NCDOL N.C. Department of Labor	**NORTH CAROLINA DEPARTMENT OF LABOR**	**No.** 32-2
	OSH DIVISION	**Date:** 10/2009
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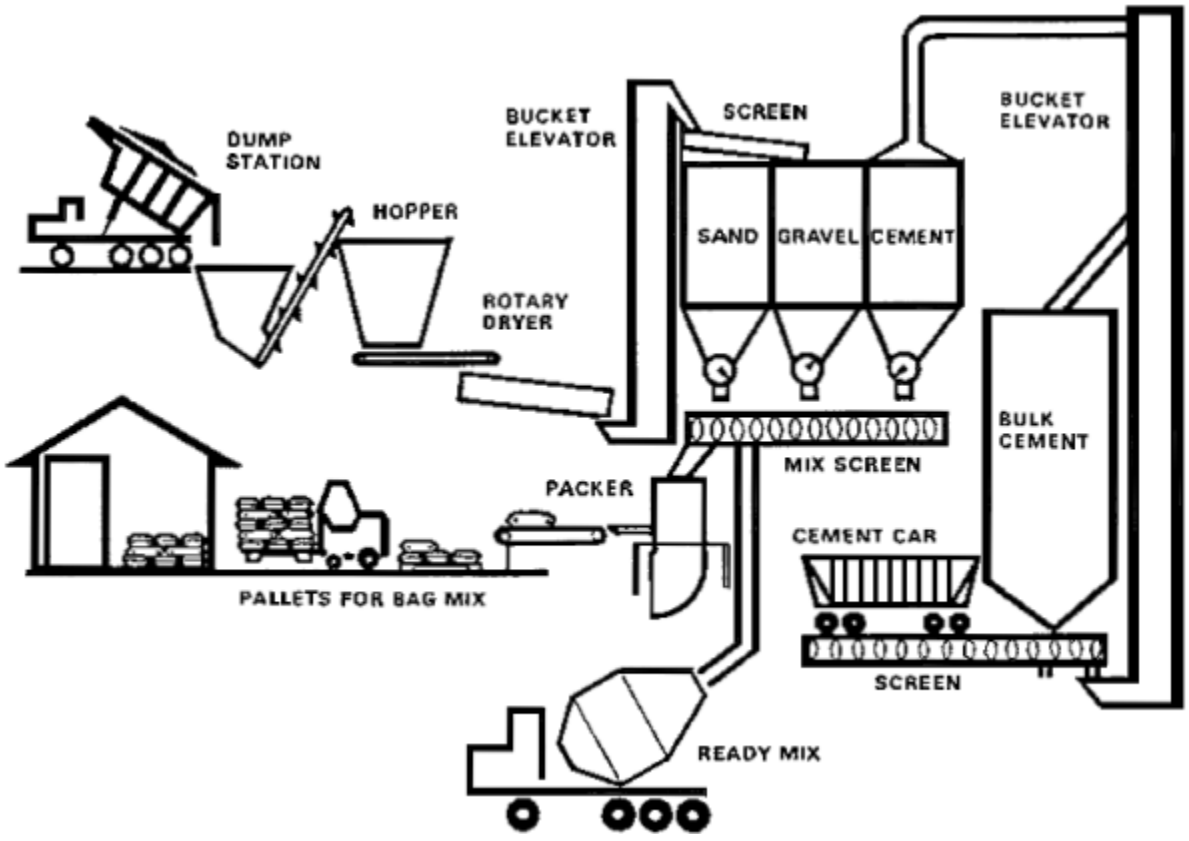
Industry: **Stone, Clay, Glass and Concrete Products**	Sub-Group: **Ready Mixed Concrete**
SIC: **3273**	NAICS: **327320**

PROCESS DESCRIPTION: Ready Mixed Concrete is produced by combining aggregate (natural and manufactured) cement, sand and water in proper proportions. Various methods are used two of which are shown below:

1) Stone, normally ¾ inch size, and washed sand are received by truck from source or stock piles, dumped into hopper and carried by conveyor to 30 ton overhead storage bins where the aggregate is weighed in maximum batches of 3 ½ cubic yards and carried by conveyor to the ready mix trucks. These materials are combined with cement and water and dumped into the truck mixer. The cement arrives by hopper car on railroad siding. The hopper car is placed over the pit and connected to a closed air cement unloading system with flexible connections. The cement is blown through a pipe to the overhead cement storage. At the point it is weighed and combined with the aggregate and water and dumped into the mixers. The ready mix trucks carry a maximum load of 10 cubic yards and deliver the concrete to construction sites or customers.

