

**DIRECTORATE GENERAL BORDER ROADS****GENERAL MAINTENANCE INSTRUCTION NO. 245****ON OPERATION AND MAINTENANCE OF  
CONCRETE BATCHING AND MIXING PLANT (PAN TYPE)  
30 CUM/HR CAPACITY MAKE AKONA-HYCON MODEL AP-30****INTRODUCTION:**

(a) The Concrete Batching and Mixing Plant (Pan Mixer) 30 cum/hr capacity make Akona-Hycon model AP-30 provided with Boom Scrapper, Aggregate feed chute, Aggregate weighing batcher, Concrete mixer pan type, Cement Silo, Cement feeder system, Portal structure, water weigh system, Control Panel, Air Compressor & water pump, water pump and Electrical motors (power source) shall be powered by Gen set 125 KVA with Acoustic enclosure and fitted with Cummins engine developing 154 HP @ 1500 rpm. This plant is having the benefits of pan mixing technology, low polluting, fast mixing and low noise are the basic features that makes it special.

(b) This GMI gives the technical specification and know how on the operation, maintenance and repair procedure of Concrete Batching and Mixing Plant (Pan Mixer) 30 cum/hr capacity make Akona-Hycon model AP-30 to ensure maximum performance and safe/satisfactory operation. Compliance with procedure given in this GMI will enable to get desired maximum service from the plant.

(c) Maintenance of Concrete Batching and Mixing Plant (Pan Mixer) 30 cum/hr capacity make Akona-Hycon model AP-30 will lead to long life, trouble free operation and less frequent break downs and also to reduce maintenance cost. The periodic maintenance must be carried out according to the '**Periodic Maintenance Schedule**' described in this GMI. Daily care, inspection and Periodic Maintenance are essential for preventing troubles and accidents to ensure satisfaction and safe operation for prolonging the operating life of the plant. All information and instructions given in this GMI is based on the latest Operator's manual and service booklet provided by the firm.

**AIM:**

The instructions are issued as guidelines for general, preventive maintenance schedule and lubrication of Concrete Batching and Mixing Plant (Pan Mixer) 30 cum/hr capacity make Akona-Hycon model AP-30 manufactured by M/s Akona Engg (Pvt) Ltd for regular attention to keep the plant in good mechanical condition which must be strictly followed.

**ACTION BY:**

(a) User unit: To carryout periodic inspection and monitor regular/periodical maintenance as laid down in this instruction and record the tasks done in log book.

(b) Field Workshop:

(i) To carryout and monitor maintenance schedule and oil changes as per periodical maintenance laid down in the maintenance instructions and to check the record of maintenance including lubrication.

(ii) To advise the user unit in respect of any lapse noticed.

- (c) Mobile Maintenance Team: To ensure that proper maintenance is carried out and submit report accordingly to Task Force Commander and OC Wksp for their necessary action.

**DETAILS:**

This instruction includes the following aspects:-

- |    |  |                |
|----|--|----------------|
| a) | Operating Procedure                          | - Appendix 'A' |
| b) | Periodic Maintenance schedule                | - Appendix 'B' |
| c) | Technical Specification                      | - Appendix 'C' |
| d) | Recommended Lubricants with filling capacity | - Appendix 'D' |

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**OPERATING PROCEDURE****Start up procedure**

1. A Normal civil work foundation is required for making the plant stationary so that it could bear the affecting load and sustain the occurred vibration.
2. Materials like aggregate, sand, cement should be sufficient. Lack of material can cause reducing efficiency of the plant.
3. Special attention should be taken where the ground soil is soft. In case of soft soil, concrete should be used to make the soil hard otherwise ground will sink and it can cause misalignment.
4. Water pipe and power cable must be used with proper safety/shielding to avoid any damage that may occur during operation.
5. Ensure that no loose objects are placed on the mixer before restarting and ensure that no unauthorized personnel are close to mixer.
6. Ensure that all fuses are intact and free from dirt. It is important that fuses fit the plug in use.
7. Check the phases properly before starting, if phases are changed then system can move in opposite direction. Hence, change the phase accordingly.
8. Fill lubrication oil and check oil level indicator before starting compressor.
9. Operate for a few seconds and check the direction of rotation of compressor as operating reverse can damage the compressor.
10. Check the 'Emergency stop' button daily for proper functioning when starting the work.

