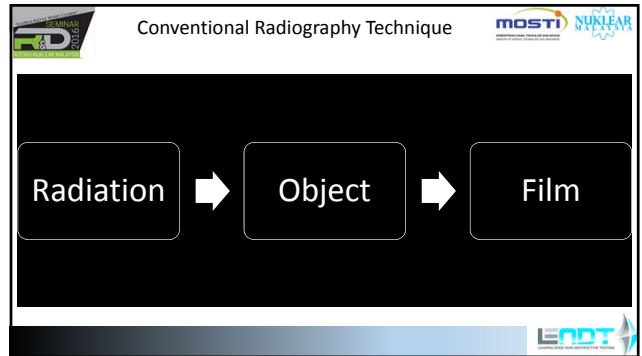


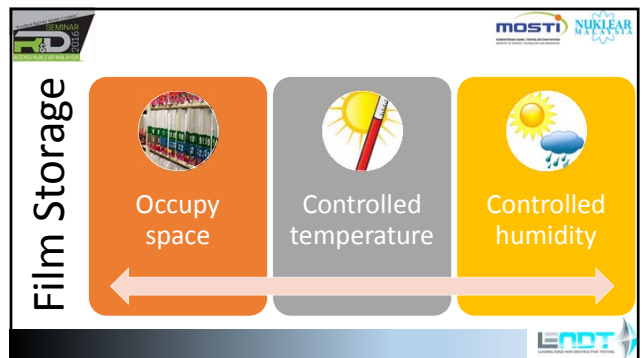
DIGITAL IMAGE QUANTITATIVE EVALUATIONS FOR LOW COST FILM DIGITIZER'S HEIGHT DETERMINATION
Penentuan Ketinggian Pindigit Film Berkos Rendah Dengan Menggunakan Kaedah Penilaian Kuantitatif Terhadap Imej Digital
Khairul Anuar Mohd Salleh, Arshad Yassin, Ahmad Nasir Yusof, Noorhazleena Azaman

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Malaysia



Exposed films

- Evaluation & interpretation
- Reporting
- Storage



> 70% contracts: Industrial radiographic films need to be stored (5 – 6 years)

> 45 % caused by the temperature and humidity

> 55% films are damaged over the years

VIDAR Systems Corporation
\$37,000 (RM 129,500)

ARRAY 2905HD
\$69,000 (RM 241,500)

SOLUTION?

- Low cost
- Meet the current demand
- Applying fundamental principles
- NDT oriented
- Digital

2002, 2004, 2007, 2015

What is the most appropriate height?

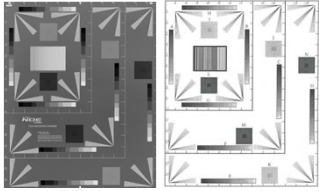
- Dimension determination
- Mobility & practicality

Four X-ray images showing internal features of various components.

Three X-ray images showing internal features of various components.

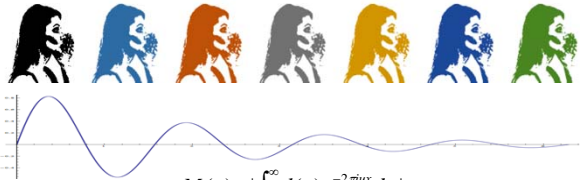
Quantitative measurements performed

- Modulation transfer function (MTF)
- Characteristic transfer curve
- Contrast to noise ratio (CNR)



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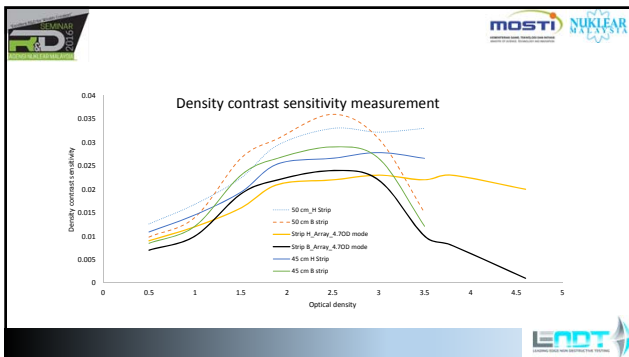
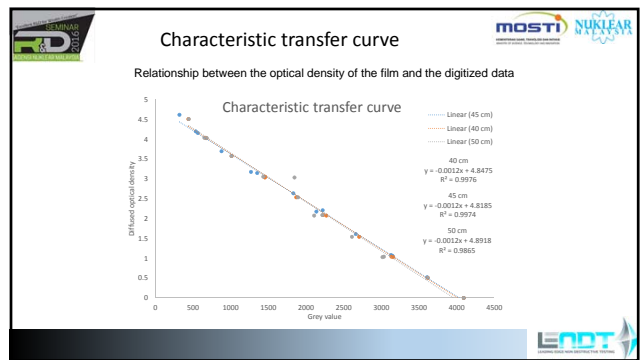
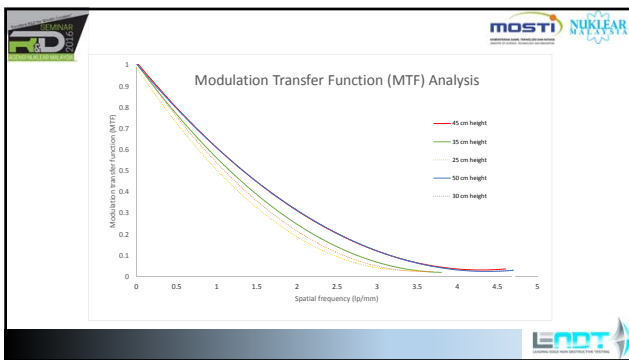
Modulation transfer function (MTF)



$$M(u) = \int_{-\infty}^{\infty} I(x) e^{-2\pi i u x} dx$$

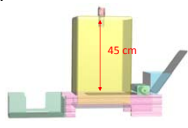
$$I(x) = \frac{d}{dx}(e(x))$$

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Conclusion


- The height of the film digitizer is determined at 45 cm.
- The height is determined thru series of quantitative measurements.
- MTF measurement suggest achievable spatial resolution at 2.7 lp/mm (at 20% modulation).
- The characteristic transfer curve indicates linear response for the chosen height.
- CNR measurement indicates achievable optical density (maximum) of 3.5



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2. MNA RMC
3. LENDT Group



Fat Man, Seen From Behind
Giovanni Battista Tiepolo
(Italian, Venice 1696-1770,
Madrid)

