



Hydraulic modeling and GIS analysis for flood-hazard risk management for the Jajrood River, Iran

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Flood hazards affect human living. Floods cannot be controlled completely but, using floodplain management, they may be mitigated to some extent. In this study, using GIS and the hydraulic model Hec-RAS, flood risk maps were developed that delineate 10, 25, 50, 100, 200-years floods. GIS interfaced with Hec-RAS through the Hec-GeoRAS extension, has to determine water surface profiles and flood zoning. Using the flood risk maps with different return periods, the most hazardous regions are determined. Hydraulic analysis of flow near two bridges in the Jajrood River in Lavasan city, show that, contrary their design capacity, floods cannot pass. The first bridge will be overtopped by a 25-year flood. The second bridge will be overtopped on the bridge by a 50 to 100-year flood. The backwater caused by these manmade structures affect the upstream floodplain and cause more damage. According to this study, due to urbanization near the river, structural improvement of both bridges is necessary to bring flood risks down to acceptable levels. Techniques for making spatial model assumptions and model errors explicit to flood risk managers are introduced. These techniques can improve the decision making for risk management.

Keywords: Flood Hazard Zoning, GIS, Hec-RAS, Hec-GeoRAS, bridges, hydraulic modeling, Jajrood River.