ALIGNMENT DESIGN AND STATUS OF THE **TAIWAN PHOTON SOURCE**



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Abstract

Taiwan Photon Source (TPS) is a new 3-GeV ring under construction at NSRRC in Taiwan with high brightness and low emittance characteristics. Due to the stability consideration, the whole building is constructed half underground, so the survey and alignment works are quite confined and difficult. For positioning magnets precisely and rapidly, a highly accurate auto-alignment girders system in conjunction with survey network procedures were designed to accomplish the alignment tasks. The survey network includes the preliminary GPS network and laser tracker network. Then, the position data from the survey network define a basis for the motorized girder system to auto-tune and improve the accuracy. The networks are established locally during the construction period and also used to monitor the building construction precision. The detailed alignment design and status are described in this paper.



Taiwan Photon Source is a new 3-GeV ring under construction at the NSRRC site in Taiwan with circumference 518.4 m and 24 double-bend cells. For stability reasons, the entire building is being constructed half underground at depth 12 m relative to Taiwan Light Source. After a long time for excavating and constructing, the building will be finished recently

2009 to May 2012, and the variation of control points of granite pillars are up to 15mm in 7 mon



The Global control points obtained from GPS

stability and accuracy of the GPS control points; we increase 4 new fiducial points in the GPS survey network before the construction. The 4 new fiducial points, the yellow points as shown in Fig. were inlaid in the laccoliths with the inserted depth is up to 5m



accurate theodolite (TDA5005) to survey base on the free station method. Moreover, constructs complete control-point coordinates of the TPS to align components in the future. Finally, the autoalignment system will adjust all girders of the storage ring in TPS construction

Conclusion

The control points of TPS were constructed from GPS, theodolite, laser tracker gradually. The accuracy of control points is under 0.5mm recently. However, the variation of control points is obvious up to 20mm during the TPS construction. Therefore, the procedure of the survey network obtained from several survey apparatus is important to the control points surveyed persistently. The survey network includes the preliminary GPS network and laser tracker network. The position data from the survey network can then be defined a basis for the motorized girder system to auto-tune and applied to improve the accuracy of alignment. The networks are established locally during the construction period and also employed to monitor the building construction precision.