



**TEREX** | COMEDIL

# **CT-CTT City-CTT Crane**

## **General Maintenance**

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## **Chapter 8**



## 1

**MAINTENANCE OF THE CRANE**

## 1.1

**GENERAL**

Maintenance of CTT type cranes is an on-going process pursuing two basic aims: inspection and repair.



Inspection consists of all the appropriate operations required to locate, identify and assess problems which might weaken the safety and functionality of the crane.

Repair is directly related to the inspection carried out and, resolving each detected deficiency, restores the crane to its original configuration and state of operation.

CTT type cranes are equipped with some electro-mechanical and structural parts which, being exposed to dynamic stresses or wear through their utilization, may suffer from deterioration and/or failures.

These factors can lead to more serious malfunctions and jeopardize the operational safety of the crane if they are not controlled.

The best way to manage these factors and minimize their negative effects is to cut down the risks of failure and/or breakage respecting a maintenance program throughout the life cycle of the crane.

This permits to reduce costs of a long run maintenance and repair times.

Comedil has devised a detailed and rigid maintenance program tailored for CTT type cranes described in this chapter, which has to be scrupulously observed by the User.

The maintenance requirements specified herein are divided into: routine maintenance and special maintenance.

**ROUTINE MAINTENANCE:**

It covers most of the operations to be carried out by the designated personnel.

These include: check of lubricating systems for delivery of lubricant; most of the daily, weekly, monthly, quarterly, six-monthly and annual inspections; troubleshooting to determine crane deficiencies; functional/operational checks; repair of components, which do not require the services of specialized technicians; replacement of parts within the capabilities of local maintenance people.

**SPECIAL MAINTENANCE:**

These activities require the skill of highly trained and experienced technicians to perform maintenance tasks not normally accomplished by the crane operators or their supervisors.

Special maintenance requirements include: crane assembly, calibration of components, special operational checks and adjustments, rope replacement, electronic system repair and NDT testing (non-destructive test) of structural members and critical components.

**SPARE PARTS**

*Use only Comedil's original spare parts.*

*Using parts that do not meet the Manufacturer's specifications could be hazardous.*

*Such parts, exposed to stresses, could suddenly fail, thus resulting in injury to people and/or damage to property.*

*Do not wait until the wearing out of the crane's components before replacing them. Replacing parts as they begin to show wear gives longer service and avoids serious damages or delays thus eliminating expense of special maintenance operations.*

## 1.2 REQUIREMENTS FOR THE CRANE'S MAINTENANCE

**TECHNICAL ASSISTANCE** *The following inspection program has been studied to help people in charge of the crane find possible structural defects of the components, assembly defects and improper functioning of the systems.*

*Comedil has a world wide after-sales service network capable of providing rapid assistance to resolve any use and maintenance problems encountered with its cranes.*



The crane owner shall designate the people responsible for performing routine maintenance of the crane: normally, the crane operator or the job site supervisor.

In any case, people performing routine maintenance shall be thoroughly trained to accomplish these tasks.

There are many inherent dangers associated with crane's operations and maintenance. Inexperienced, untrained people shall not be entrusted to work on or operate a crane; doing so could lead to serious injury to persons at the job site, death, and/or equipment damage.

## 1.3 PRECAUTIONARY MEASURES



Before major adjustments or repairs are started, the following precautionary measures shall be taken.

- A) Make sure that the crane is idle, that there is no load hanging from the hook and that the main or emergency switch is open and locked in the *open* position, except for test purposes.
- B) If the crane is travelling-type, move it to a location where it will cause the least interference with other cranes and operations in the area.
- C) Warning or *Out of Order* signs shall be placed by appointed personnel.
- D) All controllers should be at the *off* position.
- E) Where other cranes are in operation on the same runway, rail stops or other suitable means shall be provided to prevent interference with the idle crane.
- F) Allow components subject to thermal heating to cool completely before starting maintenance on them.
- G) Make sure that electrical boxes cannot be activated by people other than technicians performing maintenance on the crane's electrical and electronic systems.
- H) Functional/operational checks, which require maneuvering of the crane, shall be done under the supervision of appointed people.
- I) Having to remove any safety device to perform a maintenance task, ensure that adequate measures are taken to reduce the associated dangers to people to a minimum before beginning maintenance.



- J) Never disconnect or remove hydraulic system components when they are pressurized.
- K) Always use proper maintenance equipment.
- L) Make sure that people appointed with maintenance are always equipped with the personal safety equipment as required by the European Regulation 89/391/EEC.
- M) After adjustments or repairs have been made, the crane shall not be returned to service until all guards have been reinstalled, limit and protective devices reactivated and maintenance equipment removed. Warning or *Out of Order* signs shall be removed by appointed personnel only.