2) Sand and gravel are received from stockpiles by dump truck or brought to hopper or dump station by front end loader. After being dumped into the hopper the mixture is carried by elevator to another hopper, conveyed to a rotary dryer and thence to a bucket elevator. It is then screened, and deposited into sand and gravel storage bins, weighed, mixed, and carried by a screw conveyor to the packer where it is bagged, closed, and conveyed to tables or racks for movement by forklift truck to storage warehouse. Water is added by the customer or at destination in proper proportions. (See diagram.)

PROCESS FLOW:



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Hazards Analysis

Major Hazards			Other Hazards		
Location	**Item**	**Hazard**	**Location**	**Item**	**Hazard**
Sand, gravel and cement bins	Platforms, ladders, height	Falls	Throughout	Platforms and runways Aisle clearance and markings, silica dust Housekeeping	Falls, broken bones, bruises, death Crushing, fractures inhalation of silica Slipping, tripping and falling
Packer	Silica dust	Inhalation , silica exposure	Rotary dryer	Noise Falling material	Hearing loss Head injuries
Warehouse	Secure storage of material	Falling, crushing employees	Bucket elevator	Stairs, platform and runways	falls
Cement receiving	Rolling or moving rail cars Screw conveyor	Amputations, crushed limbs Crushed limbs	Screw conveyor	Nip points	Crushed limbs
Floors throughout	Silica dust	Inhalation, silica exposure	Packer	Automatic stitcher	Hand injuries
Storage yard	Powered Industrial trucks	Vehicles accidents, falling material, carbon monoxide exposure	Stacking table	Material handling	Crushing, fractures, death
Dump station or throughout	Open pits, ladders	Falls, broken bones, death	Shipping docks	Mechanical handling equip-wheel chocks and dock boards	Crushing, falls
			Cement storage	Ladders, platforms runways	Falls

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Key OSHNC Standards

Reference	29 CFR 1910 — General Industry Standards
Subpart D	Walking and working surfaces
Subpart E	Means of Egress
Subpart I	Personal protective equipment
Subpart O	Machinery and machine guarding
Subpart S	Electrical
1910.95	Occupational noise exposure
1910.146	Permit required confined space entry
1910.147	Control of hazardous energy (lock-out/tag-out)
1910.176	Materials Handling
1910.178	Powered industrial trucks
1910.1000	Air contaminants
1910.1200	Hazard Communication

Inspection Analysis

The inspection should begin in the receiving area where raw material, sand, aggregate, cement and manufactured or natural material is first received either by truck or rail. Check powered industrial trucks, walking and working surfaces. Guards or covers must be provided for open pits at dump station or hopper. Check for driver training, operations, and overhead guard on all powered industrial equipment in use. Ladders must be provided with cage, well, or ladder safety device for heights over 20 feet. Guarding of platforms, runways or open-sided floors at hoppers, elevators storage bins and warehousing is required. Check handrails/stair rails on numerous stairs. The screw conveyor, the most dangerous of all powered industrial trucks within warehouse and personal protective equipment where required. Moving parts of power transmission apparatus must be guarded. Check warehouse for proper stacking with items blocked, interlocked or limited in height to prevent falling and create hazards to personnel working below. Sufficient safe clearances must be allowed for aisles, through doorways, turns and passages. Dock boards must be secured by being anchored or equipped with devices which will prevent slipping. Wheel chocks are required for wheels on both ends of tank car being unloaded.

Other Pertinent Comments: