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Evaluation of Noise Levels and Vibrations at Cement Factories That Represent a Condition Monitory for The Performance of Machines

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Abstract

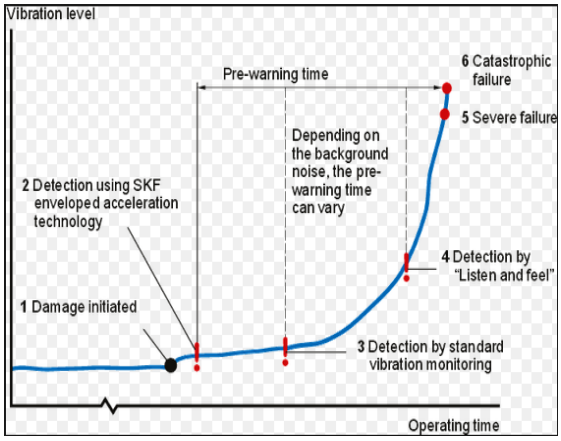
The estimation of vibration and clamor level of shift machines at any concrete organization causes the administration to watch the variety of vibration and commotion levels for each machine during the activity time frame. It encourages them to show in observing the machine and offers an admonition before the reprieve – down happens. Two concrete organizations were considered, the first is situated at Najaf city (Iraq), which is called Najaf concrete manufacturing plant, while the other is found in Kofa city, and is called Kofa concrete factory. Three stations were picked in every industrial facility (crude materials granulating plants, concrete crushing factories, and fumes fan stations) having diverse electrical engine limits, sound level meter PCE-428-EKIT were utilized for estimations. The area of bearing was picked for vibration estimation, while the area of the administrator for commotion estimation was picked. A significant level of vibration was found by the assessment standard of vibration size and higher than 85 dB for clamor level due to turning to unbalance, misalignment, and the broken machine.

Keywords: cement, vibration, noise, health monitoring.

Introduction

During the previous twenty years, different terms have been acquainted with depicting the natural appraisal cycles to befuddle two unique subjects: The first is the evaluation of the likely ecological effects of a given mechanical task. It is still in the arranging stage (implying that the industrial facility was not manufactured or work has begun in it) and the second is the effect appraisal. In reality "natural coming about" from a current profitable industry. Accordingly, there was a need to lead a specialized report upheld by the aftereffects of the examination for in suit readings for an example of concrete plants in Iraq appropriated more than two governorates to have discernment's dependent on figures that speak to the truth of the concrete plants in Iraq through which transitory and changeless medicines can be proposed to lessen the effect of the sound contamination's introduced,

misalignment and broken rigging machining [2] and bearing disappointments [3]. In this way constant checking and perception of the station machines are significant in any concrete organizations, the monitory can be vibration estimation at a different time for each machine and recording the congruity of the line as appeared in fig. 1 preceding the separate – happens create ripping noise between the shaft and



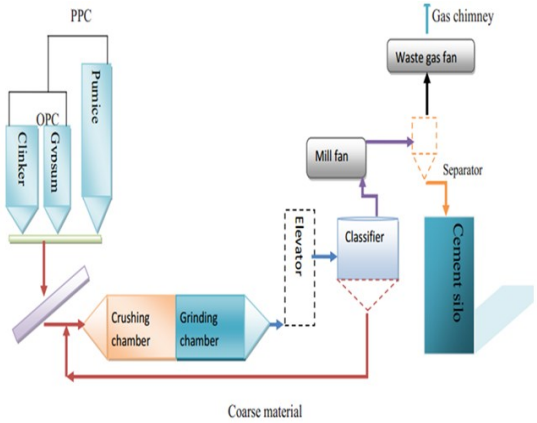


Figure (1): The high level of vibration will bearing also causing rises of bearing temperature.

