NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR

DEPARTMENT OF Metallurgical & Materials Engineering

REPORT

TITLE Pin on disk wear behaviour study at 60 N load

Name Deep Narayan

Semester 7th Roll No. 20MM8051

Section _____ Year 4th (2023)

Signature Deep

Date of Experiment 28/8/2023

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Title:

Pin on disk wear behaviour study at 60N load

Aim:

Study of Al-sample wear testing on hardened steel disk with 60N load

Theory:

As discussed in previously experiment

Procedure:

As discussed in previous experiment

Observation:

Sl. No.	Wear (μm)	Frictional Force	Time (s)	Sliding Distance (m)	Coeff. of friction
1	70	28.3	30	31.4	0.4716
2	158	26.1	60	62.8	0.435
3	207	23	90	94.2	0.383
4	260	24.8	120	125.6	0.413
5	369	30.5	150	157	0.508
6	596	30.7	180	188.4	0.511
7	780	40.8	210	219.8	0.68
8	953	32.3	240	251.2	0.538
9	1129	35.3	270	282.6	0.588
10	1270	35.9	300	314	0.598
11	1390	35.2	330	345.4	0.586
12	1510	33.5	360	376.8	0.558
13	1692	25.7	390	408.2	0.428
14	1745	24	420	439.6	0.4
15	1828	20	450	471	0.333

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Sl. No.:	Wear (μm)	Frictional Force	Time (s)	Sliding Distance (m)	Coeff. of friction
16	1860	20.4	480	502.4	0.34
17	1871	22.5	510	533.8	0.375
18	1883	23.8	540	565.2	0.396
19	1897	24.7	570	596.6	0.411
20	1911	22.7	600	628	0.378

Calculations:

Sliding distance $= \pi D N T$

$= \pi \times 0.1 \times 200 \times 10$

$= 628$

Wear rate $= \dfrac{\Delta W}{\pi \frac{d^2}{4} \times S.D.} = \dfrac{0.1411}{\pi \times \frac{(0.006)^2}{4} \times 628}$

$= 7.9505\ g\ m^{-2} m^{-1}$

$\Delta W = (1.8527 - 1.7116)\ gm = 0.1411\ gm$

Date 28/8/2023 Signature

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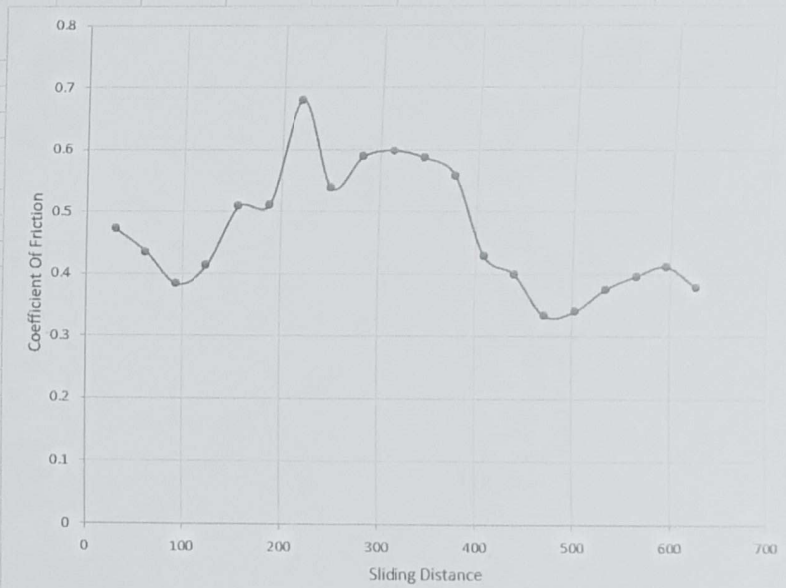
F27 COEFFICIENT OF FRICTION VS SLIDING DISTANCE

LOAD	60N	
INITIAL WEIGHT	1.8527 gm	
FINAL WEIGHT	1.7116 gm	
TRACK DIAMETER (D)	100mm	
RPM	200	
TIME	10 min	
NAME	DEEP NARAYAN	
ROLL NUMBER	20MM8051	
EGISTRATION NUMBE	20U10719	
GROUP NUMBER	B3	
XPERIMENT NUMBEF	5	
EXPERIMENT DATE	25-08-2023	
SUBMISSION DATE	28-08-2023	

Wear (micrometer)	Frictional force	Time(sec.)	Time(min.)	Sliding distance (m)	Coeff. of friction
70	28.3	30	0.5	31.4	0.471666667
158	26.1	60	1	62.8	0.435
207	23	90	1.5	94.2	0.383333333
260	24.8	120	2	125.6	0.413333333
369	30.5	150	2.5	157	0.508333333
596	30.7	180	3	188.4	0.511666667
780	40.8	210	3.5	219.8	0.68
953	32.3	240	4	251.2	0.538333333
1129	35.3	270	4.5	282.6	0.588333333
1270	35.9	300	5	314	0.598333333
1390	35.2	330	5.5	345.4	0.586666667
1510	33.5	360	6	376.8	0.558333333
1692	25.7	390	6.5	408.2	0.428333333
1745	24	420	7	439.6	0.4
1828	20	450	7.5	471	0.333333333
1860	20.4	480	8	502.4	0.34
1871	22.5	510	8.5	533.8	0.375
1883	23.8	540	9	565.2	0.396666667
1897	24.7	570	9.5	596.6	0.411666667
1911	22.7	600	10	628	0.378333333



