The use of Limiting Angles for Bloodstain Pattern Analysis

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Limiting Angles

According to several websites: Limiting angle = critical angle

The definition gives by www.thefreedictionnary.com is:

1. The smallest angle of incidence at which a light ray passing from one medium to another less refractive medium can be totally reflected from the boundary between the two.

2. The angle of attack of an airfoil at which airflow abruptly changes, causing changes in the lift and drag of an aircraft.

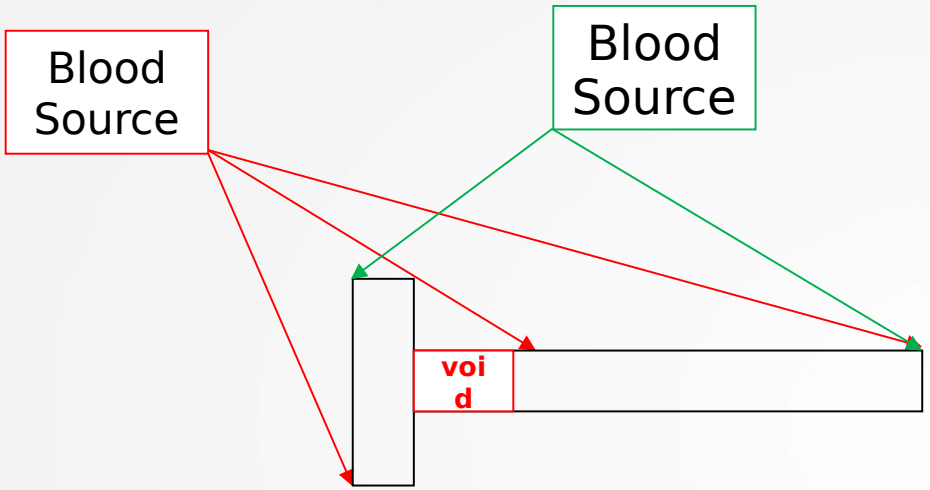
Limiting Angles

According to Bloodstain Pattern Analysis a definition could be:

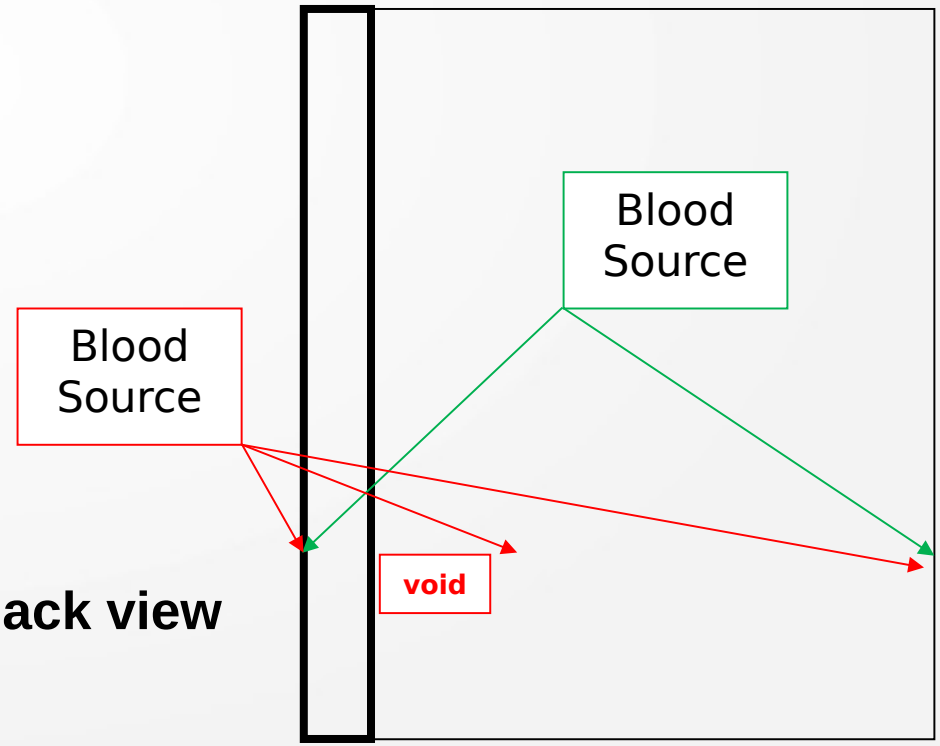
1. Observation of a void pattern caused by the action of an intermediate object intercepts the trajectory of blood droplets in flight, while on their way to an otherwise
   unobstructed final target surface.
   (Jeff Saviano, April Allgood & Zerah Malone, ACSR, 2010)

2. The smallest angle allowing one surface to be splattered of blood while it is back from another surface more forward.
   (mine definition)

Limiting Angles: where are the voids!