**Safety precautions**

1. Plant shall be used only when in proper technical condition.
2. The plant is intended to produce concrete exclusively. Any other use different from or exceeding the purpose of plant is not considered suitable.
3. Before starting the work, the personnel in-charge of any activities relating to the use of plant must be familiar with the operation and safety rules.
4. Before operation check oil level and refill if insufficient.
5. Change lubricating oil within recommended time.
6. Before draining oil, remove oil filling cap and then oil drain cap in order to release air.

**During operation**

1. When electric source is ON, don't touch any part other than operating section.
2. In case of automatic operation, some times compressor suddenly rotates when pressure drops. It can cause injury by rotating parts or burn by hot parts

3. When ever there is abnormal sound and vibration during operation, stop the compressor immediately and check.
4. Operate drain valve only when pressure is there in air receiver.

### **Shut Down**

1. After job ends, switch OFF the starter.
2. Drain out condensate from the air receiver using manual drain valve.
3. Release compressed air from air receiver.
4. Close the inlet gate of cement screw conveyor after finishing day work to avoid from cement getting hardened up.

### **Salient features**

1. Boom scarper type design for ease of feeding continuously and making work easier.
2. Mixer is lined with replaceable Ni-hard liner plates from inside and thus mixer body does not come in contact with concrete and wear & tear of the body is avoided.
3. Electronic weighting system having load cells for aggregate, cement, water and Ad mixture.
4. PLC, microprocessor based control panel with integral computerized batch controller accommodates 99 different design mixes.
5. Complete plant can be transported in one 40 feet Trailer.
6. Plant operation is very silent & with clean surroundings
7. Blade mixing technology with planetary gear box.
8. Pass word locking facility,
9. Water and Ad mix pour by weight.
10. Pneumatically operated gate for aggregate, sand, cement, water and Ad mix.
11. Heat proof cabin for control panel.
12. Hydraulic discharge system
13. Cement is conveyed in an Italian vertical screw conveyor (Cement Silo), discharge in to the pan mixer, hence there is no loss of cement due to wind.
14. Italian vibrators provided to consume complete batch precisely.

### **Do's**

1. Check that the electrical supply is within correct voltage ( $415 \pm 5.1$  volt) and there is no single phasing.
2. All the connections should be right and tight.

3. All phases should be correct, check every day.
4. Plant should be properly earthed. Check earthen connections and resistance value every month.
5. Clean mixer every day after completing work if there is gap in concrete mixing then clean the mixer as soon as last batch is done.
6. Check the gap in tiles and adjust the tiles on the blade every week.
7. Check the wire rope condition every day.
8. Check the weighing system accuracy every week.
9. Ensure that sand is always kept in its a designed sector only as there is a vibrator at that gate.
10. Use vacuum cleaner for removing dust from panel board.
11. Always use protection suits and other protective equipments.
12. Observe and follow the safety and danger signs at the plant.
13. All the electric works must be performed by trained electrician only.
14. Ensure the connection cables should not be shortening anywhere.

### **Don'ts**

1. If any motor/gear box is not working properly don't just replace the same without analyzing the reasons & removing the basic fault.
2. Do not repair the mixer when power is on.
3. Do not allow unauthorized & untrained person to operate any part of the machine.
4. Do not allow any rod or big stone or bolt into the mixer as it will damage the tiles and blades. Also avoid inappropriate feeding of aggregate, it can also cause damage.
5. Do not allow screw conveyor to rotate in reverse direction in normal plant operation.
6. Make sure that all the connection of mixer and all the machinery must be disconnected while repairing or during maintenance.
7. The Mixer motor cannot start with full vessel. Do not stop the mixer until the vessel is totally or partly emptied.
8. Do not wear loose clothing while operating the plant.
9. Do not make any modifications, extension or rebuilding including welding and cutting of supporting structures of the plant which would cause damage/safety.
10. Do not Change/alter machine programs (soft ware) for programmable control systems.
11. Do not remove shielding covers/safety guards while plant is in operation.

