ISCM – Overhead Line Monitoring

For maximum power-throughput and highly effective planning

Answers for energy.

SIEMENS
Transmission line real-time rating is the highest current at which a power line can be operated without violating safety codes, the integrity of line materials, or network reliability. When line current increases, the conductor heats up, elongates, and the line sags increase. If the line is operated beyond its maximum design temperature, the line sags may violate design clearances. Use of the Transmission Line Monitoring System for dynamic ratings allows utilities and transmission operators to develop and apply line ratings in real time, based on actual weather conditions instead of fixed, conservative assumptions. Because transmission systems require a very high level of reliability, unmonitored transmission networks can never be utilized at their full capabilities. A transmission network must always withstand the largest credible contingency, i.e., the loss of its most critical element.

Valuable information at your fingertips

Overhead Line Monitoring is one of the modules of ISCM, our integrated and flexible solution for energy networks. ISCM covers all relevant components of your electricity supply network – from transformers and switchgear to overhead lines and cables – all monitored, analyzed, and visualized with one system. It can be seamlessly integrated in the existing substation infrastructure. Thus, ISCM provides a major contribution to reliable network operation and management.

All relevant data is well documented and stored for further investigations and as reference for future surveys about similar conditions and events.

Reliable diagnoses through advanced knowledge modules

Using patented temperature sensors, load cells, cellular or radio communications, and advanced rating algorithms, Overhead Line Monitoring is a powerful tool for maximizing the capabilities of transmission lines and avoiding unnecessary operator interventions for transmission line loading relief. Typically, dynamic ratings provide higher line capabilities 98% of the time and provide at least 15–30% additional capability for over 95% of the time.

Data can then be used to optimize the load on overhead lines, so that they can transmit more power, while ensuring that the sag remains well within safety limits. The system operates “in the background,” sending an alarm signal only when specific conditions occur, and allowing operators to interrogate the systems in anticipation of system changes.

Precise temperature measurements are accomplished by two systems: The ambient temperature sensor is a highly accurate device that provides a reading with a resolution of 0.1°C. The sensor incorporates an aspirated shield. The net radiation sensor is designed to provide approximately the same emissivity, absorbency, cooling surface, and time constant as the conductor being monitored. The net radiation sensor measures the temperature the conductor would attain if it were de-energized. This provides a baseline measurement for the calculation of the actual temperature of the energized conductor.

Forecast ratings

Short-, medium- and long-term statistical rate forecasts can be made.

- 30-minute forecast – contingency response
- 1–4-hour forecast – minimizing or avoiding dispatch changes
- 24 hour forecast – dispatch, generation, and outage scheduling

These forecasts are backed up by accurate, observable real-time ratings and are usable for power marketing, operations planning, maintenance scheduling, and asset management decisions as well as, not least, for operating decisions based on real-time ratings.
Your benefits at a glance

- Optimized use of infrastructure by maximizing the capacity of transmission paths
- Elimination of unnecessary and often risky operator interventions
- Quick reaction time for contingencies and responsiveness to weather
- Safe and reliable operation above static ratings
- Minimal disruption to the network when correcting line dispatch
- Meeting new transmission reliability regulations
- Rapidly deploy solutions when capacity deficiencies are discovered
- Raise transmission capacity by 15–30% to avoid network congestion
- Accurately monitor sag on older lines, where design conditions are least certain
- Match overhead line ratings to actual load capacity and weather conditions
- Provide advance warning of impending clearance violations
- Avoid unnecessary operator actions