MEMORANDUM

TO: Distribution

RECOMMENDED BY: Tom Varughese, PE, Director
Division of Planning and Engineering
Office of Engineering and Construction

APPROVED BY: Paul L. Shank, PE, C.M., Chief Engineer
Division of Planning and Engineering

DATE: July 29, 2019

SUBJECT: Planning and Engineering Guidelines and Standards (PEGS)
Supplement Number: PEGS-19-02, Arc Flash

Effective immediately, the following modification shall be made to the MDOT MAA 2019 PEGS Manual:

Volume 2, Architectural and Engineering – Chapter 11, Electrical

- Insert New Section 11.9 – Arc Flash

Consultants listed herein are required to distribute this standard to their respective staff and subconsultants.

If you believe the attached standard conflicts with any other codes or regulations or if you should have any questions regarding this matter, please contact the Director, Office of Engineering and Construction at (410) 859-7093.

Attachment

Distribution:

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Volume 2, Architectural and Engineering: Insert New Section 11.9, Arc Flash

11.9 Arc Flash

11.9.1 Coordination Study and Arc Flash Study for Electrical Distribution Equipment

All new electrical distribution equipment installed at the substations and downstream to the distribution panels with overcurrent protection devices shall have overcurrent protection settings determined through a Coordination Study.

New electrical distribution equipment, such as switchgears, switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers shall have arc-flash incident energy information as determined through an Arc Flash Study. Calculations of incident energy shall be in accordance with IEEE 1584 Guide for Performing Arc-Flash Hazard Calculations. Per NFPA 70E Standard for Electrical Safety in the Workplace, there are two methods for arc-flash studies, namely Arc Flash PPE Categories Method and Incident Energy Analysis Method. Arc Flash PPE Categories Method is allowed for new branch circuit panelboards if there are no new distribution panels involved. Otherwise, Incident Energy Analysis Method shall be used.

11.9.1.1 Construction Technical Specifications

Consultants must prepare appropriate technical specifications to require the contractor to conduct Short Circuit Study, Coordination Study, and Arc Flash study and affix appropriate PPE labels based on the requirement of the project and these standards.

11.9.2 Software Requirements for Updating the Master SKM Model for Arc Flash

All of the coordination and arc flash studies with the Incident Energy Analysis Method shall be implemented by analyzing with the correct version of SKM Power Tools software. The MDOT MAA has Master SKM Models built in SKM version 8.0.3.5 with capacity of 2000 buses for the existing electrical distribution system at BWI Marshall Airport, Martin State Airport, and the BWI Marshall outbuildings. These models have electrical information consisting of BGE Utility power sources, existing feeders, and electrical distribution equipment.

Consultants shall conduct and implement the Coordination and Arc-Flash studies for the new electrical distribution equipment with SKM Power Tools version 8.0.3.5 for Windows.

11.9.3 Updating the Master SKM Model for Arc Flash

11.9.3.1 MDOT MAA SKM Model Discrepancies

The original Master SKM models created, which MDOT MAA maintains, were not field verified by tracing circuits. During construction, if a discrepancy is found between the Master SKM Model and existing field conditions, the MDOT MAA Task Manager must be notified in writing and provided photos for review.

Consultants shall note this requirement in the construction documents.

11.9.3.2 MDOT MAA SKM Model Coverage Areas

The consultant performing the Coordination and Arc- Flash study for new electrical equipment shall obtain the corresponding MDOT MAA Master SKM Model data file for the appropriate coverage area from MDOT MAA GIS & Engineering Technology Section (GETS), Document Manager. Models of coverage areas are listed below:

1. Switchgear 1 – Pier D, DX, DY, Commuter, Partial Pier C, CD Connector, DE Connector, Airfield Lighting Vault
2. Switchgear 2 – Pier E, Central Utility Plant (CUP), Daily Garage
3. Switchgear 3 – Pier A, B, Partial Pier C, AB Connector, BC Connector, Hourly Garage
4. BWI Outbuildings
    a) 107 – Airline Cargo Building (Tenant Storage)
    b) 111 – Signature Flight Support Cargo (Tenant Maintenance)
    c) 112 – American/DHL Freight (Tenant Administration)
    d) 113 – MAA Storage
    e) 115 – MAA Snow Team Dorm/Warehouse
    f) 116 – Grounds Maintenance
    g) 135 – Salt Dome
    h) 136 – FMX/Signature Storage Building
    i) 155 – Kauffman Building
    j) 166 – Daily Garage
    k) 172 – MAC (Materials Acquisition Center)
    l) 172A – 800 MHz Antenna
5. Martin State Airport

Any new building requiring Coordination Study and Arc Flash Study for Electrical Distribution Equipment shall be added to the SKM Master Model by the consultant.

11.9.3.3 Obtaining a Master SKM Model

A Master SKM Model based on the coverage areas in Section 11.9.3.2 can be requested using a Digital Data Request form found at ***AIRPortal>Planning and Engineering Reference Library (PERL)>Volume 1-AIRPortal>Requesting Digital Data***.

MDOT MAA GETS will release a copy of the appropriate SKM Master Model upon Task Managers approval of the Digital Data Request form. Based on the complexity of construction, some projects may have longer durations than others, and the same copy of a model may have been distributed to multiple projects. Consultants are responsible for obtaining the most up-to-date model for each project requiring a coordination/arc flash study.

11.9.3.4 Submitting SKM Model for Incorporation into Master Model

After the study is complete, the consultant/contractor will add the electrical information from the new electrical equipment and feeders to the obtained copy of Master SKM Model with equipment nomenclature matching the Master SKM Model. Submit the following items to MDOT MAA GETS:

1. SKM Model – updated by the contractor and reviewed and accepted by the consultant/designer of record
2. Coordination and Arc-Flash Study – provided by contractor
3. Construction as-built drawings – provided by the contractor

Upon receipt of the items listed above, MDOT MAA Task Manager and/or its representative will review the updated SKM Model for acceptance. If the updated model is not acceptable, MDOT MAA will return it to the consultant for corrections. Upon acceptance of the model, the updates will be incorporated into a new Master SKM Model.

Upon submission, the contractor shall provide appropriate PPE labeling per NEC article 110.16, OSHA and NFPA 70E article 130.5(D) for all of the electrical equipment that was included in the Arc-Flash Study submittal.