**PERIODIC MAINTENANCE SCHEDULE**

Maintenance work	Service intervals in hours					Remarks
	Daily	50	200	1200	2400	
<b>Engine of Gen set</b>						
Eng oil level and condition	*					
Coolant/water level in Radiator	*					
Battery electrolyte level	*					
Eng oil/oil filter change	After every 250 hrs					
Fuel filter change	After every 250 hrs					
<b>Compressor</b>						
Check oil level	*					
Drain air receiver	*					
Check operating pressure of pressure switch		*				
Check safety valve operation		*				
Check for abnormal sound/vibration	*					
Check Looseness of bolts, nuts or screws			*			
Check belt for tension and damage			*			
Inspect Air intake filter			*		*	To be changed every after 2400 hrs
Change Compressor/Lub oil			*	*		
<b>Overall</b>						
Carbon on delivery pipe, inter cooler and joints check valve					*	Remove carbon or replace with new parts (Don't damage seated section during dismantling)
Carbon on valve seat and cylinder head					*	
Check valve				*		Check each part and replace it if there is any wear and damage on it. Apply heat resistance grease on O-ring.
Piston ring					*	When oil consumption increase abnormally, replace complete piston ring set.
Piston and cylinder					*	If sliding of piston and cylinder are damaged or worn, replace same.
Rotating & sliding section					*	Check bearing and pin of crank shaft for wear or abnormality. If abnormal replace with new parts.
Electrical parts					*	If contact point is worn or lamp burns out, replace.
Pipe & fitting, rubber hose, resin tube					*	If hardened or cracked, replace

Maintenance work	Service intervals in hours					Remarks
	Daily	50	200	1200	2400	
<b>Air receiver</b>						
Air receiver					*	Check shell and end plates for corrosion, leak or bulge, remove inspection blanking lid and clean.
Pressure gauge					*	Check that pointer of pressure gauge points to 0 when pressure is 0.
<b>Routine Check</b>						
Check emergency stop button first of all for proper functioning	*					
Check Cleaning of Pan Mixer	*					
Visual check up inside pan mixer	*					
Check Skip wire rope fasteners and clamps	*					
Check Limit switch response without load at start	*					
Visual check of pneumatic pipes and electric wire to avoid accident	*					
Check cement screw feeder and its hopper during initial starting, whether any unwanted piece is not there	*					
Cover the cement hopper and empty screw feeder at the time of shut down	*					
Check all the wire ropes visually	*					
Check oil level of all gear boxes	*					
Check electric supply (voltage and frequency)	*					
Check DG set meters and fuel	*					
Drain Bowl of Filter Regulator (FRC14)	*					
Check Compressor moisture		*				
Check FRC1 moisture (Filter regulator)		*				
Check LI Cylinder oiling (Lubricator)		*				
Check Screw feeder hanger bearing oiling and greasing		*				
Check Gear box motor out shaft oil seal		*				
Check Skip wire rope greasing		*				
Check Track roller greasing		*				
Check Pan discharge gate assembly		*				
Check Chipping inside pan mixer		*				
Check Feeding gates pillow bearing greasing		*				
Check All fasteners of plant		*				
Check wire rope of boom Scrapper cabin		*				

