

The traditional Naturmuseum Senckenberg
relies on unearthed power supply

TECHNICAL APPLICATION

The Stone Age meets modern network protection technology

In one of the largest natural history museums in Germany, irreplaceable exhibits need to be protected against fire. At the same time, the costs to fulfil accident prevention regulations are very high. In order to reduce costs and increase fire safety in its most famous museum, the Senckenberg Natural Research Gesellschaft has opted to use insulation monitoring devices from Bender.

The Naturmuseum Senckenberg in Frankfurt am Main is internationally renowned. Virtually all school-children in the Hessen region have visited this traditional museum at least once. But what is less known is that the Senckenberg Gesellschaft für Naturforschung (SGN) Senckenberg for short – also carries out comprehensive research into bioscience and geoscience.

The emphasis is on research into biodiversity, evolution, the ecosystem and human interaction with the earth.

Senckenberg is the governing body of a total of six research institutions at ten sites across Germany and three natural history museums in Frankfurt am Main, Dresden and Görlitz.



TECHNICAL APPLICATION

▶▶▶ 6000 square metres of natural history



The Naturmuseum Senckenberg Museum in Frankfurt am Main covers 6000 square metres, making it one of the biggest natural history museums in Germany. Exhibitions and museums are the shop window of natural research through which Senckenberg shares the latest scientific findings with its visitors and gives an insight into times gone by. Senckenberg shares research and research findings from all areas of biology, palaeontology and geology with the public through the medium of rare, often spectacular exhibits such as dinosaurs. Alongside the museum's educational programme, special exhibitions on changing themes, presentations and events supports the permanent exhibitions at the Senckenberg Nature Museum.



Spectacular exhibits ...

The highlights of the permanent exhibition include the fossilised "Dinosaur mummy" of an Edmontosaurus, a capybara-eating anaconda or a reconstruction of the skeleton of 'Lucy', the mother of the modern human. Visitors to the Senckenberg can also admire the skeletons of huge mammoths and the ancient foal from the UNESCO World Natural Heritage excavation in Messel, stand in the stomach of a fin whale or discover glittering stones in the darkness.



... require special protection

Every exhibit tells its own little story and gives an impression about the time and the place it came from. And it goes without saying that these unique, highly valuable objects need extra-special protection, especially against fire, because they are one-offs and irreplaceable.

In the collection storage of the Institute in Frankfurt am Main products from around the world are available for research purposes. More than 22 million objects are stored, which are available as references for about 200 visiting scientists each year. The Senckenberg Research Archive is therefore one of the most important collections of its kind. In the workshop for taxidermy it is clear to see how the exhibits of the museum is "brought to life".

Electrical insulation faults
are the number one cause of fires.

A comprehensive operational readiness around the clock requires a high degree of electrical safety with the power supply. Even with careful planning, execution and maintenance: Electrical installations are always at risk – moisture, ageing, dirt, mechanical damage or other errors can never be completely ruled out. Undetected insulation faults can have



disastrous affects or lead to high costs, for example for repairs, replacement of devices or unplanned service calls.

Goal of every operator must be to detect faults in time and to eliminate the causes economically in order to achieve optimum plant and operational safety and ultimately reduce costs. One solution is the unearthed power supply (IT system) with insulation monitoring.

Reliability and fire protection

In IT systems there is no active conductor connected to earth. When an insulation fault occurs, only a small amount of leakage current can flow and this is mainly due to the system leakage capacitance. The upstream fuse does not respond, the power supply is not affected which ensures continued operation. The immediate information on potential risk is performed by an insulation monitoring device, the ISOMETER®, which continuously monitors the insulation resistance between earth and system.



Due to these considerable advantages – maximum safety at minimal cost – the installation of the collection storage is implemented with two unearthed IT systems. Both the AV system (normal power supply) and the SV system (safety power supply), were built as three-phase AC systems and are monitored by means of an ISOMETER® from the series IRDH260. In the SV system the control of the fire alarm system and CO₂ extinguishing system are continuously monitored.

Besides the increased reliability the fire alarm system was a key point for the decision to install IT systems in the deep storage. In IT systems, there are no earth fault currents that pose a significant risk of fire.



Collected knowledge:

In storage at the institute in Frankfurt am Main is a collection of specimens from all over the world which are available for scientific research.

The total number of collected items is estimated to run into millions.

Prevention instead of intervention

For the operational safety and maintenance costs, the ISOMETER® offers the operator of the Senckenberg Naturmuseum the additional advantage of permanent monitoring, even with disconnected loads. In addition, the cost-intensive test intervals are no longer required, as prescribed for earthed systems.

This means that the exhibits, some of which are a million years old and irreplaceable can look forward to a secure future thanks to the electrical safety technology from Bender. ■

*Dipl.-Ing. Heiner Carnein, Tech. Office Hesse
René Bülow, S-SER*

INCREASE SAFETY, REDUCE COSTS

Compared to the known and widely used earthed systems (TN and TT systems) the IT systems provide numerous other advantages, the most important are:

- **Optimised maintenance:** Detect and report insulation deterioration at an early stage
- **Improved fire protection:** Recognise gradually developing insulation faults early; minimize arcing faults which are a frequent cause of fire
- **Higher efficiency:** Reduce time and personnel expenses for maintenance; detect weak points in the installation
- **Higher reliability:** No operational interruptions due to single-pole earth faults; installations remain at a high level of availability.