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Control survey for KEK e^+/e^- Injector Linac

The KEK e^+/e^- Injector Linac (injector) started its user operation in 1982 and achieved net 200,000 operation hours in June 2020.

The control survey with a conventional technique using a laser tracker and a digital level was finally introduced for the injector in 2020.

The injector (645 m long in total) consists of 120-m straight section, 33-m arc section which reverses its advancing direction, and 492-m straight section and delivers beam for total four rings; dumping ring (DR), Photon Factory (PF), PF-Advanced ring (PF-AR), SuperKEKB high or low energy rings (HER/LER), respectively.

The injector is divided into 60 units. Standard accelerator components, such as accelerator tubes, magnets, vacuum systems, and diagnostic systems are mounted on a so-called unit girder and installed in each unit. Each unit girder was aligned with a He-Ne laser baseline and photo-diode sensor, which is mounted on upstream side of the girder, referring the laser pointing and the sensor coordinates for two straight sections until 2018.

In this contribution, systematic coordinates and their error distribution via the control survey are discussed and newly encountered issues are discussed.

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