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Redesign of contraction, test section and diffuser for a six-inch high speed water tunnel IVAYLO NEDYALKOV, MARTIN WOSNIK, University of New Hampshire — The six-inch high speed water tunnel was recently moved from St. Anthony Falls Laboratory to the University of New Hampshire, where it is being restored. This water tunnel was a 1:6 scale model for the 36-inch Variable Pressure Cavitation Tunnel at David Taylor Model Basin and was used in many fundamental cavitation studies in the past, including the development of Schiebe bodies. It originally had a 6-inch circular test section and was later retrofitted with a 7-inch octagonal test section. In order to increase the maximum achievable velocity in the test section and improve the flow quality a new 6-inch square test section with diminishing 1-inch fillets was designed, which also required the design of a new contraction and diffuser. Contraction, test section and diffuser configurations were studied parametrically using CFD. The numerical predictions are compared to results in the literature and measurements in the tunnel. Further improvements include a new motor and control system. The renovated six-inch tunnel will be used for research on control of cavitating flows, hydrofoil development and general cavitation studies.

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