Material and Methods

Arrangement of estimation was led at each station for vibration estimation utilizing
The class 2 open-air sound level meter PCE-428-EKIT, from the field of ecological estimation innovation, is an ideal sound level meter for estimations at work environments, building destinations, in rush hour gridlock, air terminals, and so forth. The open-air sound level meter is outfitted with an octave band recurrence channel. Alternatively, the open-air sound level meter PCE-428-EKIT can be redesigned with a 1/3 octave band channel. The extra unit for outside sound estimation makes it conceivable to quantify open-air commotion with a sound level meter over an extensive period, even in the downpour. Appeared in fig. 2

level meter PCE-428- Fig (2): Outdoor sound EKI.

Three stations were reads for every plant, crude materials smasher factories, concrete crushing plants, and a fumes fan for the oven. The accelerometer was mounted on the course of every unit at the X-Y hub independently. Each plant comprises of an electrical machine with 1000 R.P.M took care of into a decrease gear having five phases to lessen the speed to 15 R.P.M and pivot the drum of the factory which contains a steel ball inside it to pulverize the crude materials or the concrete clinkers as appeared in fig 3.

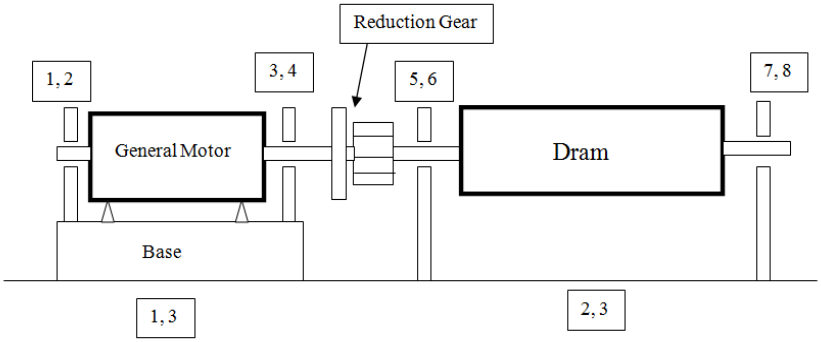


Fig.(3):showsa general layout of the mills unit and points of accelerometer locations.:

Four focuses were chosen for clamor pressure estimations utilizing compact commotion level meter mounted at point 1,2 at the front, 3, and 4 at back, the estimations were taken at the ear of the administrator. The perusing was rehashed at deferent focuses for vibration estimation of the fumes fan and clamor pressure estimations.

The readings for vibration estimation of crude materials plants, granulating concrete factories, and a fumes fan for the two organizations appear in tables 1,2,3,4 Together with the clamor pressure levels at the found focuses.

Results and Discussion.

Najaf factory:

Table 1: Vibration measurements

Raw –material mills stations

Location 1	**1**	**3**	**5**	**7**
Vertical $\frac{m}{s}$	4.2	7.5	5.8	10.6
Location 2	**2**	**4**	**6**	**8**
Radial $\frac{m}{s}$	5.3	6.5	6.1	8.1

Cement grinding mills station:

Location 1	**1**	**3**	**5**	**7**
Vertical $\frac{mm}{s}$	5.1	6.4	9.0	10.8
Location 2	**2**	**4**	**6**	**8**
Radial $\frac{mm}{s}$	5.9	6.8	6.1	8.4

Exhaust fan station:

Location 1	**1**	**3**	**5**
Vertical $\frac{mm}{s}$	2.5	3.2	3.9
Location 2	**2**	**4**	**6**
Radial $\frac{mm}{s}$	3.4	3.5	4.1

Table 2: Noise pressure level measurement

Raw-material mills station

Location 1	**1**	**3**	**5**
Raw-material mills station (dBA)	95	102	103
Cement grinding mills station (dBA)	104	107	104
Exhaust fan station (dBA)	89	93	

Kofa Factory:

Table 3:Vibration measurements

Raw –material mills stations

Location 1	**1**	**3**	**5**	**7**
Vertical $\frac{mm}{s}$	6.4	7.3	6.2	11.9
Location 2	2	4	6	8
Radial $\frac{mm}{s}$	6.1	6.5	7.4	9.2

Cement grinding mills station:

Location 1	**1**	**3**	**5**	**7**
Vertical $\frac{mm}{s}$	6.2	6.9	9.8	10.8
Location 2	**2**	**4**	**6**	**8**
Radial $\frac{mm}{s}$	7.3	7.2	7.9	9.3

