KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

POLITEKNIK MALAYSIA
KUCHING SARAWAK

JABATAN KEJURUTERAAN MEKANIKAL		
DJJ30323 & STRENGTH OF MATERIALS		
LECTURER NAME		
TYPE OF ASSESSMENT		
TOPIC		
DURATION		
DATE OF ASSESSMENT		
STUDENT'S INFORMATION	*NAME*	*REGISTRATION NO.*
TOTAL MARKS	*CLO3*	*/100*

POLITEKNIK MALAYSIA
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DJJ30323 & STRENGTH OF MATERIALS

PRACTICAL TASK 4 & DEFLECTION

CLO 3	Organize appropriate experiments in groups according to Standard Operation Procedures. (P4, PLO5)	**PLO5**	DK6: ENGINEERING PRACTICE DP1: DEPTH OF KNOWLEDGE DP3: DEPTH OF ANALYSIS REQUIRED DP4: FAMILIARITY OF ISSUES

A. TITLE

Comparison between theoretical and experimental maximum deflection.

B. OBJECTIVES

To study the deflection of beams using different types of materials.

C. TOPIC SUMMARY/ THEORY

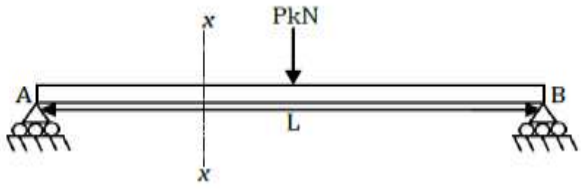
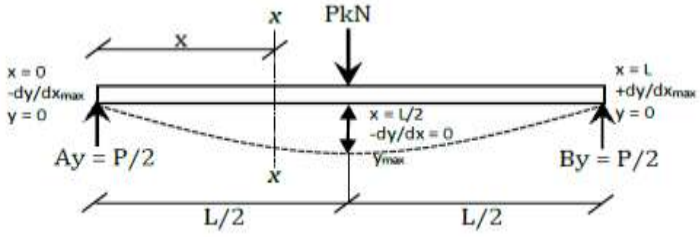


Figure 3(a)

FBD



The maximum deflection occurs at x = L/2; ymax = $-(PL^3 / 48EI)$

The formula of Moment of Inertia for square or rectangle; I = $bd^3/12$

Given Young's Modulus for materials used as beam.

EWood = $13GN/m^2$

EBrass = $105GN/m^2$

ESteel = $207GN/m^2$

D. MATERIAL / TOOLS

Lists of apparatus:

i. A pair of simple support
ii. A set of loads
iii. A set of materials used as beam
iv. Load hanger
v. Dial indicator
vi. Measuring tape

E. GENERAL INSTRUCTION / SAFETY PROCEDURE

i. Wear suitable attire when in the lab.
ii. Wear safety goggles while handling the liquids.
iii. Always clean droplets or excessive liquid at the working area during and after experiments.
iv. Always obey the Lecturer/Lab Assistant instructions.

F. WORK INSTRUCTION / PROCEDURE

Lists of procedure:

i. Measure the width, b and depth, d of the beam using measuring tape.
ii. Place the beam on the supports, A and B.
iii. Measure the length of the beam span, L from A to B using measuring tape.
iv. Hang the load hanger at the center of the beam referring to the FBD.
v. Place a set of loads on the load hanger.
vi. Record the indicator's reading in Table 6.1, 6.2 and 6.3. The value displayed represents the value of deflection.
vii. Repeat step (v) to (vi) for another **FOUR** sets of cases using the same beam.
viii. Place another **TWO** sets of beams and repeat from step (i).

G. RESULT

Given the formula of percentage error, $y_{max} = [(y_{max(exp)} - y_{max}) / y_{max}] \times 100\%$ Answer the following questions:

i. Fill in Table 1, 2 and 3.
ii. Plot the bar chart to compare the theoretical and experimental deflection for each case.

Table 1: Wood

Load Case	Beam Width, b(m)	Beam Depth, d(m)	Moment of Inertia, I (m^4)	Beam Span's Length, L (m)	Load, P (N)	Dial Indicator's Reading or Deflection Experiment, ymax(exp) (m)	Deflection Theory, ymax (m)	Percentage Error, ymax (%)
Case 1								
Case 2								
Case 3								
Case 4								
Case 5								

Table 2: Brass

Load Case	Beam Width, b(m)	Beam Depth, d(m)	Moment of Inertia, I (m^4)	Beam Span's Length, L (m)	Load, P (N)	Dial Indicator's Reading or Deflection Experiment, ymax(exp) (m)	Deflection Theory, ymax (m)	Percentage Error, ymax (%)
Case 1								
Case 2								
Case 3								
Case 4								
Case 5								

Table 3: Steel

Load Case	Beam Width, b(m)	Beam Depth, d(m)	Moment of Inertia, I (m^4)	Beam Span's Length, L (m)	Load, P (N)	Dial Indicator's Reading or Deflection Experiment, ymax(exp) (m)	Deflection Theory, ymax (m)	Percentage Error, ymax (%)
Case 1								
Case 2								
Case 3								
Case 4								
Case 5								

H. DISCUSSION

Discuss the following questions:

i. Discuss the reaction that happens when a load is applied to the beam and discuss why the condition occurred.

i. Discuss the probable factors that affect the accuracy of this experiment.

I. CONCLUSIONS

Make a conclusion about the experiment.

J. REFERENCES

List down all the books and journals referred.

PREPARED BY: *(Course Lecturer)* *……* *( )* ***Date:***	***CHECKED BY:*** *(Course Coordinator/ Head of Programme)* *……* *( )* ***Date:***	***APPROVED BY:*** *(Head of Programme/ Head of Department)* *……* *( )* ***Date:***