

Investigation of Sulfur modified asphalt mixes for road construction in the Gulf region

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Abstract: A study has been funded by Saudi Aramco and conducted at KFUPM on the feasibility of using sulfur as an additive for local asphalt concrete mixtures. The research work covered many aspects of utilizing sulfur modified asphalt in road construction including the field trial at Khursaniyah and the concerns related to air pollution due to sulfur containing gases. This study on sulfur-asphalt concrete consists of testing local sulfur, Shell Canada sulfur-extended asphalt modifier (SEAMTM), with local asphalt-concrete mixes to assess the effect of sulfur and modified sulfur materials by comparing the performance of these paving mixes. Results from laboratory and field trials indicated that SEAMTM and sulfur modified asphalt concrete can be produced, hauled, placed and compacted easily with conventional methods and equipment. There will be no constructability problem with the use of sulfur or SEAMTM binder. Use of SEAMTM or sulfur material at 30% replacement of asphalt could be more economical as compared to regular asphalt as the amount of required asphalt will be reduced in proportion to the SEAMTM/sulfur percentages added. The field tests on assessing the environmental impact of the sulfur-asphalt technology show that there is no long-term hazard for mixes as indicated by acceptable values of emission of hazardous gases such as H₂S and SO₂ (<1 PPM at 76°C). However, precautions must be taken during preparation and laying of mixes at 145°C.