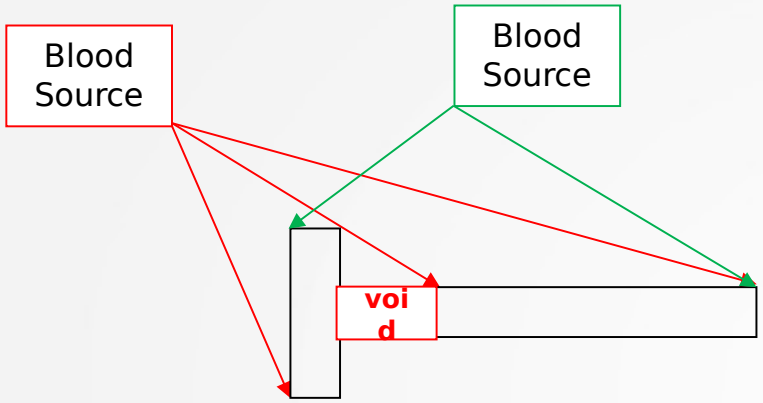


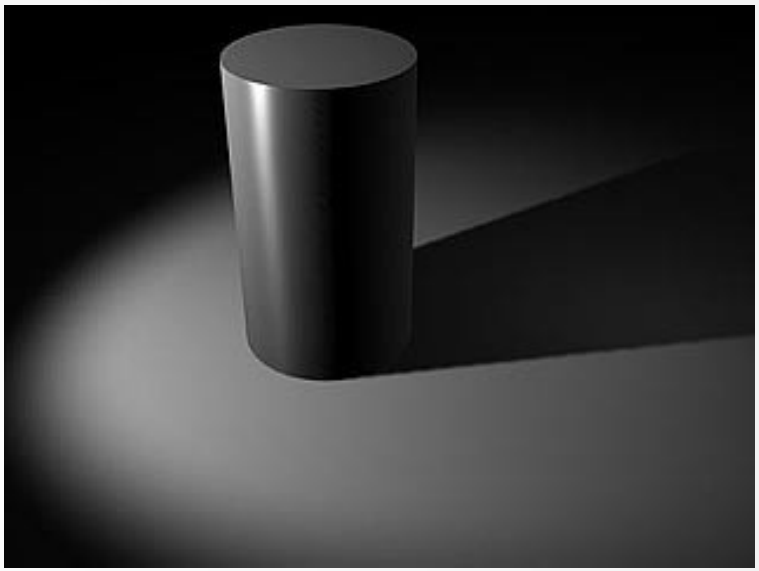
Bird view

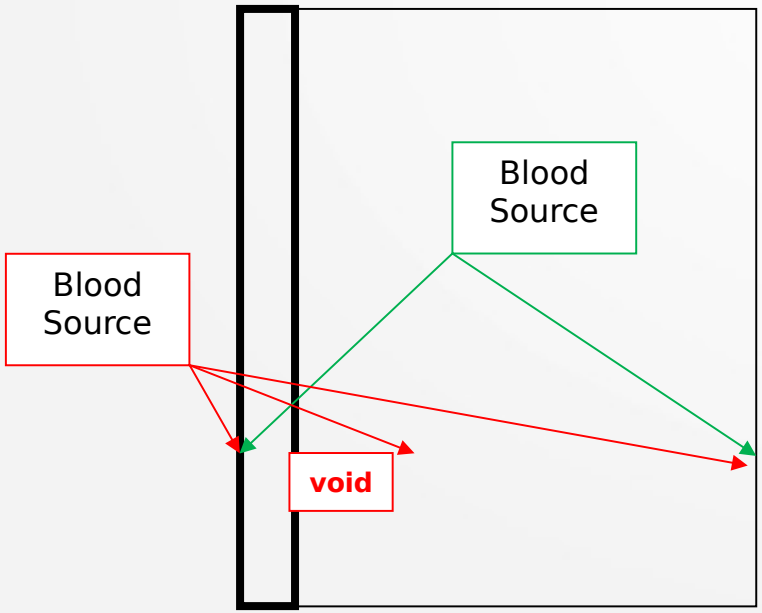


Back view

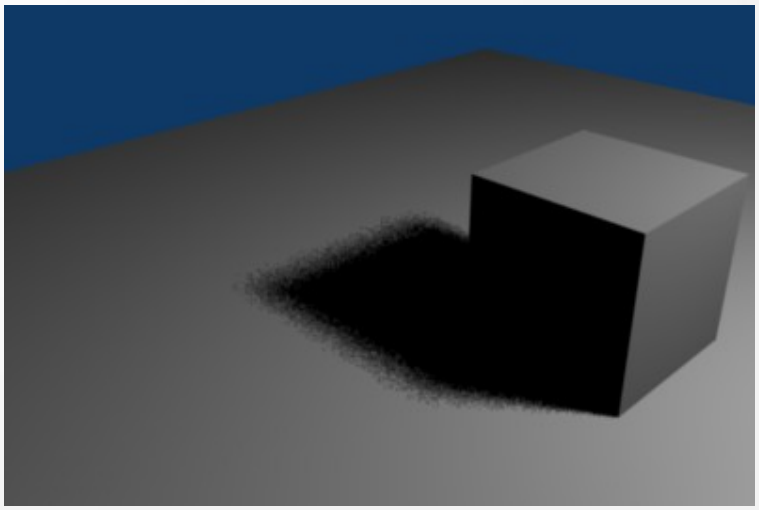
