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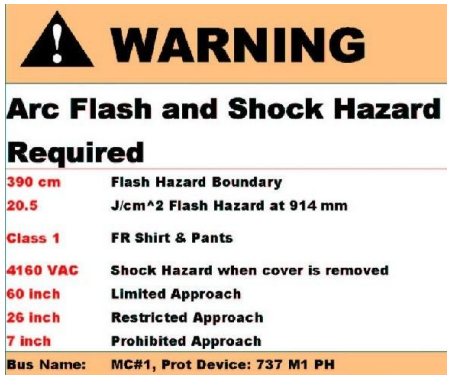
New Arc Flash Hazard Study

Today we are dependent on electricity. Everyone comes in to contact with electricity even if it's the simple act of plugging in an appliance. The dangers when plugging in a handheld appliance are small but real as we learn the first time we get a little shock. The dangers facing an electrician or electrical test engineer when coming in to contact with energized electrical equipment are much greater, even life-threatening, in the form of an arc flash or arc blast.

An arc flash:

- Produces a pressure wave, hot gases, molten metal and shrapnel
- Happens very quickly; faster than the human eye can perceive
- Includes blast, acoustic and thermal energy
- Can be caused by human, environmental or equipment factors
- Travels a distance determined by the energy released and the equipment involved
- Causes 75 to 80 percent of all serious electrical injuries



Arc flash hazard labels are required on all new electrical equipment

Although the hazards of arc blasts have been studied for over 20 years, this knowledge has only very recently begun to affect changes within the electrical industry. These changes include the introduction of arc flash hazard requirements in regulation, standards and safety practices. According to the NEC Digest (April/May 2002) "by the early 1990s, the extreme thermal and blast hazards of arcing faults in electrical systems were recognized as uniquely different from the hazard of electric shock. As the body of knowledge and

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Busway Revisited

In our last issue, we discussed busway application and installation considerations. An interested ***Testing Times*** reader responded to this article with the following comments:

> *"While I have, over 30 years in our industry, installed many miles of busway, the most serious problem with this product is not the one that your article mentioned. A total lack of maintenance on electrical apparatus continues to be a major oversight of facility owners and managers in general. Busway in particular is most commonly manufactured with the use of aluminum conductors, and as you know, this metal requires even more attention than copper. The limited practice of preventive maintenance makes this a problem waiting to happen."*

These comments raise an excellent point: you should perform maintenance on busway (and all other types of electrical equipment). What type of maintenance can you perform? Unfortunately, not much. NFPA 70B Recommended Practice for Electrical Equipment Maintenance 2002 Edition lists the

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(Arc Flash Hazard, Continued from page 1)
understanding of the arc flash phenomenon grew, leadership emerged to change federal regulations; building codes; design of electrical equipment; application of circuit protection; safe work practices; training of personnel in utility, industrial and commercial work environments; and the development and application of personal protective equipment."

A logical step to increase personnel safety was to add a new requirement in the National Electrical Code (NEC). Accordingly, The NEC 2002, Article 110.16, requires that electrical equipment have "field marking" to warn qualified persons of potential electric arc flash hazards and to indicate the necessary personal protective equipment (PPE) appropriate for the hazard level. The most efficient way to do the field marking now required by the NEC is to do an additional study in conjunction with a short circuit and coordination study. Called an "Arc Flash Study" or "Arc Flash Hazard Analysis", the study provider produces labels for each switchboard, panelboard, etc., to comply with the new code requirement. According to the NEC 2002 Handbook, the real purpose of the new code requirement is to alert personnel to some of the hazards of working on or near energized equipment. Owners and consulting engineers should be requiring an Arc Flash Hazard Study with labels on all new electrical equipment. ❖

(Busway, Continued from page 1)
following:

- Electrical Joints—visual inspection, sample check for proper torque
- Housing—visual check of covers, joints, weep holes, etc.
- Plugs—checked for proper operation, tightness
- Testing—perform insulation resistance test (megger)
- Infrared survey

All these recommendations are hampered by the fact that busway joints are often covered up behind walls. Many sections aren't visible or accessible. However, whenever possible, performing this maintenance annually will go a long way towards improving the reliability of busway as well as all other electrical equipment.❖

Testing Times by e-mail

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