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論文名稱：魚道複式人工砂丘板開口寬度與高度之試驗

英文論文名稱：I

【中文摘要】

在魚道內設置開口式砂丘板後，確實能達到增加水深及減緩流速之目的，魚道內之水流狀況與砂丘板開口寬度與高度應有密切關係；因此本研究針對砂丘板開口寬度與高度作進一步的探討，根據高泉達（2001）『魚道內開口人工砂丘板密度之試驗』採用試驗中之理想砂丘板間距 0.74m，並於三種渠槽流量、三種坡度、九種砂丘板型式下，進行渠槽試驗，針對架設砂丘板後渠槽的水深、流速及比能加以探討，並進行加砂試驗。

經由試驗資料分析，在架設不同型式砂丘板後水位平均上升之幅度均可提昇 2 倍以上，而流速減低幅度均可降低 20% 以上，砂丘板開口寬度影響水位上升幅度、流速減低幅度及淤砂百分率均明顯比砂丘板高度之影響大，但加砂部分，不論於哪種坡度，均會有淤砂的情形產生，但所淤積之砂石全部淤積在開口的兩側，所以並不會有堵塞魚道的情形發生。

本試驗針對魚道內施作不同開口式砂丘板型式於加砂情形作進一步探討，發現在砂丘板高寬比為 0.67 時，淤砂情況較不嚴重，希望此點能對將來在魚道之內部設計時有所幫助。

【英文摘要】

The installation of open sand dunes makes it feasible to increase the flow depth and reduce the flow velocity in fishway. Meanwhile, it should be noted that the state of water flow in fishway is significantly dependent on the width and the height of sand dune opening. In this study, the dimension effect of sand dune opening on the flow state in fishway was extensively investigated. Based on the experimental ideal spacing of sand dune, 0.74m, which was adopted in the paper entitled “The Experiment on the Density of Artificial Sand Dune with Opening in Fishway, C.T. Kao, 2001” , a series of experiments were conducted for 9 types of sand dunes, 3 discharge capacities and 3 inclined slopes to study the performances of flow depth, flow velocity, specific energy and sedimentation (or adding sands).

According to the testing results, the installation of various types of sand dune may result in an increment over 200% for the average flow depth and a decrement over 20% for the flow velocity. The influence of the width of sand dune opening on raising the flow level and reducing the flow velocity in fishway is more significant than that of the height of opening. In further, it was found that the sediment deposit of sand material occurs in all cases of sand dune with various inclined slopes. However, most of the sand material settles at the both sides of opening. As a result, the fishway can still provide a free flow path without any clogging.

In experiments, the behavior of sedimentation for various types of sand dune was also investigated. It is found that the sedimentation can be largely mitigated for the sand dune with the dimension of 15cm in width and 10cm in height. It is also expected that these findings can be employed as a reference in the similar design of engineering practice.