Hydraulic model studies on pump intakes and flow characteristics



Facility for sump model study



CFD results of sump model study



IITB facility for sump model studies

Pump sump has its applications in many fields like thermal power plants, lift irrigation, water supply, etc. and the need for proper design and analysis of pump sump is increasing. For the efficient performance of the pumps, proper design of pump sump is necessary as the flow entering the pump is a key factor. Though there are many guidelines for such a design, an appropriate model study is required since each system is situation specific. By conducting scaled model studies in the laboratory, the proposed design can be checked and modifications to the intake geometry done, depending on the extent of deviations. In the Hydraulics laboratory at IIT Bombay, a facility has been created for the systematic pump sump modeling. This facility includes an elevated platform for sump construction and testing, recirculation flume, flow measurement equipment (such as ultrasonic flow meter), velocity measurement equipment (such as programmable electro magnetic system), etc. Using the developed system, a number of physical model studies have been conducted for various clients such NTPC, KBL, BHEL, TATA Power, Sunil Hightech, Xylem, Jyoti Pumps and L&T. Also, numerical modeling of the pump sump using CFD (computational fluid dynamics) software has been undertaken as an alternative to get an appropriate design to identify the turbulent flow characteristics.