PLANNING AND ENGINEERING GUIDELINES & STANDARDS (PEGS)
SUPPLEMENT NUMBER: PEGS-21-008

NOVEMBER 16, 2021

ARC FLASH
Volume 2, Chapter 11 - Arc Flash

Effective immediately, the following modification shall be made to the MDOT MAA 2021 PEGS Manual:

Volume 2, Chapter 11 – Arc Flash
Remove Chapter 11 in its entirety and replace with new Chapter 11 Arc Flash (attachment 1).

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

If you believe this standard supplement 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.

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DISTRIBUTION

Attachment:
1. Volume 2, Chapter 11 – Arc Flash

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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 is no new distribution panels involved. Otherwise, Incident Energy Analysis Method shall be used.

11.9.1.1 Construction Technical Specifications

A. **For MDOT MAA Capital projects**, consultants must conduct Short Circuit Study, Coordination Study, and Arc Flash Study and provide appropriate PPE label information based on the requirement of the project and these standards.
    1. Consultants must prepare appropriate technical specifications to require the contractor to fabricate and affix appropriate PPE labels based on the requirement of the project and these standards.

B. **For Permit projects**, consultants must prepare appropriate technical specifications to require the contractor to conduct Short Circuit Study, Coordination Study, and Arc Flash Study, and the contractor shall fabricate and install 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 latest 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 Terminal, Martin State Airport, and the BWI Marshall Airport outbuildings. These models have electrical information consisting of BGE Utility power sources, existing feeders, and electrical distribution equipment.

Conduct and implement the Coordination and Arc Flash studies for the new electrical distribution equipment with the latest version of SKM Power Tools software 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 models that MDOT MAA maintains were not field verified by tracing circuits. During construction, if a discrepancy is found between the master 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 the Document Manager of MDOT MAA GIS & Engineering Technology Section (GETS). 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

The party responsible for updating the SKM model shall submit a Digital Data Request noting which model(s) are being requested based on the coverage areas listed in Volume 2, Section 11.9.3.2 MDOT MAA SKM Model Coverage Areas. MDOT MAA GETS will release a copy of the requested SKM Master Model upon Task Manager's 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/Contractors are responsible for obtaining the most up-to-date model for each project requiring a Coordination and Arc Flash studies.

11.9.3.4 Submitting SKM Model for Incorporation into Master Model

A. Arc Flash Study Performed by Project Construction Contractor

After the study is complete, the 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 model. The following items shall be submitted to MDOT MAA GETS as part of the as-built documents:

1. Study SKM Model – updated by the contractor.
2. Coordination Study and Arc Flash Study reports – provided by contractor.
3. Construction as-built drawings.

Upon receipt of the items listed above, MDOT MAA will review the updated SKM model for acceptance. If the updated model is not acceptable, the MDOT MAA will return it to the contractor for corrections. Upon acceptance of the model, the updates will be incorporated into a new Master SKM Model

B. Arc Flash Study Performed by Project Designer
After the electrical portion of a construction is complete enough to generate the needed model data, the contractor changes are provided to MDOT MAA GETS who will forward to the designer of record. The designer 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. When updates are completed, designer will submit the following items back to MDOT MAA GETS:

1. Study SKM Model – updated by the designer
2. Coordination and Arc Flash Study – provided by the designer

Upon receipt of the items listed above, MDOT MAA will review the updated SKM model for acceptance. If the updated model is not acceptable, the MDOT MAA will return it to the designer for corrections. Upon acceptance of the model, the updates will be incorporated into a new Master SKM Model

11.9.4 Installation of Arc Flash Labels

The contractor shall be responsible for fabrication and installation of the Arc Flash labels per NEC Article 110.16, OSHA and NFPA 70E Article 130.5(D) for all electrical equipment that was included in the Arc Flash Study submittal.

Proposed labels shall be provided by the contractor to MDOT MAA for review and approval. Upon approval, the labels are installed and incorporated into the as-builts by the contractor.