Exhaust fan station:

Location 1	**1**	**3**	**5**
Vertical $\frac{mm}{s}$	3.4	4.3	4.7
Location 2	**2**	**4**	**6**
Radial $\frac{mm}{s}$	3.3	3.8	4.0

Table 4: Noise pressure level measurement

Raw-material mills station

Location 1	**1**	**3**	**5**
Raw-material mills station (dBA)	112	107	106
Cement grinding mills station (dBA)	106	105	108
Exhaust fan station (dBA)	92	91	

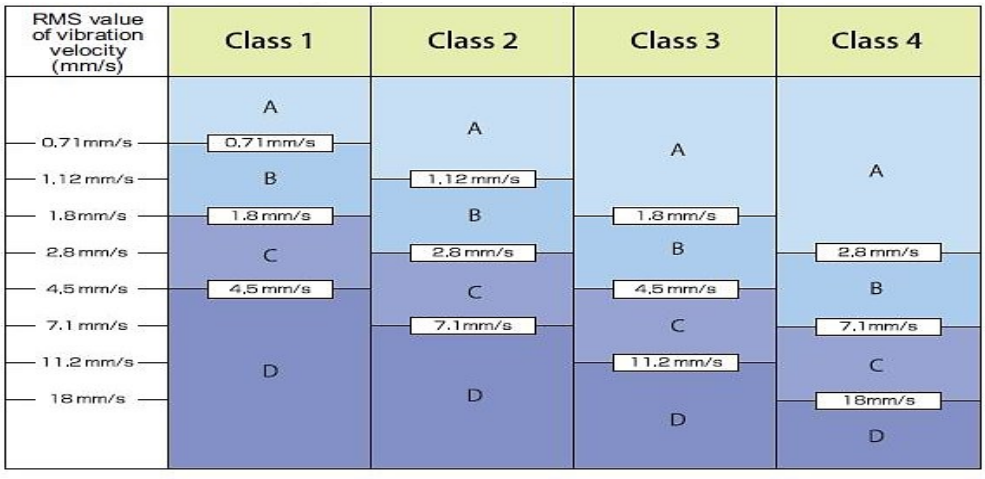


Table 5: Typical evaluation criteria zone vibration magnitude (2)

Machine groups

Class 1	Individual parts of engines or machines (typically electric motors of up to 15 kW) built in as parts of complete machines.
Class 2	Middle scale machines having no particular base (typically electric motors of 15 kW to 75 kW) and engines or machines (300 kW maximum) mounted on a rigid base.
Class 3	Large scale generating machinery or rotating machines mounted on a rigid base.
Class 4	Large scale generating machinery or rotating machines mounted on a comparatively soft rigid base (for example, turbo generator sets and gas turbines of output of 10 MW minimum).

Evaluation zones

Zone A	Vibration zone including vibration values of a new installed machine (Good)
Zone B	Vibration zone in which a machine can run long without any limitation (Acceptable)
Zone C	Vibration zone in which a machine cannot be expected to run long (Unsatisfactory)
Zone D	Vibration zone in which a machine may be damaged (Unacceptable)

Discussion

Before the analysis of our outcomes, it is essential to take a deep look at the concrete cycle that appeared in fig. 4:

