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IMPRESSION EVIDENCE

Objects or materials which have retained the characteristics of other objects or materials which have been impressed against them
Footwear impressions can be positively identified as having been made by a specific shoe
PHOTOGRAPHY OF FOOTWEAR IMPRESSIONS

- General crime-scene photographs
- Examination quality photographs
OBLIQUE LIGHT PHOTOGRAPH OF THREE-DIMENSIONAL IMPRESSIONS

Camera

Light source

-45°
-30°
-15°

(Impression)
OBLIQUE LIGHT PHOTOGRAPH OF TWO-DIMENSIONAL IMPRESSION

Camera

Light is reflected off dust particles and into camera

Light source

(Impression)
WEAR OF THE SHOE

• Position of wear
• Degree of wear
Wear - The erosion of the outsole due to frictional and abrasive forces that occur between the outsole and the ground
INFLUENCES ON THE WEAR OF SHOE OUTSOLES

• Foot type and function
• Occupation
• Habits

• Body type
• Shoe style
• Shoe materials
• Walking surfaces
Wear pattern

Refers to the wear on the entire shoe or a portion of the shoe
Wear pattern

Anatomical wear pattern
Wear characteristics alone are not accepted as a means of positive identification
CLASS AND IDENTIFYING CHARACTERISTICS

- Knowledge
- Pattern recognition
- Assessment
CLASS CHARACTERISTICS

- Size
- Pattern design
- Contour of imprint
- Shape
COMBINED CLASS CHARACTERISTICS

• Size
• Design
IDENTIFYING CHARACTERISTICS

Result when something is randomly added to or taken away from a shoe outsole that either causes or contributes to making that shoe outsole unique.
Pattern Recognition Techniques used as searching criteria
RECOGNITION OF MANUFACTURING METHODS
Two hand-engraved moulds using same templates and pantograph but resulting in different “gross designs”
Types \(<\) Preliminary classification
Feature classification
Shoe impressions

Partial

Complete
Shoe sole collection systems assist in determining the classification of full shoe impressions.
Different **pattern designs** and possible small differences within patterns
Recorded Impressions (filed) → Pattern designs

Features
FOOTWEAR IMPRESSIONS

A valuable form of physical evidence

Provide an important link between the criminal and the crime scene
Development of footwear collection

Known criminals

Shoe Stores
ESTABLISHMENT OF A DATABASE

- Link crime scenes
- Possible suspect
- Brand name of shoe
FEATURE CLASSIFICATION

- Pattern on edge
- Toe area
- Heel area
- Circles
- Shapes within shapes
- Patterns surrounding motifs, letters, numbers
PATTERN DESIGNS

- A hollow circular area inside a circular shape
- Numerals inside a circular shape
- Unusual shaped studs on the edge of the sole
- Motif engraved in the border of the sole
- ETC
FEATURE CLASSIFICATION CATEGORIES

- The edge area
- Circular areas surrounded by a valley
- Certain features
- Patterns on sole
- A pattern/shape inside another pattern/shape
- The toe/back of heel area
### MAIN GROUPS OF THE PATTERNS

<table>
<thead>
<tr>
<th>Digit (first)</th>
<th>Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Mesh</td>
</tr>
<tr>
<td>1</td>
<td>Stud</td>
</tr>
<tr>
<td>2</td>
<td>Wave</td>
</tr>
<tr>
<td>3</td>
<td>Zig-Zag</td>
</tr>
<tr>
<td>4</td>
<td>Bar</td>
</tr>
<tr>
<td>5</td>
<td>Complicated</td>
</tr>
<tr>
<td>6</td>
<td>Crepe and plain</td>
</tr>
<tr>
<td>7</td>
<td>Continuous border</td>
</tr>
</tbody>
</table>
# Pattern Types in the Main Groups

<table>
<thead>
<tr>
<th>Digit (second)</th>
<th>Shape</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Circular</td>
<td>Width of line/broken/continuous high/low</td>
</tr>
<tr>
<td>1</td>
<td>Triangular</td>
<td>Width of line/broken/continuous</td>
</tr>
<tr>
<td>Wave or Zig-Zag</td>
<td></td>
<td>= continuous border of the shoe sole</td>
</tr>
<tr>
<td>Bar pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous border</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thus 71 means that there are triangular studs in a continuous border.
DEFINITION

Pattern recognition is the identification of normal structure and appearance on an image and those variations of appearances which may indicate a disordered state.
PHYSICAL PATTERNS IN IDENTIFICATION

Identification based on structural features is the recognition of a physical pattern.
PHYSICAL PATTERNS IN IDENTIFICATION

- Physical matching
- Comparison of markings
- General shape or form comparison
Database of:

- Shoeprints at scene of crime
- Shoes of suspects
- Shoes on the market
NEURAL NETWORKS
IN FORENSIC SCIENCE