Limiting Angles = Shadow



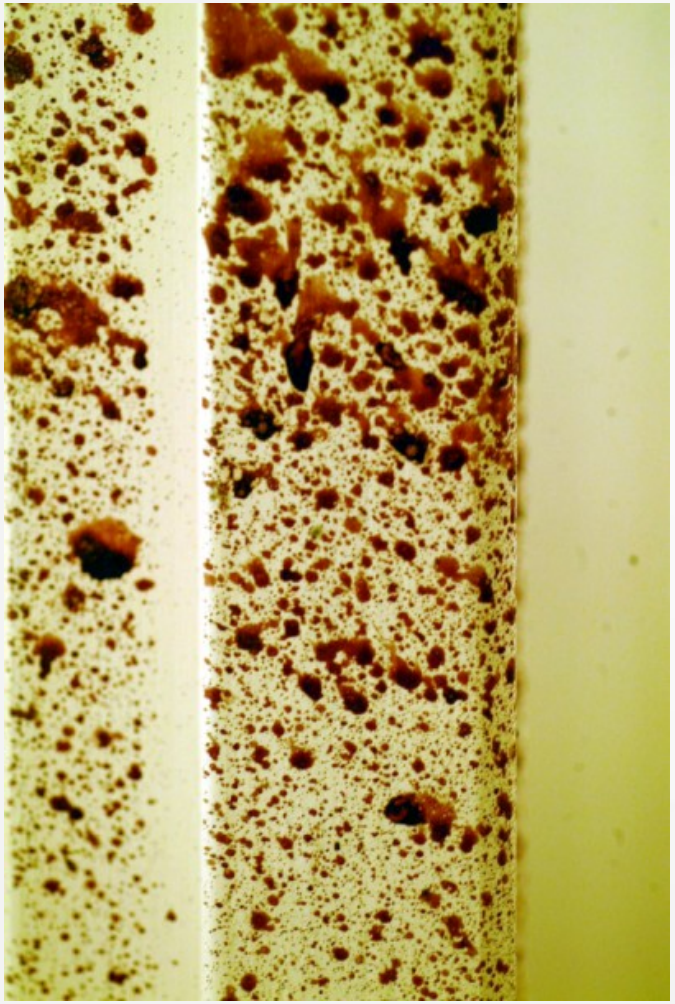




Shadow = Void



Limiting Angles

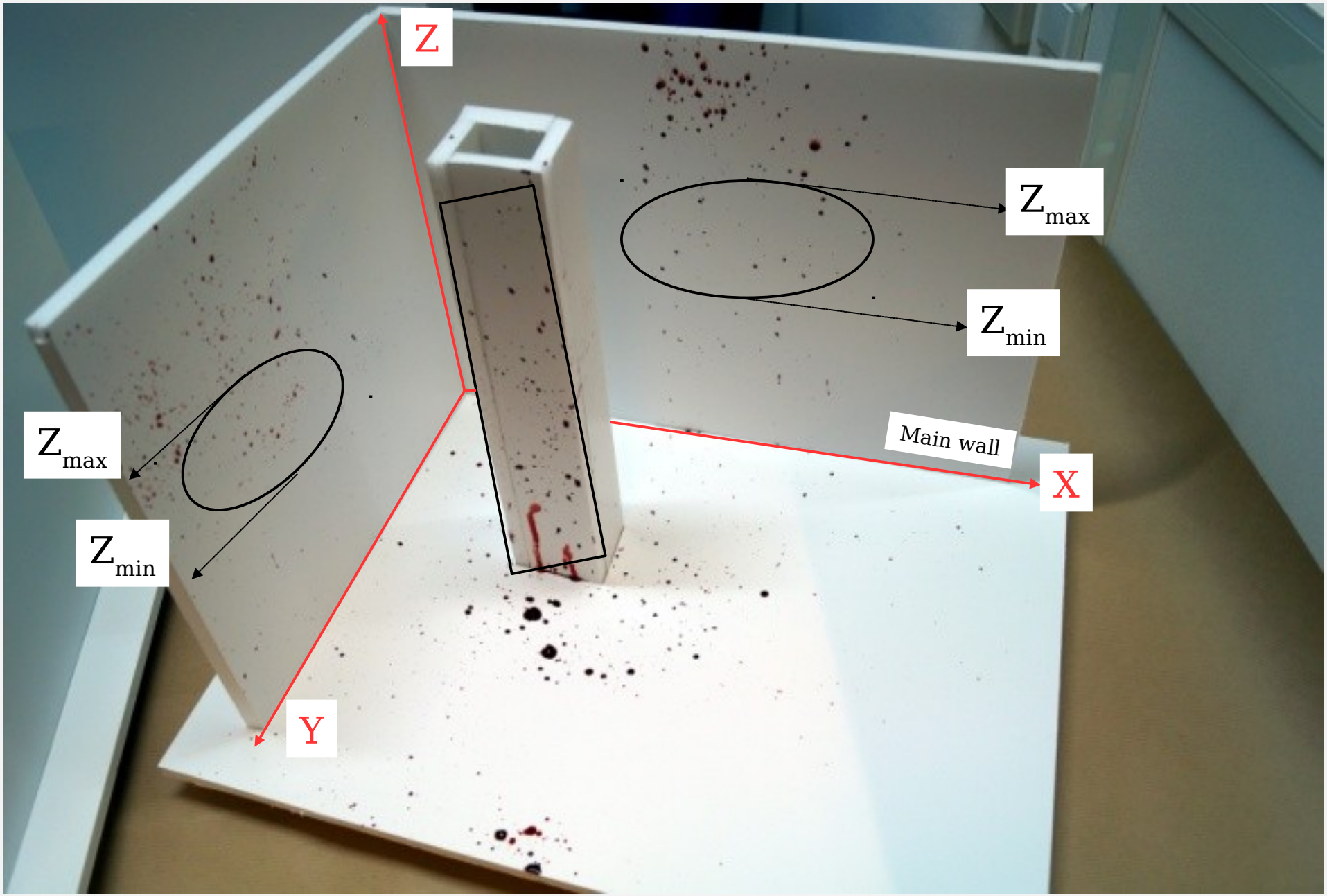


According to BPA a definition could be**:**
The smallest angle allowing one surface to be splattered of blood while it is back from another surface more forward. (mine definition)