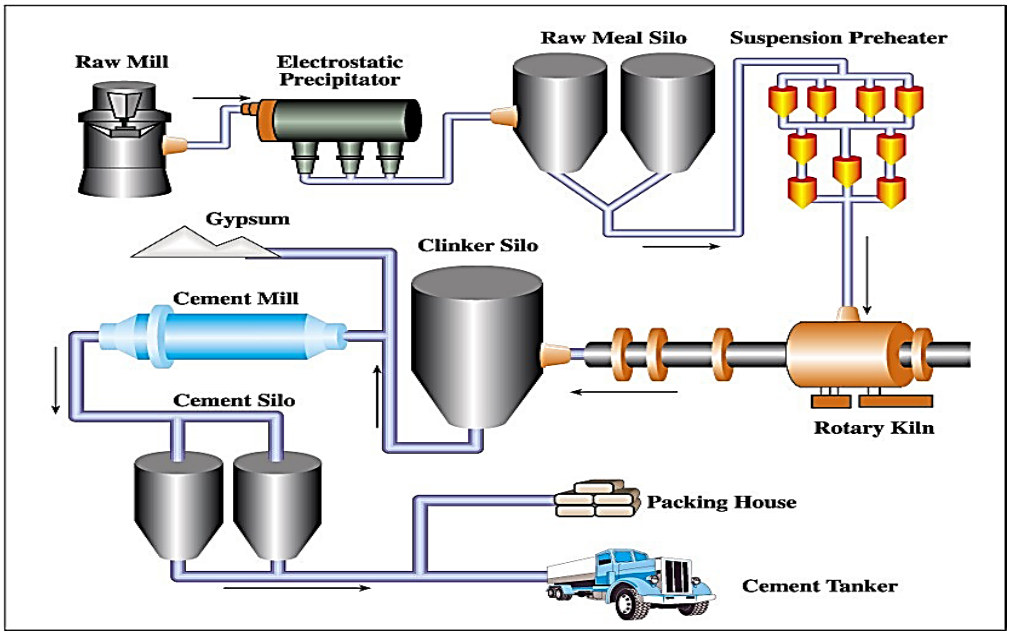


Fig 4: Cement production process.

Concrete plants have several turning machines moderns [3,4], commonplace apparatus unit comprises of numerous kinds of gear, for example, fans, siphons, blower, engine, drum. Notwithstanding the revolving oven, every hardware has a few courses, decreases gears, and so on which has a level of vibration level. The joined impacts of all units make commotion, likewise an ascent of bearing temperature [5].

The majority of the examination work done was focused on hardware vibration and clamor, the other some portion of work was on Buck lavish wonders [6], which makes vibration because of an absence of immaculate pounding. The work is never really commotion contamination and its impacts on human wellbeing [7], as the mechanical laws in numerous nations shield laborers from clamor contamination which surpasses 85dBA [8]

Back to tables 1,2 and 5 for the Najaf manufacturing plant Which speaks to average assessment standards of vibration size since the factories unit can be thought to be ≥ 75 KW a large portion of the readings at various areas can be accepted inside zone A, B aside from the fan area.
Crude materials factory and concrete granulating factories have readings that are situated in zone C which is a significant level. These because of unbalancing due to the steel balls inside the plants which squash the crude materials or the concrete.

The readings of this area ought to be rehashed time and time with care-full watching the bearing to dodge harms. Examinations should be possible by associating the vibration meter to the recurrence analyzer to assess the recurrence of the significant level vibration to explore the reasons for the high vibration level. For the exhaust fan vibration level, the majority of the areas of the readings inside zone A&B are worthy of commotion estimations. The majority of the readings are above 85dBA because of the pivot of the factories at 15 R.P.M causing a streamlined commotion likewise because the clamor produced by the steel balls smashes the crude materials and the concrete. The pound between the steel ball and the crude materials, the granulating concrete, and the streamlined clamor of the plants is a significant factor.
For Kofa factory, at areas 7,8 for both crude materials plants and concrete crushing factories has a significant level of vibration which is situated in zone C, the explanation referenced for Najaf is the equivalent for Kofa. Consideration ought to be paid for additional estimations and vibration examination is required. For the fumes fan, a large portion of the perusing situated at zone A, B. The majority of the readings were more than 85dBA were because of unbalancing pivoting which causes scouring the principle bearing by the pole, at last, streamlined clamor created by the rotation of Drum.

Conclusions

By the profound investigation of the estimations taken from the contemplated industrial facilities, we can finish up the accompanying:

1-Measurement of commotion power level and vibration of machines at shift times through their work can be accepted as a decent device and simple sign to foresee the status of machines.

2-To keep all pivoting units of concrete plants in a decent running condition estimation of commotion level and vibration levels ought to be estimated week after week as parts of support staff's obligations.

The most significant level of streamlined clamor created by the turn of Drum The exhaust fan readings were thought to be the least between all areas in the two manufacturing plants.

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