EXPERIMENT 5

**Name: Navneet Saraf**

**Admission no.: U19ME076**

**Division: B**

**AIM:**

**To measure shear plane angle by performing shaping operation.**

**MATERIAL REQUIREMENTS:**

1. Workpiece (Al bar 30mm X 8mm)
2. Six Single point cutting tools of relief angle 6o (rake angles: 0o, 5o, 10o, 15o, 20o, 25o)

**LIST OF MACHINES/EQUIPMENTS REQUIRED:**

1. Shaping machine
2. Vernier caliper
3. Ruler
4. Bevel protractor

**DRAWING:**

**PROCEDURE:**

**DERIVATION:**

**OBSERVATION TABLE:**

**L = Stroke length = 55 mm**

**N = Ram speed = 40 strokes/min**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sr. No. | Rake Angle  (degree) | Depth of cut  (mm) | Average length of chip  (mm) | | | | | Length of uncut chip  (mm) | Chip thickness ratio |
| **l1** | **l2** | **l3** | **l4** | **lf** |
| 1. | **0** | **0.3** | **3** | **4** | **4** | **5** | **4** | **30** | **0.13** |
| 2. | **5** | **0.3** | **5** | **6** | **6** | **6** | **5.75** | **30** | **0.192** |
| 3. | **10** | **0.3** | **7** | **7** | **8** | **8** | **7.5** | **30** | **0.25** |
| 4. | **15** | **0.3** | **10** | **10** | **9** | **9** | **9.5** | **30** | **0.32** |
| 5. | **20** | **0.3** | **7** | **7** | **6** | **6** | **6.5** | **30** | **0.22** |
| 6. | **25** | **0.3** | **12** | **12** | **12** | **11** | **11.75** | **30** | **0.392** |

**N = Ram speed = 70 strokes/min**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sr. No. | Rake Angle  (degree) | Depth of cut  (mm) | Average length of chip  (mm) | | | | | Length of uncut chip  (mm) | Chip thickness ratio |
| **l1** | **l2** | **l3** | **l4** | **lf** |
| 1. | **0** | **0.3** | **5** | **5** | **6** | **6** | **5.5** | **30** | **0.183** |
| 2. | **5** | **0.3** | **7** | **8** | **9** | **8** | **8** | **30** | **0.267** |
| 3. | **10** | **0.3** | **9** | **9** | **9** | **8** | **8.75** | **30** | **0.292** |
| 4. | **15** | **0.3** | **10** | **11** | **12** | **11** | **11** | **30** | **0.367** |
| 5. | **20** | **0.3** | **7** | **7** | **6** | **7** | **6.75** | **30** | **0.225** |
| 6. | **25** | **0.3** | **13** | **12** | **12** | **13** | **12.5** | **30** | **0.42** |

**RESULT TABLE:**

|  |  |  |  |
| --- | --- | --- | --- |
| Sr. no. | Rake angle  (degree) | Shear plane angle  (degree) | |
| N = 40 strokes/min | N = 70 strokes/min |
| 1. | 0 | 7.4 | 10.37 |
| 2. | 5 | 11.01 | 15.23 |
| 3. | 10 | 14.43 | 16.85 |
| 4. | 15 | 18.62 | 21.39 |
| 5. | 20 | 12.6 | 12.9 |
| 6. | 25 | 23.06 | 17.38 |

**Sample Calculations: -**

**CONCLUSIONS:**