

Summary

Reliability of a Positron Emission Tomography System (CTI: PT931/04-12)

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[Purpose] The maintenance data of a PET system (PT931/04-12 CTI Inc.) was analyzed to evaluate its reliability. **[Method]** We examined whether the initial performance for the system resolution and efficiency is kept. The reliability of the PET system was evaluated from the value of MTTF (mean time to failure) and MTBF (mean time between failures) for each part of the system obtained from the maintenance data for 13 years. **[Results]** The initial performance was kept for the resolution, but the efficiency decreased to 72% of the initial value. The 83% of the troubles of the system was for detector block (DB) and DB control module (BC). The MTTF of DB and BC were 2,733 and

3,314 days, and the MTBF of DB and BC per detector ring were 38 and 114 days. The MTBF of the system was 23 days. We found seasonal dependence for the number of troubles of DB and BC. This means that the trouble may be related the humidity. **[Conclusion]** The reliability of the PET system strongly depends on the MTBF of DB and BC. The improvement in quality of these parts and optimization of the environment in operation may increase the reliability of the PET system. For the popularization of PET, it is effective to evaluate the reliability of the system and to show it to the users.

Key words: PET, Reliability, MTTF, MTBF.