Investigation of the Stream Geomorphology Hazards on of Trunk-Line Energy Transmittal by Using the Pipeline Risk Model (IGAT-9)

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Abstract

In recent years, valuable experiences have been gained in relation to environmental challenges, as well as pipeline risk management in the United States and Europe, in relation to the design and stabilization of pipelines, including the knowledge of geomorphological hazards, in particular the erosion hazards of the stream. It has helped to reduce the risk, and identify the response and response of the stream and rivers. In this paper, Pipeline Risk Screening Matrix studies the hazards of the geomorphology of the stream pipelines in the Iran gas trunk – line 9 (IGAT 9), in Khuzestan province. For this purpose, seven hydro-geomorphological data including scale, landscape sensitivity, stream type, riparian corridor, bank characteristics, bed characteristics and hydrologic regime were used. In the pipeline risk axis, three nominal scales include: Low risk, medium risk, and high risk were used to estimate the risk profile of the pipeline in relation to the increase or decrease of response and river responses. The results of this study showed that from the seven classes of the studied, the type stream is low-intermediate risk stream response and three classes, the riparian corridor, bed characteristics and hydrological regime are Medium risk. Bed characteristics and scale are medium-high risk and the landscape sensitivity high risk stream response. Overall, the class of risk stream response in IGAT 9, is medium – high risk stream response class.

Introduction

In the world, most of the research work on the hazards of pipelines (oil and gas pipelines) is in the United States, Canada and Russia, respectively. Also Western European countries, in particular the UK, have had research in this field. In Iran, pipeline failure or damage to the pipeline is eroded annually, for example, Rafsanjan-Naein-Esfahan oil pipeline (2013), Ray-Tabriz (2017). In Iran, there

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is no comprehensive study in which the geomorphological impact of the erosion damages to the pipelines unlike the long history (over 110 year records) of the oil and gas industry. In this paper, the purpose is to identify and assess of the risk stream response by using of pipeline risk screening axis relation to IGAT 9.

Method and result
In this paper we use of pipeline risk screening axis for estimate and identify of stream response risk class. This axis has seven criteria such as: scale, landscape sensitivity, stream type, riparian corridor, bank characteristics, bed characteristics and hydrologic regime. Pipeline risk screening axis classified into three categories, low risk, medium risk and high risk based on field data from seven criteria:

1) 50 river have point scale, 2 river reach scale, 4 rivers multi-reach and 4 rivers have watershed. 2) Landscape sensitivity have high risk reaction groups. 3) Stream type are two class include alluvial and bed rock. 4) Riparian corridor is 3 type of continuous – wide, semi continuous – wide and discontinuous – narrow. 5) bank characteristics have 3 type naturally non erodible, erosion resistant and highly erodible. 6) bed characteristics have 3 types boulder/cobble/clay bed, gravel /silt bed (dominate in case study) and sand bed. 7) hydrologic regime in our case study is rain and thunderstorm.

Conclusion
The results of this study showed that from the seven classes of the studied, the type stream is low-intermediate risk stream response and three classes, the riparian corridor, bed characteristics and hydrological regime are Medium risk. Bed characteristics and scale are medium-high risk, and the landscape sensitivity high risk stream response. Overall, the class of risk stream response in IGAT 9, is medium – high risk stream response class. For decrease of stream response risk, and improvement Iran gas trunk – line 9, it needs to tight management – engineering measurements, and Geomorphologically in case of erosion stream and restoration and review of project of rout line.