## 1.4 LIST OF THE CRANE'S SYSTEMS/COMPONENTS SUBJECT TO MAINTENANCE

To facilitate the routine maintenance operations, CTT type crane's systems/components have been shared into three main groups of intervention.

They associate several crane components and sub-groups in a manner which makes them ideal for use as a checklist.

The groups are:

- I) **STRUCTURES**
- II) **DRIVE ASSEMBLIES**
- III) **ELECTRICAL / ELECTRONIC SYSTEMS**

Technicians should refer to these groups to carry out the daily, weekly, monthly, quarterly, six-monthly and annual inspections.



If further details are needed to visualize and understand some maintenance/inspection requirements, refer to the pictures contained in this manual or contact Comedil's Engineering Department.

### List of the crane groups subject to maintenance

#### I) **STRUCTURES**

- A) Foundation, base plates and undercarriage
- B) Rail tracks ("T" installation)
- C) Tower sections, ladders, platforms and slewing ring support
- D) Jib, counterjib, counterjib tie-bars, ballasts, control cab, jib ties, handrails and safety ropes.

#### II) **DRIVE ASSEMBLIES**

- A) Slewing unit
  - 1) *Slewing ring*
  - 2) *Motors*
  - 3) *Reduction gears*
- B) *Travelling unit ("T" installation)*
  - 1) *Bogies*
  - 2) *Reduction gears*
  - 3) *Wheels*



## C) Hoisting unit

- 1) *Winch*
- 2) *Wire ropes*
- 3) *Winch brakes*
- 4) *Limiters*
- 5) *Hoist block*

## D) Trolley traversing unit

- 1) *Winch*
- 2) *Sheaves*
- 3) *Wire ropes*
- 4) *Brakes*

**III) ELECTRICAL / ELECTRONIC SYSTEMS**

## A) Connectors and electric cables

## B) Control cab

## C) Slip ring (if provided)

## D) Limit switches

- 1) *Hoisting*
- 2) *Trolley traversing*
- 3) *Slewing (if provided)*
- 4) *Travelling ("T" installation)*

## E) Limiters

## F) Proximity sensors

## G) Control units in the cab

## H) Cooling fans







## 1.6 PERIODICAL INSPECTIONS

There are six routine inspections required for the CTT type crane:

- 1) **Daily Inspections:** to be performed before taking the crane into operation;
- 2) **Weekly Inspection:** to be performed every week on the same day.  
Should the crane not be used for more than one week, then carry out both weekly and daily inspections the day the crane goes back into operation;
- 3) **Monthly Inspection:** to be performed every month on the same day.  
Should the crane not be used for more than one month, then carry out monthly, weekly and daily inspections the day the crane goes back into operation;
- 4) **Quarterly Inspection:** to be performed every 3 months on the same day.  
Should the crane not be used for more than 3 months, then carry out quarterly, monthly, weekly and daily inspections the day the crane goes back into operation;
- 5) **Six-monthly Inspection:** to be performed every 6 months on the same day.  
Should the crane not be used for more than 6 months, then carry out six-monthly, quarterly, monthly, weekly and daily inspections the day the crane goes back into operation;
- 6) **Annual Inspection:** to be performed on their due date regardless of the crane use over the year.

The inspection criteria and requirements listed hereon are enumerated under the three systems/ components breakdown groups outlined in paragraph 1.4.



**A record of routine and special maintenance interventions shall be kept on the “TEST RECORD BOOK”.**

### 1.6.1 Daily inspections

DAILY INSPECTIONS		
GROUPS OF INTERVENTION	TYPE OF INSPECTION	NOTES
	General conditions of the crane	
	Fixing of ladders, platforms, safety rails, general safety devices, operators safety devices	
	Travel tracks (only for travelling cranes)	

**Table 1.6.1**



## 1.6.2 Weekly inspections

WEEKLY INSPECTIONS		
GROUPS OF INTERVENTION	TYPE OF INSPECTION	NOTES
STRUCTURES	Correct assembly of structure's connection systems	
	Cabin's condition (if provided))	
DRIVE ASSEMBLIES	Lubrication of mechanisms which require it	
	Lubrication of slewing ring's rotating system and its relative teeth and pinions	
	Lubrication of snub pulleys	
	Presence of security and protection devices	
	Correct assembly and pin-connections of components	
	<u>Hoist winch</u> : visual inspection, running test and inspection of pads wear and tear	
ELECTRICAL AND ELECTRONICAL SYSTEMS	Inspection of integrity and correct connection of supply cable (make sure that the phases are connected correctly)	
	Visual inspection of the integrity of the electrical and electronical connections	