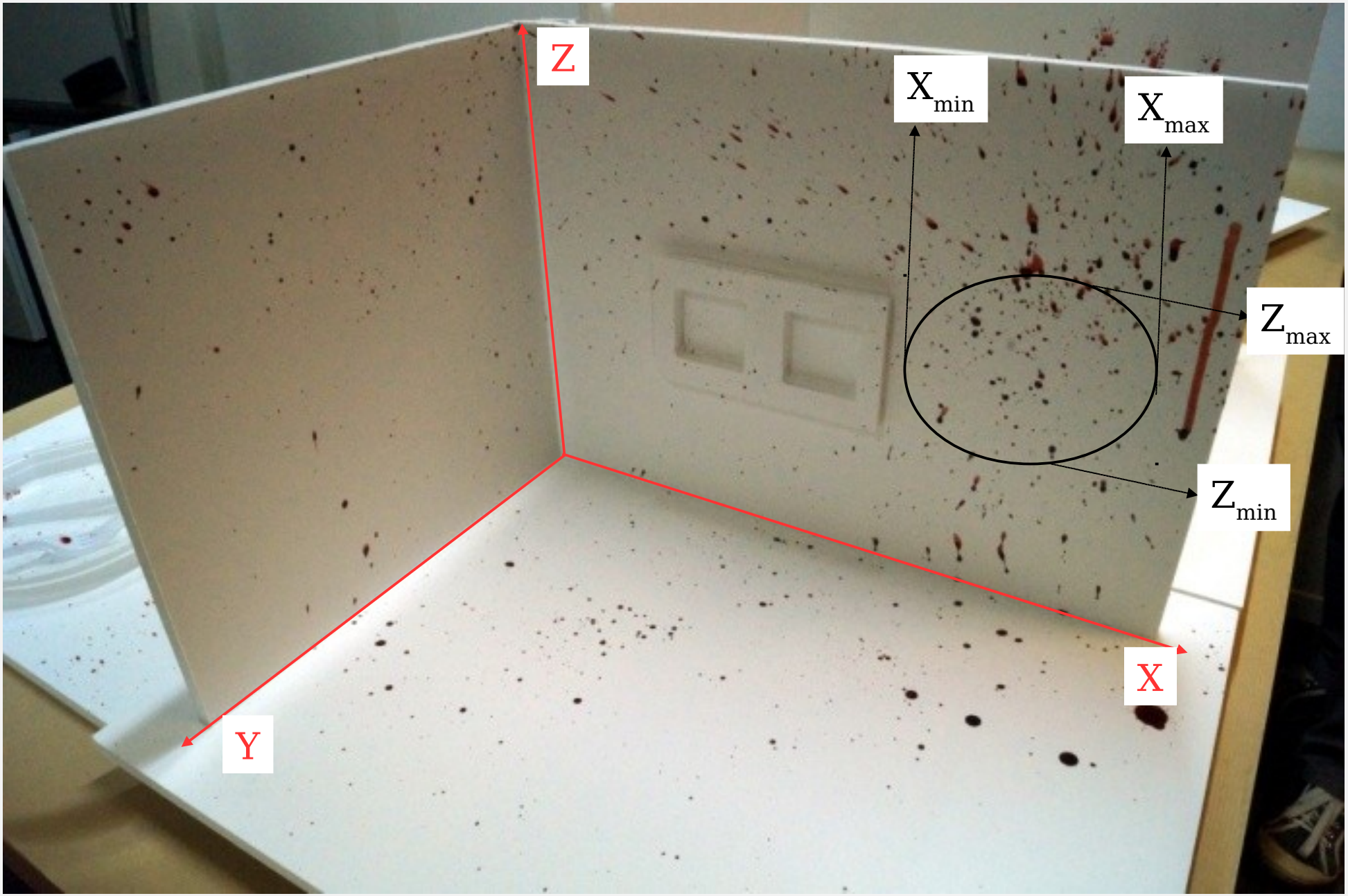
SO, with this smallest angle showed by a string, you could determine the (x,y) location of the blood source causing the spatters!!

The Convergence area gives the Height!!

