



## Anthropology Section - 2016

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### A72 New Forensic Archaeological Recovery Protocols for Fatal Vehicle Fires

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After attending this presentation, attendees will be familiar with new forensic archaeological protocols applicable to fatal vehicle fire scenes that result in the efficient and effective recovery of human remains and associated evidence.

This presentation will impact the forensic science community by highlighting the benefits of employing modified forensic archaeological techniques in the documentation and recovery of the fatal vehicle fire scene. Furthermore, the forensic science community can employ the detailed recovery protocols being presented for fatal vehicle fire recoveries.

Fatal fires are one of the most complex scenes to recover, primarily because materials at the scene are heavily modified. In particular, human remains appear homogenous in color with the surrounding burned matrix and they become very fragile due to the taphonomic modifications of fire and subsequent suppression efforts by first responders. Too often, remains are quickly pulled from the fire debris with no documentation of body positioning or of the relationship of the remains to other physical evidence. The complexity of fatal fire scenes and the current recovery protocols for these types of recoveries often result in the human remains and evidence being missed, damaged, or destroyed in their entirety.<sup>1</sup> This in turn hinders autopsy, positive identification, and laboratory and bone trauma analysis of the remains.

Of approximately one million fires per year in the United States, 13.3% are vehicle fires.<sup>2</sup> Fatal vehicle fires are hybrid scenes with combined characteristics of both indoor and outdoor scenes. Much like indoor scenes, the general structure of the burned vehicle is preserved, thereby providing permanent reference points and simplifying mapping; however, the quantity of material, impact of taphonomic agents, and the potential stratigraphic relationships of remains and evidence are all features consistent with outdoor crime scenes. There are other complexities unique to vehicle fires that warrant specific recovery protocols that differ from indoor scenes, outdoor scenes, or fatal structure fires. First, vehicle fires almost always have accelerants present (i.e., gasoline) that impact how the vehicle burns. Second, components of the vehicle, such as the magnesium steering column, create an exploding effect that mirrors the dispersal of materials more commonly encountered with bomb blasts or mass disaster scenes. Last, vehicle fires are more contained and are somewhat easier to process than structure fires due to their smaller size. Often, it is easier to identify the location of the human remains very quickly in vehicle fires.

The new protocols being presented for fatal vehicle fire recoveries are based on and modified from the protocols developed by Dirkmaat et al. for burned structures and are based on field exercises and past case studies.<sup>3</sup> A summary of the newly developed protocols is as follows: (1) overall scene documentation (photographic, written, and spatial team with barcoding system) that continues throughout recovery; (2) pedestrian line search to flag evidence and remains; (3) determination of significance; (4) preparation of the vehicle for recovery (i.e., removal of the roof, trunk, and doors); (5) establishment of a mapping system (i.e., subdivide vehicle into regions using a baseline or grid system); (6) excavation of individual units using trowels, dustpans, and labeled buckets; (7) hand sorting of debris on tarps and screening through ¼" mesh; (8) full exposure of the remains *in situ*; (9) creation of a plan-view map detailing positioning of the remains and associated evidence; (10) mapping of the grid system by the provenience team to later be geo-referenced to the hand-drawn map; (11) wrapping of loose elements and fragile bones with heavy-duty plastic wrap; (12) removal of the remains using body bags and backboards to stabilize the body during transport; (13) collection of loose pieces in labeled containers or bags for re-association in the laboratory; and, (14) excavation beneath the remains following removal.

The implementation of these new protocols using modified forensic archaeological methods results in a nearly 100% recovery of remains and physical evidence in a timely manner, while also limiting disturbance and damage of the remains during the recovery of fatal vehicle fires. Furthermore, detailed mapping and photographs provide precise information on contextual relationships of the remains and evidence at the scene following recovery.

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### Reference(s):

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  2. FEMA. U.S. Fire Administration statistics, 2011. <http://www.usfa.fema.gov/data/statistics/>
  3. Symes S.A., Dirkmaat D.C., Ousley S.D., Chapman E.N., Cabo L. *Recovery and interpretation of burned human remains*. Washington (DC): National Institute of Justice; 2012 Mar. Report No.: 237966.
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### Vehicle Fires, Forensic Archaeology, Recovery Protocols