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Experience with the KEKB/SuperKEKB Magnet Cooling Water System

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KEKB and its successor, SuperKEKB, are double-ring, e+e- colliders made for producing B mesons. The construction of KEKB started in 1994, utilizing the existing 3 km circumference tunnel of TRISTAN, a single-ring e+e- collider. KEKB commissioning started in 1998, and lasted until June 2010. KEKB's max peak luminosity, $2.11 \times 10^{34} / \text{cm}^2 / \text{s}$, remains as the current world record. The magnet system consists of more than 1600 (KEKB) or 1700 (SuperKEKB) water-cooled magnets. Though the number of magnets was doubled from TRISTAN to KEKB, the cooling water system was unchanged, resulting in a need for delicate flow balance among individual magnets, which resulted in a system vulnerable to water flow fluctuations. The balance was checked every year during the shutdown, and the occurrence of magnet water trips was kept low. However, the trip rate incidents started to increase from 2003, when the system was contaminated by oil used for maintenance work on the pumps. Our experiences with magnet trips, caused by contamination, by clogging of the strainer mesh attached to the water channel, and by other causes, will be presented along with countermeasures for a more reliable system for SuperKEKB.

Primary author: MASUZAWA, Mika (KEK)

Co-authors: UEKI, Ryuichi (KEK); KAWAMOTO, Takashi (KEK); OHSAWA, Yasunobu (KEK); EGAWA, Kazumi (KEK); NAKAMURA, Shu (KEK); OKI, Toshiyuki (KEK)

Presenter: MASUZAWA, Mika (KEK)

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