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PO42 - Incidents caused by earthquakes and storms, and how to detect them

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“At the National Institutes for Quantum Science and Technology (QST), carbon-ion therapy has been carried out since 1994, and a total of more than 15,000 patients have been treated to date. Japan, where QST is located, is prone to disasters such as earthquakes and storms, which can cause equipment failures: Earthquakes can cause misalignment in equipment, and storms can cause power outages due to lightning strikes.

Currently at our facility, inspections in the event of a disaster are limited to those devices that have experienced failures due to disasters in the past and are based on operators’ judgment. In fact, even if operating is started with failures due to a disaster, equipment alarms can detect them. However, if possible, we should detect them before they become serious. For this purpose, it is necessary to assume in advance what kind of the failures may occur due to each disaster, and to conduct appropriate inspections that have been studied in advance, when or before a disaster occurs. In addition, it is desirable to divide inspection items by the scale of the disaster, so that appropriate inspections can be performed depending on the situation.

The points that should be on alert for failure due to earthquakes are those where small misalignments lead to serious failures, in other words, those subjected to high stresses. Therefore, when an earthquake occurs, cooling water piping, vacuum equipment, and rotating gantries should be inspected. On the other hand, measures to prepare for earthquakes are largely dependent on the building, and there is little that can be done proactively.

The threats in storms are power outages caused by lightning strikes and lightning strikes themselves. While equipment shutdowns due to power outages are inevitable, UPSs and other equipment should be inspected regularly to avoid critical failures of system. Also, the failures caused by lightning strikes can be prevented to some extent by anticipating and taking countermeasures against surge entry paths as much as possible.

In this presentation, we will assume failures which can be caused by earthquakes and storms, and discuss inspection items to detect signs of failure, such as misalignment of markings and strange drive noises.”

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Session Classification: Poster / Demo Sessions