggregates for construction materials in urban structures, road construction, and civil and industrial projects. Also, river aggregate is far more convenient to access than mountain aggregate.

Feasibility studies on aggregate mining potential and operation on rivers are among the most important studies in river engineering, widely affecting hydraulic, environmental, and morphological conditions of streams. In other words, river aggregate mining affects hydraulic regime of the flow which in turn results in variations in sediment load and

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