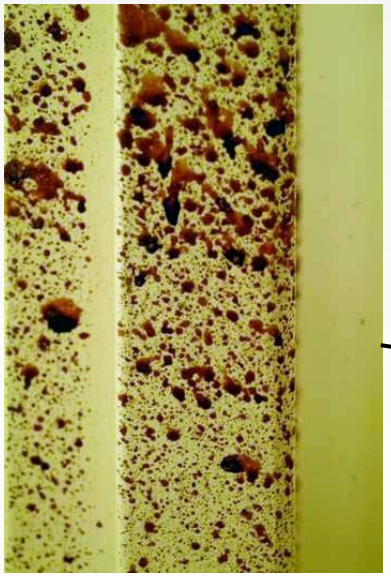
Limiting Angles approach



Limiting Angles approach

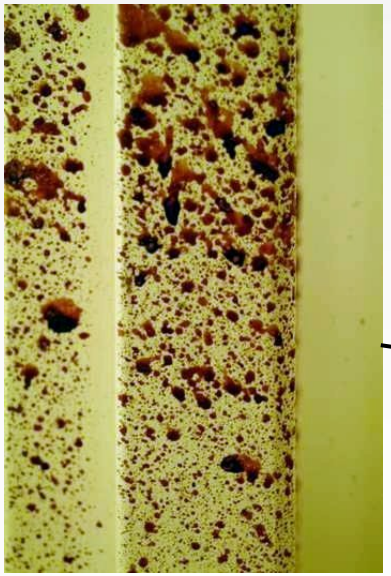


Real case

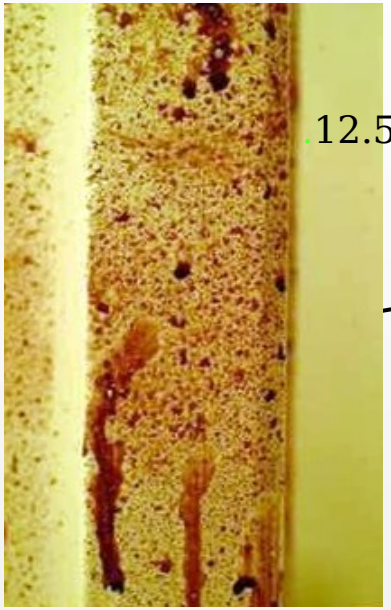


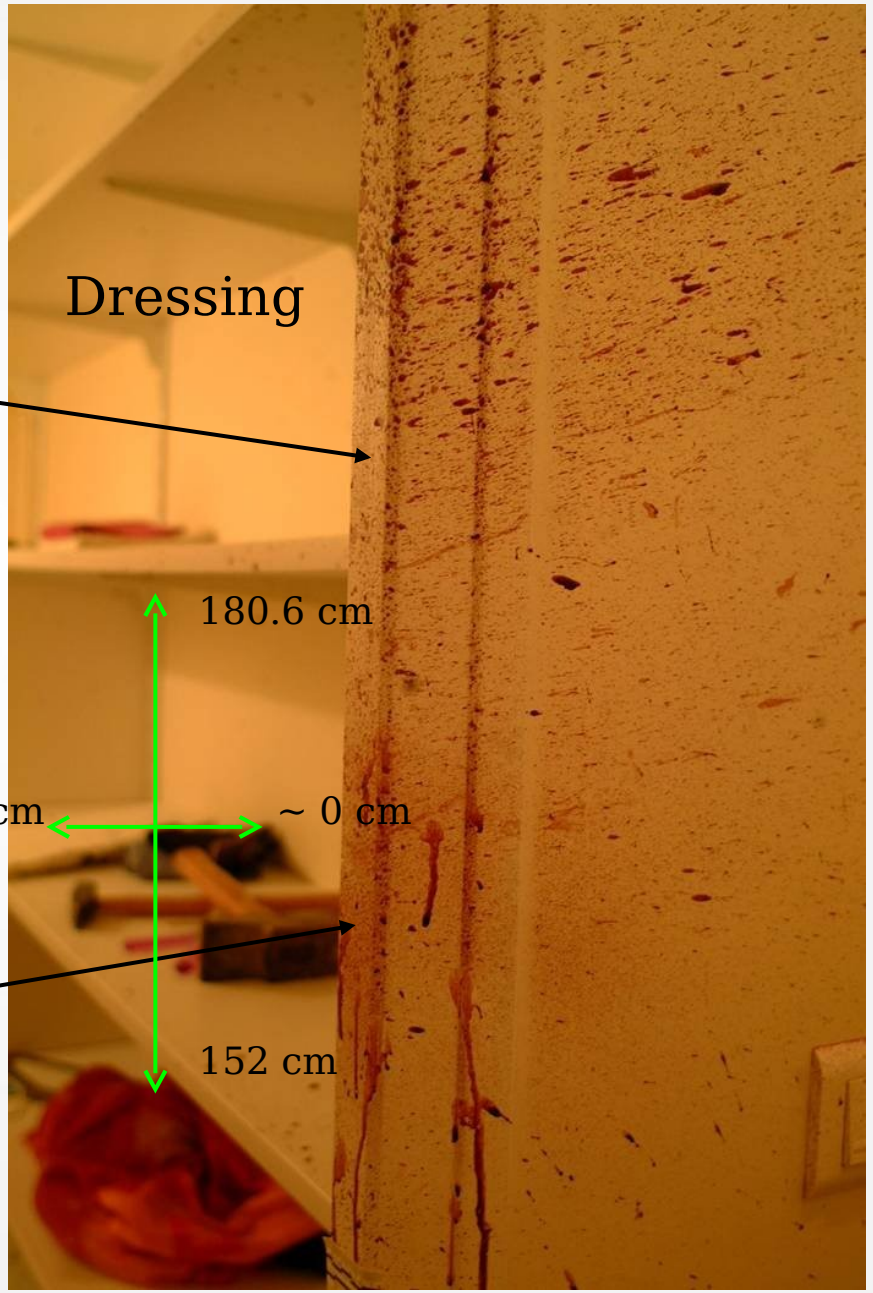
doorframe

Real Case



doorframe



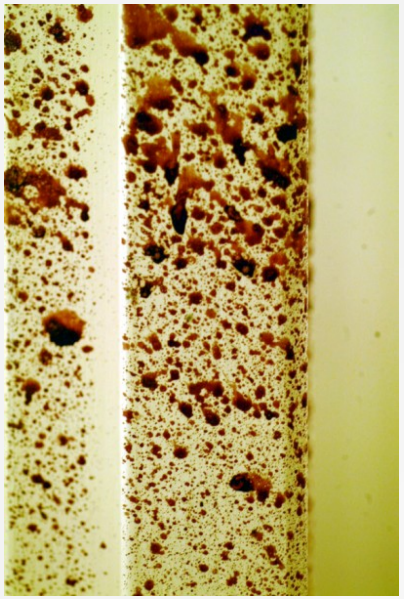


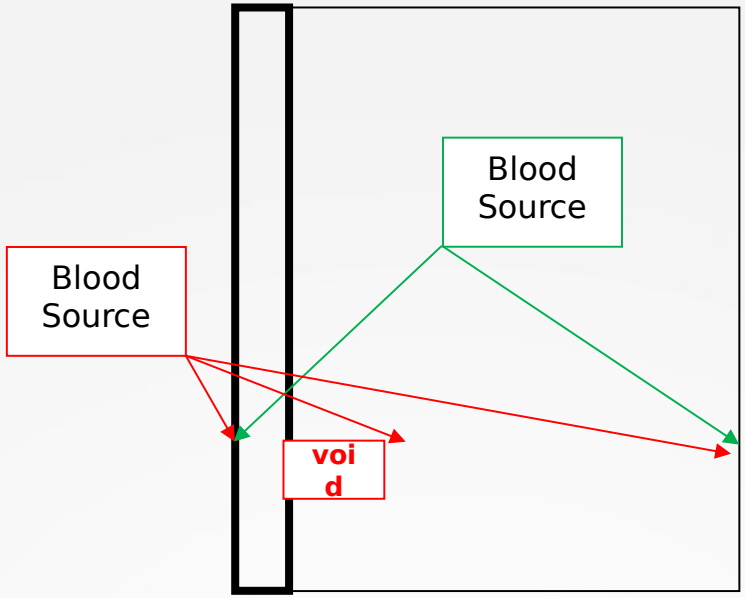
Limiting angles in BPA :

- gives rise to **void areas**
  - linked to multiple target surfaces

(e.g.: doors, switches, radiator, furniture…)

- allows to estimate the **location of individuals** during the bloodshed
  - increasing the accuracy of **the Height**
  - **quicker** than others currently used methods
  - **easier to do and to explain**
  - **Reducing the calculation human errors**
  - avoiding troubles causing by the **surfaces positionning**





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