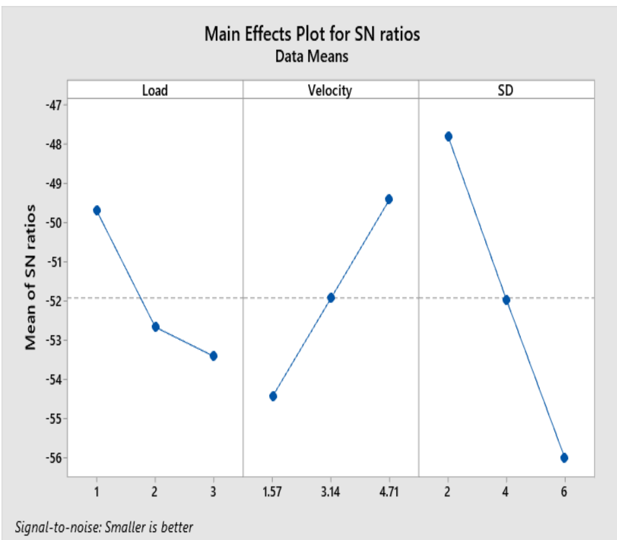
TABLE III OUTPUT TABLE OF SIGNAL-TO-NOISE RATIO

	Sample 1			Sample 2			Sample 3		
Level	**Load**	**Velocity**	**SD**	**Load**	**Velocity**	**SD**	**Load**	**Velocity**	**SD**
1	-49.69	-54.42	-47.80	-34.71	-40.55	-33.25	-25.21	-31.03	-23.82
2	-52.66	-51.92	-51.96	-39.16	-38.01	-37.95	-29.64	-28.20	-28.21
3	-53.41	-49.41	-55.99	-40.16	-35.47	-42.83	-30.40	-26.02	-33.22
Delta	3.72	5.01	8.19	5.45	5.08	9.57	5.19	5.01	9.40
Rank	3	2	1	2	3	1	2	3	1

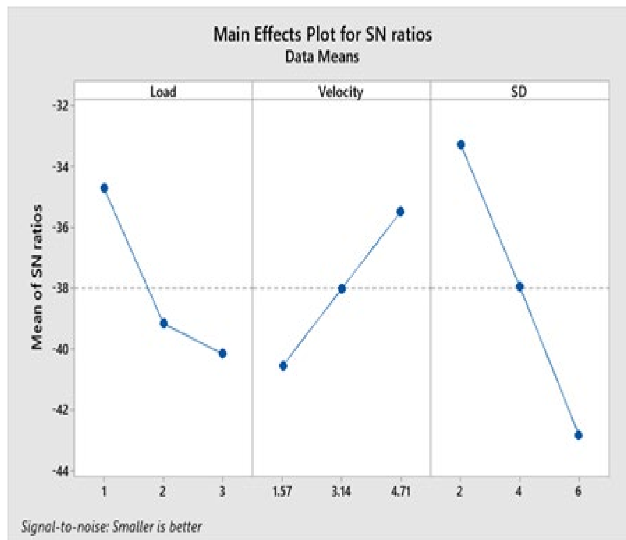
III. DESIGN OF EXPERIMENT (DOE)

In traditional method, it is needed to carry number of experimentation to reach at some acceptable results or conclusion and it is very time consuming process. In order to develop some strategic way to carryout experimentation Design of Experiment technique is used.

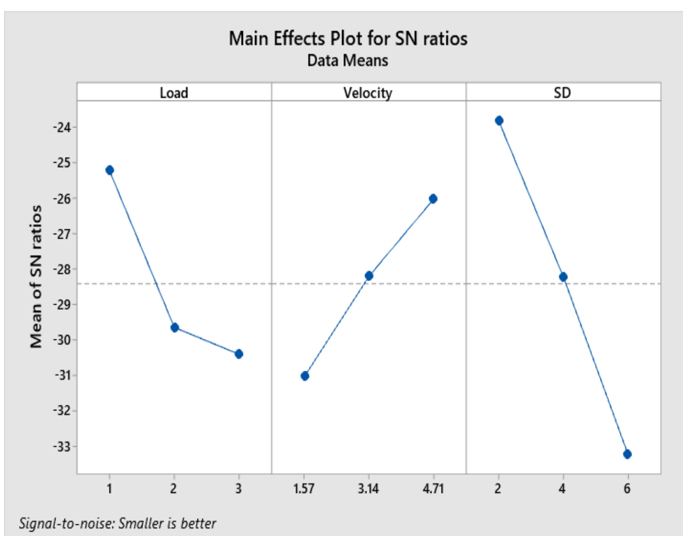
For optimization of experimental work to come up at acceptable conclusion, the design of experiment technique is used. It minimizes the experiment numbers to be carried out and concentrate on optimum test runs. The Orthogonal Arrays (OA) of Design of Experiment gives optimum test runs to be carried out. L_9 orthogonal array is used for this study.



Sample 1



Sample 2



Sample 3

Fig. 3 Mean of signal to noise ratio

IV. RESULTS AND DISCUSSION

Results derived from the experimentation on said samples for the wear properties of Pure PTFE, 25% carbon filled PTFE and 35% carbon filled PTFE are shown in Table II. The wear rate is the main target of consideration and discussion.

Best fitted parameters for the process were found with help of signal to noise ratio of Taguchi approach [6]. The know the effect of process parameters on the response output i.e. wear rate; the wear test were performed on pin-on-disc. L_9 OA was selected to carry out optimum experiments. Experimental data is used to calculate signal-to-noise, S/N ratio of output parameter. The quantitative effect on output features was studied using obtained response graphs. Admissible factors and its effect on wear rate were identified by using analysis of variance, S/N ratio analysis etc. The mean of all responses (S/N ratio) for all three samples at each level are shown in Table III. The wear rate is increases considerably along with increase in sliding velocity, as shown in Fig. 3. It also signifies that, load and sliding distance are inversely proportional to the wear rate of PTFE. When PTFE is used with composition of carbon then, the sliding distance at level first, load at level second and sliding velocity at level third can give best possible response results. whereas, for plain PTFE, sliding distance at level first, sliding velocity at level second and load at level third was found as a best possible response results.

V. CONCLUSION

The wear resistance of PTFE can be significantly enhanced by incorporating carbon content into it. Optimal process parameters for minimizing wear rate include a sliding distance of 1000 m, a load of 20 N, and a sliding speed of 4.71 m/s. Confirmation tests have demonstrated that these parameters can indeed achieve the desired reduction in wear rate. Moreover, the addition of 25% carbon to PTFE results in a decrease in wear rate by 70-75%, while a 35% carbon content can further reduce the wear rate by 85-90%. However, it is important to note that exceeding a carbon percentage of 35-40% may lead to increased brittleness in the composite material. Therefore, it is not advisable to surpass the 35% carbon content threshold.

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