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**Title :** FLOW AND SEDIMENT MATRIX FOR THE FORMATION OF MIDLAND POINT BARS IN SAND BED CHANNEL

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A large number of studies, both theoretical and experimental have been devoted to understanding the physical mechanisms underlying the bar formation. Numerous data on bar formation have been accumulated yet the methods to predict bar geometry, especially bar height are still insufficient. This research aims to investigate the parameters that promote bar formation in term of bar height. Investigation was carried out on an erodible sand bed channel using a large-scale physical river model. Study have included various hydraulic and sediment characteristics with steady flow rates and sediment supply. There are four matrices of flow rate and channel width with other variables, namely grains size and bed slope which were kept constant. A relationship between dimensionless bar heights with the respective independent parameters has been established. Bar profile development was generated using *Surfer*, of which 3D elevation plots are given. Analysis has included the discussion on a significant difference of planform view for each experimental condition, trends in volume change along the channel, widening ratio and centreline bed elevation profile along the longitudinal distance. Both experimental and historical data were used to develop the empirical model. Model development involved selection of parameters through review of established models, dimensional analysis to check on the homogeneity of the model and statistical analysis. Derived empirical model has been validated using a different set of data from previous studies. Analysis confirmed that the empirical model derived using linear regression technique depicts the highest accuracy of 90% with $\frac{D}{d_s}$ and $\frac{B}{D}$ as the most significant parameters that promote bar height formation. An empirical formula to predict bar height formation in sand bed channel for flow rates in the range of 4.97 $m^3/hr$ to 10.91 $m^3/hr$ is proposed. The empirical formulae considers constant supply of sediment in the upstream of channel, thus the growth of bar $\frac{H_B}{d_s}$ is higher in the range of 67 to 107.