COEFFICIENT OF FRICTION VS SLIDING DISTANCE

40N 20N 60N Sheet1 Sheet2 Sheet3 Sheet4

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LOAD	60N
INITIAL WEIGHT	1.8527 gm
FINAL WEIGHT	1.7116 gm
TRACK DIAMETER (D)	100mm
RPM	200
TIME	10 min

Wear (micrometer)	Frictional force	Time(sec.)	Time(min.)	Sliding distance (m)	Coeff. of friction
70	28.3	30	0.5	31.4	0.471666667
158	26.1	60	1	62.8	0.435
207	23	90	1.5	94.2	0.383333333
260	24.8	120	2	125.6	0.413333333
369	30.5	150	2.5	157	0.508333333
596	30.7	180	3	188.4	0.511666667
780	40.8	210	3.5	219.8	0.68
953	32.3	240	4	251.2	0.538333333
1129	35.3	270	4.5	282.6	0.588333333
1270	35.9	300	5	314	0.598333333
1390	35.2	330	5.5	345.4	0.586666667
1510	33.5	360	6	376.8	0.558333333
1692	25.7	390	6.5	408.2	0.428333333
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1860	20.4	480	8	502.4	0.34
1871	22.5	510	8.5	533.8	0.375
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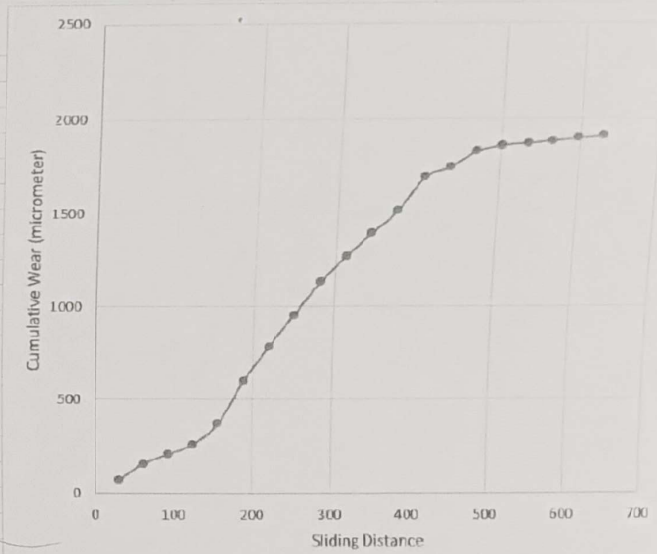

CUMULATIVE WEAR VS SLIDING DISTANCE FOR 60N LOAD

40N 20N 60N Sheet1 Sheet2 Sheet3 Sheet4

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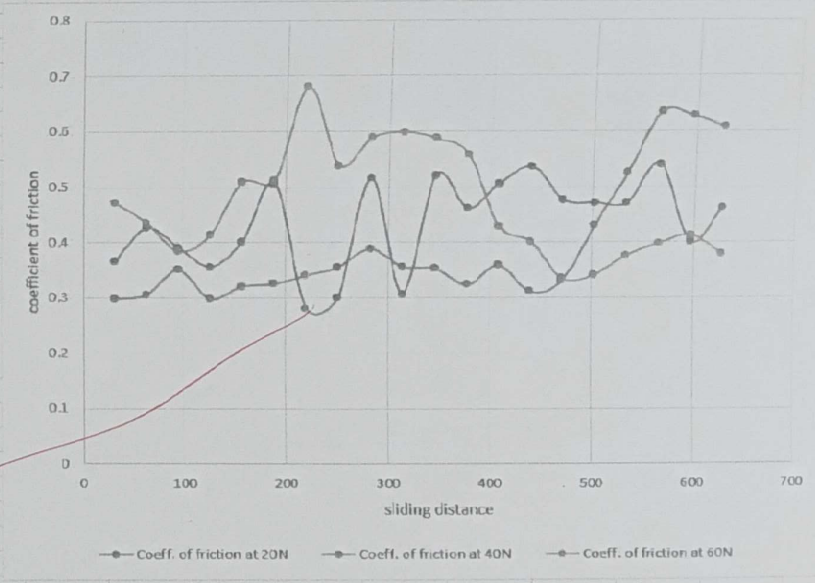
Coefficient of friction vs Sliding Distance Graph (Combined for all loads)

Sl. No.:	*Sliding distance (m)*	*Coeff. of friction at 20N*	*Coeff. of friction at 40N*	*Coeff. of friction at 60N*
1	31.4	0.365	0.2975	0.471666667
2	62.8	0.425	0.305	0.435
3	94.2	0.39	0.35	0.383333333
4	125.6	0.355	0.2975	0.413333333
5	157	0.4	0.32	0.508333333
6	188.4	0.505	0.325	0.511666667
7	219.8	0.28	0.34	0.68
8	251.2	0.3	0.355	0.538333333
9	282.6	0.515	0.3875	0.588333333
10	314	0.305	0.355	0.598333333
11	345.4	0.52	0.3525	0.586666667
12	376.8	0.46	0.3225	0.558333333
13	408.2	0.505	0.3575	0.428333333
14	439.6	0.535	0.31	0.4
15	471	0.475	0.33	0.333333333
16	502.4	0.47	0.43	0.34
17	533.8	0.47	0.525	0.375
18	565.2	0.54	0.635	0.396666667
19	596.6	0.4	0.6275	0.411666667
20	628	0.46	0.6075	0.378333333



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40N 20N 60N Sheet1 Sheet2 Sheet3 Sheet4

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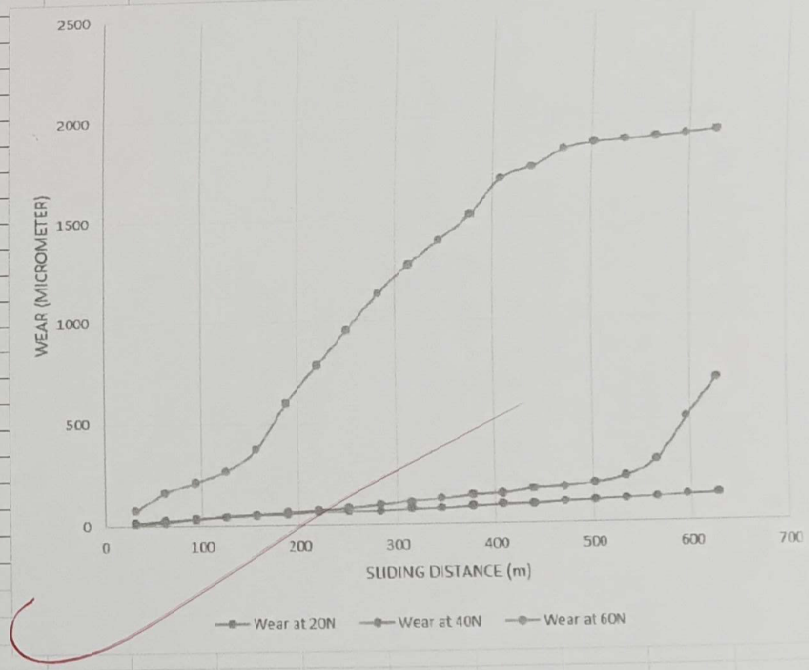
CUMULATIVE WEAR VS SLIDING DISTANCE GRAPH (COMBINED FOR ALL LOADS)

Sl. No.:	Sliding distance	Wear at 20N	Wear at 40N	Wear at 60N
1	31.4	12	5	70
2	62.8	23	15	158
3	94.2	31	30	207
4	125.6	41	39	260
5	157	47	49	369
6	188.4	50	59	596
7	219.8	59	68	780
8	251.2	63	78	953
9	282.6	64	91	1129
10	314	72	107	1270
11	345.4	73	118	1390
12	376.8	81	135	1510
13	408.2	87	143	1692
14	439.6	90	162	1745
15	471	98	169	1828
16	502.4	103	186	1860
17	533.8	110	218	1871
18	565.2	117	299	1883
19	596.6	126	501	1897
20	628	131	693	1911



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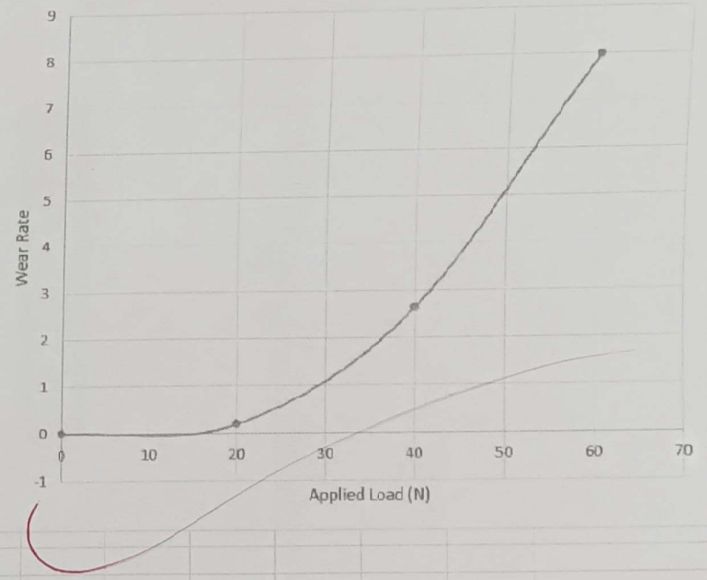
Wear Rate vs Applied Load

APPLIED LOAD (N)	WEAR RATE
0	0
20	0.18
40	2.627
60	7.97



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