

Received 13 October 2015

Received in revised form 7 May 2016

Accepted 30 June 2016

Available online 30 June 2016

New Test Method of Inverted Mold on Integral Separation Marks

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Abstract At the criminal scene, objects of surface brittleness vessels are frequently formed by external forces broken into numbers of pieces. There are a lot of pieces we don't know the original shape, and the object broken degree is of great fragmentation and numbers of isolates, which leads to difficulties of integral separation of trace inspection, not to mention that determine the number of the original object is a hindrance. To solve this problem, we try to conduct experiments on fragments of different objects in the whole separation of trace inspection methods, implementation steps and practice tests, to provides a new method of technology — the horse cast integral separation of trace test — for the separation of trace material evidence on whole inspection appraisal.

Keywords: Trace inspection, Inversion casting method, Integral separation, Surface of the object, Debris, Forensic Science.

1 Introduction

One or more complete object, is broken down by crime into several parts, break down of each part will be in various forms of information that they belonged to a whole. These is manifested by the separation of various parts and show that they belonged to the same, with a trace of whole properties of the sum of information carrier called integral separation of trace ^[1].

Integral separation of trace as a special mark, common in intentional murder, mayhem, shooting, such as fire, traffic accident scene. Striking feature of this kind of site is that its destructive, messy, complicated, the legacy trace evidence more frequently, the object is formed by external force broken after separation of number of fragments.

Any object has its own properties and morphology, from a whole process is separated into multiple separate body, keep the original formation on the basis of the properties and some new properties and morphology, and generate separation and separation surface traces. In accordance with the same identification theory, by means of science and technology of separating traces, morphology and separation properties of the object after testing, to identify the relationship between the separation of objects.

Surface of an object such as sphere, cylinder geometry surface and free surface object, among the common surface are: cylinder, cone, sphere, hyperboloid, etc. ^[3].

Object based on five different surface debris 20 times under the condition of different integral

separation test of the process of test, summed up the "inverted cast integral separation of trace inspection" of the new method, which USES high strength solid footprint extraction materials and related auxiliary material lining gauze casting bonding method is used to derive the corresponding model, properly handle makes it easy to material evidence of lining model fragments of adhesion, fixed, and then under the frame of the model to splice pieces of evidence.

2 Materials and Methods

2.1 tools and materials to extract the special foam glue, scissors, three-dimensional footprint gypsum, bamboo sticks (gauze) class skeleton, sandpaper, glycerin, back tape or duct tape, silly putty or rubber gloves, cotton gloves,

PC, etc. [2].

2.2 inspection of material identification and record

2.2.1 for pieces of material evidence one by one number, and according to the corresponding specification processing to extract material evidence on face, fingerprint, trace material evidence specimens, etc.

2.2.2 article with the back tape made material evidence identification (JC01 ~ JCXX, according to the inspection of material quantity), paste it on the background content in sequence, article identifies the paste spacing determined according to the size of the pieces of evidence. In turn put on in the background, indulgence, horizontal scale, fixed [2] are positive and negative pictures.

Article 2.2.3 with back small tape material evidence identification number 1 ~ X, font suggestion in red), read isolation paper, according to the above examination number sequence on the surface for examination, in turn, paste red font small logo, big and small label must correspond to the Numbers shown consistent, photograph the fragments, fixed and in accordance with the serial number to measure and record the size and characteristics of [2].

2.3 preliminary splice pieces

2.3.1 choose appropriate thickness, area of silly putty material as underlay, and covering a layer of mold on the lining paper, debris and the underlay in isolation, to avoid pollution. (Fig. 1).

The glass and mud wall

Relying on the underlay 2.3.2 pieces of evidence for splicing, as much as possible until joining together can not continue. Remove the liner, orderly in a partition. (Fig. 2). Pieces of anastrophe splicing

2.3.3 repeat the one step, fragments of has not yet been spliced, so pieces of material evidence is divided into



Figure 1. Inversion debris splicing.



Figure 2. Gauze sticking.



Figure 3. Local conditions after splicing..

a number of copies. Temporarily can't determine the location and the relationship between some pieces on a partition to put.

2.4 lining model making

Against 2.4.1 fragments in the mold of the medial dorsal or paper evenly glycerol release agent or isolation agent.

2.4.2 selection and debris within each partition area of size of gauze, after soaking liquid gypsum stack 3 ~ 5 layers. Then should be applied to the dorsal. (Fig. 3). Gauze were applied

2.4.3 according to fragments stitching shapes, pruning gauze. After being solidified shell in gypsum plaster model dry or drying. Gypsum model after drying, must be based on the use of the thickness of the lining back tape or adhesive tape to moderate its overall.

2.4.4 will be fixed after molding of gypsum model block two combination, joining together, try to form the complete form of an object. Stitching is complete, you can use a hand drill holes on a certain thickness of model, inside the hole to join stent for strengthening.

2.4.5 through cracks or punching the stitching good perfusion fluid of gypsum block of model combination is fixed, as the case again the appearance with grinding, molding finish thus.

2.5 model USES

2.5.1 will finish production model of debris in turn back on the partitions and the inside of the fragments or dorsal affixing double-sided adhesive.

2.5.2 in combination of model surface fixed back tape or adhesive tape, including preliminary splicing of debris and cannot distinguish location of debris, in turn, sticky, appropriate forcibly pressure fixed, fixed pictures and record.

2.5.3 if the pieces more than might be from the same type of the original object, is a mold can be used many

times, and can distinguish the number of the original object.

3 Results

Fragments of surface of the object by using inversion casting method through the characteristics of joining together than the overall separation test, better solve object without sample pieces of the overall separation test technical problem, solve the scene at the same time the original object number of divisions.

4 Discussion

"Object surface inversion cast integral separation of trace inspection" the matters of attention in the new method in the actual operation process is as follows:

4.1 by production, use, storage, maintenance and other factors, the influence of each tool appearance structure has specificity, and in the form of linear marks on could be reflected with species and detail characteristics, joining together, than pay attention to the decorative pattern on the debris, surface structure and formed in the process of production of clean line characteristics, separation of grain on surface and cross-section, cracks, defects,^[4] the concavo-convex structure characteristics, these characteristics can be used to quickly determine the relationships between each position of the pieces.

4.2 together scraps, the comparison operation, both hands should be lined with cotton gloves, jacket PC or rubber gloves, preventing debris harm hands^[2].

Fixed, photo 4.3 record: joining together, fixed beside vertical add put scale, after the completion of work from different angles of fixed splicing photograph intact material evidence

and record, do comprehensive and accurately reflect all the pieces of Mosaic^[2].

4.4 after fixed of the safekeeping and storage of material evidence

Using liner model for pieces of material evidence after fixation, pay attention to the protection of fragments of the original form, can be placed (or package) on which the layer of kraft paper (physical evidence and prevent the wrappage adhesion), using the appropriate thickness sponges on the cover, packages, make its not knock against, rolling in the material evidence safekeeping, vibration^[2]. Fixed, while the photo record after the completion of the work to decompose, joining together the material evidence to restore the original state to the physical evidence in custody after deposit, especially the separation, separation more carefully protect^[5], to ensure that the evidence of the original form is not damaged.

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