Maintenance work	Service intervals in hours					Remarks
	Daily	50	200	1200	2400	
Check front pulley set of scrapper cabin		*				
Check dust removal of control panel printer by vacuum cleaner		*				
Check electrical joints		*				
Check all weighing system		*				
Check and tight hyd cylinder end bolts and replace if defected		*				
Check springs of Scrapper cabin		*				
Clean water pump impeller		*				
Check and tighten pulley of compressor and check belt tension		*				
Material removal over air cylinder mounting		*				
Check all tiles and blades fasteners inside the pan mixer carefully		*				
Check all connections inside and outside the plant			*			
Check all the oil and greasing elements on regular basis			*			
Check Silo top ventilation hood and clean it.			*			
Check pressure relief valve			*			
Check all the seals and flanges			*			
Check all the pipes of air and water			*			
Piston and rings of the compressor cylinder			*			
Clean all the filters			*			
Lubricate Inlet top end bearing of screw feeder			*			
Refill oil in gear box and inside the blade arm housing			*			
All Gear box oil	Replace after 500 hrs first time and then after every 2500 hrs					
Hydraulic oil	Replace after every 500 hrs					
Pneumatic system (L1) oil	Replace after every two months					
Self lubricated ZZ type Bearings	Replace bearing after every 4800 hrs					
Winch system of Scrapper Cabin	Greasing to be done after every three months					

**TECHNICAL SPECIFICATION**

<b>Description</b>	Concrete Batching and Mixing Plant (Pan Mixer) 30 cum/hr capacity make Akona-Hycon model AP-30
<b>Engine</b>	
Make/Model/Type	Cummins Make water cooled Turbo charged diesel engine
Engine power output minimum	154 HP @ 1500 rpm
<b>Conc BMP AP-30</b>	
Capacity	30 cum/hr
Geometric. Volume	1.7 cum/hr
Ready Mix Concrete output/batch	Minimum 0.5 cum
Percentage of filling	40%
Batches per hour	Minimum 60 batches
Discharge height from GL	Discharge in T.M (3.60 mtrs and suitable for Transit mixer)
Theoretical capacity	240 cum
Boom scarper	In-built
Discharge gate opening system	Hydraulic
<b>Power Consumption</b>	
Pan Motor	30 HP
Skip motor	10 HP x 6 Pole
Screw feeder motor	15 HP
Scarper motor	15 HP
Water pump	2 x 5 HP (Kirloskar Make)
Air Compressor motor	3 HP
Chemical Motor	1 HP x 6 Pole
Vibrator	1 x 0.25 HP
Power pack motor	2 HP
Net consumption	87 HP
Power supply	415 Volt x 3 Phase x 50 Hz, 4 wire, 0.8 PF
DG Set	125 KVA
Alternator Make	Stamford (Self regulated and self excited type)
Reach of Boom Scrapper	Minimum 10.00 meter
Volume of the skip of Boom Scrapper	600 ltrs
Minimum Radial coverage of Boom	0 to 180 <sup>0</sup>

Aggregate feed chute	Consist of 4 segment gates, electro pneumatically operated
Feed chute height	Minimum 4.50 meters with provision to add intermediate pedestal so as to increase height by another 500 mm or more
Aggregate weighing batcher	Consist of a weigh frame mounted on 4 load cells each of 1100 kgs
Concrete mixer pan type input	750 ltrs or more
Cement Silo capacity	60 tons
Cement batch screw conveyor capacity	20 TPH
Cement feeding system capacity	Feeding 60 tons Silo at 25 TPH
Control Panel	PLC based control system complete with 99 recipe/mix design store
Air Compressor	30 CFM @ 8 Bar pressure capacity

**Appendix 'D'****RECOMMENDED LUBRICANTS WITH FILLING CAPACITY**

S/No	Item	Grade of Lubricant/oil	Filling Capacity	Remarks
a)	Engine	Eng oil 20W 40	20 ltrs	
b)	Gear box for Skip	Gear oil Grade 90	7 ltrs	
c)	Gear box for Pan Mixer	Gear oil Grade 90	8 Ltrs	
d)	Gear box for Boom Scrapper	Gear oil Grade 90	5 Ltrs	
e)	Blade Arm housing	Gear oil Grade 90	5Ltrs	
f)	Cement screw conveyor	Gear oil Grade 90	5 ltrs each for up & down	
g)	Power Pack Pan Mixer	Hydraulic oil	20 ltrs	
h)	All greasing points	Grease General purpose	--	

**Note:** Never mix two different brands of oil.