Written by Special to Maintenance Technology From NSK
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In tough working environments, where contaminants constantly threaten bearings and other pump components, keeping equipment up and running poses a real challenge. Slurry-handling operations are that type of place.

NSK engineers devote their attention to the needs of bearings in the real-life applications and wide range of challenging environments in which they will be used. One such application is an impeller slurry pump. It's a category of machinery that often sees substantial downtime, high maintenance costs and high levels of premature bearing failure.

In the case of one cement producer, centrifugal, slurry-handling screw-pump downtime due to failed bearings was resulting in high costs for bearing replacement, maintenance and line downtime—*something the company couldn't afford to ignore*. Screw pumps operating in a cement plant are going to be subjected to extreme levels of cement dust and dirt. While maintenance practices in these operations can be less than desirable, in this particular case, dust contamination was determined to be the root cause of the bearing failures.

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NSK General Recommendations For Centrifugal Pumps*

BEARING BORE SIZE			SHAFT DIAMETER TOLERANCE				SHAFT STRAIGHTNESS AND ALIGNMENT**			
BORE SYMBOL	BORE (mm)	BORE (inch)	METRIC (MM)		INCH		METRIC (MM)		INCH	
			+MAX	+MIN	+MAX	+MIN	STRAIGHT	ALIGN	STRAIGHT	ALIGN
02	15	0.5906	0.009	0.0001	0.0004	0.0000	0.013	0.051	0.0005	0.002
03	17	0.6693	0.009	0.0001	0.0004	0.0000	0.013	0.051	0.0005	0.002
04	20	0.7874	0.011	0.0002	0.0004	0.0001	0.013	0.051	0.0005	0.002
05	25	0.9843	0.011	0.0002	0.0004	0.0001	0.013	0.051	0.0005	0.002
06	30	1.1811	0.011	0.0002	0.0004	0.0001	0.013	0.051	0.0005	0.002
07	35	1.3780	0.013	0.0002	0.0005	0.0001	0.013	0.051	0.0005	0.002
08	40	1.5748	0.013	0.0002	0.0005	0.0001	0.013	0.051	0.0005	0.002
09	45	1.7717	0.013	0.0002	0.0005	0.0001	0.013	0.051	0.0005	0.002
10	50	1.9685	0.013	0.0002	0.0005	0.0001	0.013	0.051	0.0005	0.002
11	55	2.1654	0.015	0.0002	0.0006	0.0001	0.013	0.051	0.0005	0.002
12	60	2.3622	0.015	0.0002	0.0006	0.0001	0.013	0.051	0.0005	0.002
13	65	2.5591	0.015	0.0002	0.0006	0.0001	0.013	0.051	0.0005	0.002
14	70	2.7559	0.015	0.0002	0.0006	0.0001	0.013	0.051	0.0005	0.002
15	75	2.9528	0.015	0.0002	0.0006	0.0001	0.013	0.051	0.0005	0.002
16	80	3.1496	0.015	0.0002	0.0006	0.0001	0.013	0.051	0.0005	0.002
17	85	3.3465	0.018	0.0003	0.0007	0.0001	0.013	0.051	0.0005	0.002
18	90	3.5433	0.018	0.0003	0.0007	0.0001	0.013	0.051	0.0005	0.002
19	95	3.7402	0.025	0.0003	0.0010	0.0001	0.013	0.051	0.0005	0.002
20	100	3.9370	0.025	0.0003	0.0010	0.0001	0.013	0.051	0.0005	0.002
21	105	4.1339	0.028	0.0013	0.0011	0.0005	0.013	0.051	0.0005	0.002
22	110	4.3307	0.028	0.0013	0.0011	0.0005	0.018	0.076	0.0007	0.003
24	120	4.7244	0.028	0.0013	0.0011	0.0005	0.018	0.076	0.0007	0.003
26	130	5.1181	0.033	0.0015	0.0013	0.0006	0.018	0.076	0.0007	0.003
28	140	5.5118	0.033	0.0015	0.0013	0.0006	0.018	0.076	0.0007	0.003

[illegible] Bearings ** TIR= Total Indicator Runout (for alignment it means both parallel and [illegible]

With hardening concrete ready to pump and pour, an unexpected pump failure is a major issue. Centrifugal, slurry-handling screw pumps call for specific bearing installation practices to ensure they achieve top performance under contaminated conditions:

- The bearing inner ring for this type of pump is not held in place by the fit between the shaft, sleeve and bearing. It is mounted on a screw bushing assembly bolted to the end of the pump shaft. Metric bolts are utilized in the bearing assembly and they need to be installed to the correct torque specification. Thread locker must also be used on these bolts to help maintain their position. This practice ensures that the bearing assembly does not spin on the shaft. If your bearing is slipping on the screw bushing and/or the screw bushing is slipping on the shaft, the bolts holding the plate against the bearing inner ring are the wrong type, wrong torque—*or both*

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- Lubrication has a significant impact on the operation of machinery and its bearings. This is especially true in contaminated environments. For slurry pumps, high-quality EP (extreme-pressure) greases are the best option. Bentone-based greases, suitable for antifriction bearing lubrication at temperatures from 0 F to +300 F, are preferred.
- Maintenance and re-lubrication are also vital to the life of your bearings. For screw pumps that operate continuously, monthly re-lubrication is recommended, as is monthly preventive maintenance. During the re-lubrication process, check the grease for oiliness and dirt

contamination, and adjust the re-lube schedule accordingly.

- Operating temperatures can be used as a guide for re-lubrication. A sustained temperature drop after adding grease could indicate insufficient lubrication was initially supplied. Conversely, a noticeable rise in operating temperatures could indicate excess grease supply.

Applications such as this demand not only correct maintenance and installation practices, but the right components as well. NSK can provide answers. The attached chart lists our general recommendations for centrifugal pump bearings. **MT**