Table 1.6.2


**1.6.3 Monthly inspections**

<b>MONTHLY INSPECTIONS</b>		
<b>GROUPS OF INTERVENTION</b>	<b>TYPE OF INSPECTION</b>	<b>NOTES</b>
STRUCTURES	Accurate visual inspection of welding of base plates, undercarriage, tower, slewing ring support, jib tie bars and bogies (only for travelling crane)	
	Presence and integrity of all provided plates	
	Lubrication of all connection pins	
DRIVE ASSEMBLIES	Inspection of torque wrench setting of fixing bolts of the slewing ring (first intervention)	
	Inspection of the anchoring of the gearmotors to the frames	
	Restoration of the oil level of the reduction gear	
	Inspection of sheaves and their relative bearings	
	Inspection of the general conditions of the hoisting groups	
	<u>Winches</u> : inspection of the working order of brake discs and component's wear and tear, registration of brake pads	
	<u>Ropes</u> : general inspection and lubrication	
	Inspection of correct tensioning of trolley traversing rope	
	Inspection of lubrication of trolley traversing rope's jib point swivel	
ELECTRICAL AND ELECTRONICAL SYSTEMS	Inspection of wear and tear of the components of the electrical box	
	Cleaning of the inside of the panels and electrical boxes	
	Cleaning of the cooling fans and electric motors	
	Inspection of general conditions of electric boxes, tower, cabin and counterjib	
	Inspection of integrity and efficiency of the motors	

**Table 1.6.3**

#### 1.6.4 Quarterly inspections

QUARTERLY INSPECTIONS		
GROUPS OF INTERVENTION	TYPE OF INSPECTION	NOTES
STRUCTURES	Accurate visual inspection of the weldings of the jib and the counterjib	
DRIVE ASSEMBLIES	Inspection of torque wrench setting of fixing bolts of the slewing ring (subsequent interventions)	
	Accurate visual inspection of the weldings of the trolleys and hoist blocks	
ELECTRICAL AND ELECTRONICAL SYSTEMS	Inspection of grounding's connections	

Table 1.6.4

#### 1.6.5 Six-monthly inspections

SIX-MONTHLY INSPECTIONS		
GROUPS OF INTERVENTION	TYPE OF INSPECTION	NOTES
STRUCTURES	Accurate visual inspection of weldings of ladders, platforms and protections	
	Visual inspection of the structural integrity of the ballasts and their lock pins	
DRIVE ASSEMBLIES	Inspection of wear and tear of sheaves and bearings	
ELECTRICAL AND ELECTRONICAL SYSTEMS	Inspection of wear and tear of windscreen wipers of cabin's glass	

Table 1.6.5

## 1.6.6 Annual inspections

ANNUAL INSPECTIONS		
GROUPS OF INTERVENTION	TYPE OF INSPECTION	NOTES
STRUCTURES	Execution of non-destructive tests on weldings of base plates, undercarriage, tower, jib, slewing ring support, counterjib, jib/counterjib tie-bars and bogies (only for travelling cranes)	
	Inspection of wear and tear of jib's pin connections	
	Removal of possible deposit and oxidisation from the bolts connecting the base plates to the base tower section	
	Execution of anticorrosion treatment and painting of the crane's oxidized surfaces	
	Inspection of readability of ballast identification plates	
	Inspection of the conditions of fixing systems of the crane	
DRIVE ASSEMBLIES	Inspection of wear and tear of teeth, pinions and spheres of the slewing ring	
	Setting of travelling brakes (only for travelling cranes)	
	Inspection of wear and tear and integrity of the travelling tracks and of the travelling wheels with lubrication of the latter (only for travelling cranes)	
	Inspection of the corrosion condition of the external structural components	
	Inspection of wear and tear and integrity of main bearings and possible treatment of component's corrosion	
	Execution of non-destructive tests on the winch's brake discs and on tie-bars weldings	
	Treatment for possible corrosion of tie-bars connection and possible lubrication	
	Replacement of damaged fixing devices	
ELECTRICAL AND ELECTRONICAL SYSTEMS	Inspection of correct setting of the electrical systems and possible request for special maintenance	
	Treatment for corroded components	

Table 1.6.6