

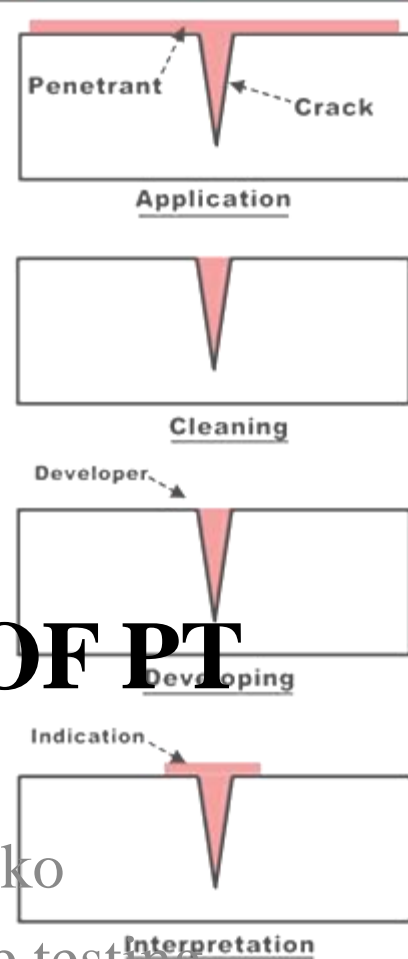
# PART 3

## THEORY AND PRINCIPLES OF PT

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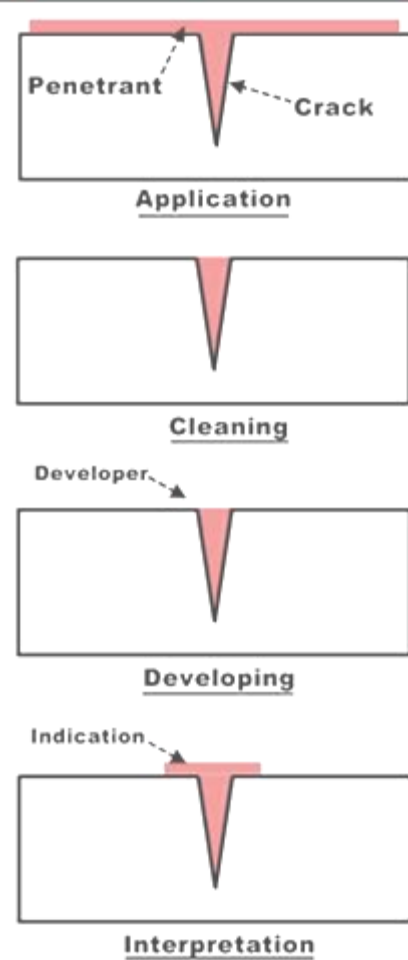
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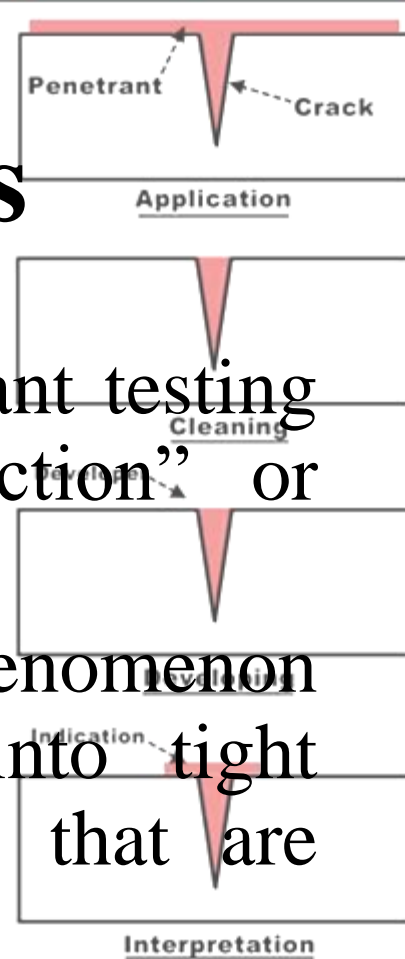
# Content:

## 1.Theory and Principles



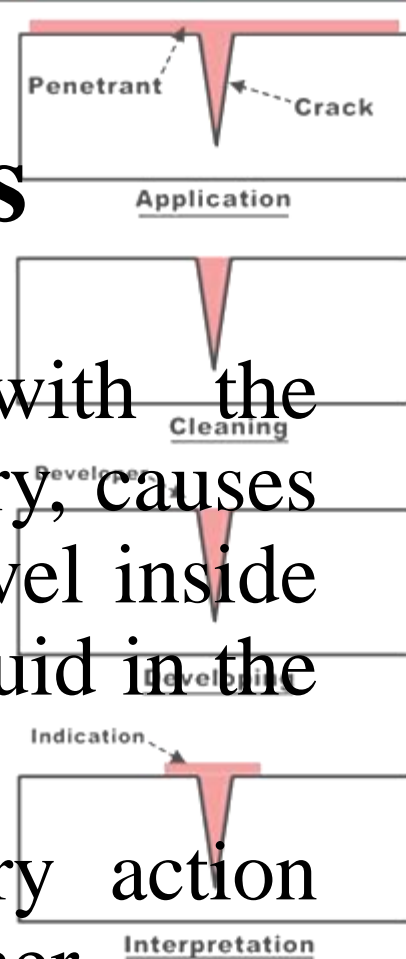
# Theory and principles

- The basic principle upon which penetrant testing is based is that of capillary “attraction” or “action”.
- Capillary action is a surface tension phenomenon that permits liquids to be drawn into tight openings as a result of the energies that are present at the surfaces of the openings.
- The principle of capillary action is demonstrated by placing a glass straw into a beaker filled with colored water.



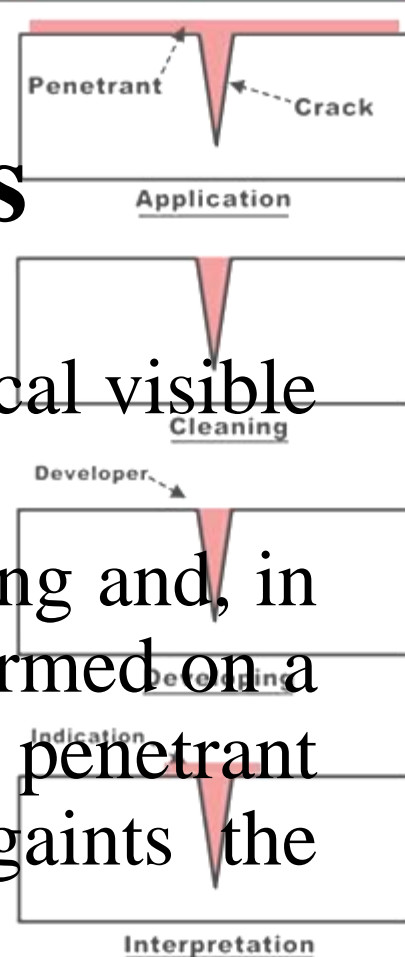
# Theory and principles

- The surface tension associated with the opening of the glass straw, or capillary, causes the liquid level to move to higher level inside that capillary than the level of the liquid in the beaker.
- A simple demonstration of capillary action using two glass panels clamped together.
- One can consider that discontinuities open to the surface behave in much the same fashion.



# Theory and principles

- The liquid used in this example is a typical visible contrast penetrant.
- The capillary action forces are very strong and, in fact, if a penetrant test were being performed on a specimen in an overhead position, the penetrant would be drawn into the opening, against the force of gravity.
- The capillary force is much more stronger than gravity and discontinuities will be detected even through they may be in an overhead specimen.



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