

VISUAL EVALUATION AND TESTING

by

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SUMMARY

1. Objectives of Visual Testing (VT)
2. Physiology of the human eye
3. Instruments used to enhance VT
4. Emotional response/Subjectivity of VT
5. Advantages/Disadvantages
6. Conclusions

Objectives of Visual Testing

- Verify INTEGRITY of an engineering structure (are all parts whole?)
 - Examine for FLAWS (surface blemishes, holes, cracks)
 - Compare with AESTETIC standards (technical, cultural)
 - Evaluate DIMENSIONAL properties
- => Predict FUNCTIONALITY or ability to perform (eg. look at tire thread depth and predict mileage)

***What are we going to look at...?
(Roof collapse, welded joints)***



Anatomy and Physiology of the Human Eye

- “Parts” – Acuity, resolution, aging – see ASNT Handbook. Anatomy books
- Seeing vs. Perceiving – “déjà vu”
- Relative “value” among the seven senses...
 - ”eye for an eye”, Exodus 21:24-26.
 - “If your eye causes you to lust, gouge it out and throw it away, for it is better than a part of you be destroyed than all of you be cast into hell” Matt. 5:28-29

EMOTIONAL RESPONSE TO VT

- “Seeing is believing” – often not true: optical illusions, human brain malfunctions
- “Vanity, all is vanity...” – people often do not wear glasses and are unaware or refuse to believe they lost visual acuity
- “A picture is worth a thousand words” – not always...
- VT leaves no room for imagination or doubt – Video/TV generation versus reader/listener generation – Video recordings in courtroom...

Example: Thermal cut was performed after roof collapse to remove sample



Example: Excessive corrosion resulted during storage, not at collapse a year before...



INSTRUMENTS FOR VISUAL TESTING

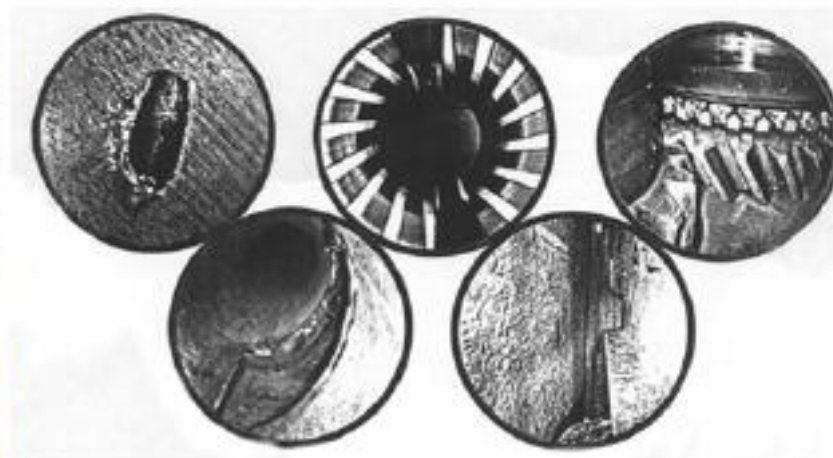
1. MAGNIFYING
2. LIGHTING
3. DOCUMENTING
4. SECONDARY VT (Examining UT, RT, LP or MP results – e.g. Radiographic Image Quality Indicators)

* TIMING is also important – pre-, during- or post-process VT

Endoscope



Glass fiber endoscope (fibrescope)



VISUAL TEST ACCEPTANCE STANDARDS

- Personnel Qualifications (visual acuity tests, etc)
- AWS/ASNT Standard for Visual Examination of Welds
- Weld geometry and flaw reproduction kits

VISUAL TESTING AND OTHER NDE METHODS

□ ADVANTAGES

- **Inexpensive**
- **Most “tools” are readily available**
- **Easy to document**
- **Can avoid further NDE costs by early flaw detection**

□ DISADVANTAGES

- **Requires extra technical knowledge – know what to look at/for...**
- **Subjective to interpret, easy to “manipulate” information**
- **Difficult to quantify or agree on acceptance standards**
- **Use of improper visual aids can result in erroneous information**

CONCLUSIONS

- Visual Testing (VT) is one of the most underrated and inexpensive NDE/NDT methods – MOST WIDELY USED BUT PERFORMED INSTINCTIVELY...
- Great care should be exercised when performing, interpreting and acting upon results of VT (very susceptible to subjective interpretation!)
- Using adequate instrumentation for Visual Evaluation, Testing and recording can enhance the efficiency and reliability of testing