केवल कार्यालयीन उपयोग हेतु
For official use only

सत्यमेव जयते

भारत सरकार – रेल मंत्रालय

Government of India – Ministry of Railways

वरिष्ठ खंड अभियंता (कार्य) हेतु शक्ति चालित औजार

POWER OPERATED TOOLS FOR SSE (WORKS)



कैमटेक/2010/सि/2010/पी ओ टी/1.0

CAMTECH/2010/C/POT/1.0

दिसम्बर – 2010 / December– 2010

अअमासंRDSO
रेल अग्रदूत Transforming Railways

An ISO 9001-2000 Certified Organisation
उत्कृष्ट अनुरक्षण प्रौद्योगिकी केन्द्र
Excellence In Maintenance

Indian Railways
Centre for Advanced Maintenance Technology

महाराजपुर, ग्वालियर – 474 005 (भारत)

Maharajpur, Gwalior - 474 005 (INDIA)

✆ : 0751 - 2470869 & Fax : 0751 - 2470841

वरिष्ठ खंड अभियंता (कार्य) हेतु शक्ति चालित औजार

POWER OPERATED TOOLS FOR SSE (WORKS)

प्राक्कथन

वर्तमान में रेल के अभियांत्रिकी विभाग में कार्यरत कारीगर पुराने और समयातीत औजारों के साथ ही कार्य कर रहे हैं। इससे उनकी उत्पादकता प्रभावित होती है। शक्ति चालित औजारों के उपयोग से कारीगरों की उत्पादकता बढ़ायी जा सकती है।

मुझे यह जानकर खुशी है। कि केमटेक के अभियांत्रिकी विभाग ने एक हस्त पुस्तिका तैयार की है एवं उसमें विभिन्न विधाओं के कारीगरों के उपयोग में आने वाले शक्ति चालित औजारों का विवरण एवं उसके उपयोग बताये गये हैं।

इस पुस्तक में शक्ति चालित औजारों के उपयोग में क्या सावधानियॉ रखनी चाहिये, यह भी बताया गया है।

मैं यह उम्मीद करता हूॅ कि यह पुस्तक कारीगरों की क्षमता एवं दक्षता बढ़ाने में सहायक होगी।

कैमटेक, ग्वालियर
31, दिसम्बर 2010

एस. सी. सिंघल
कार्यकारी निदेशक

FOREWORD

Presently the artisan staffs of engineering department are working with old and obsolete tools. This is affecting the productivity of artisans. Use of Power operated tools improves the productivity of the workers.

I am happy to note that the civil engineering branch of CAMTECH has been made the handbook covering Power operated tools for various trades of Civil Engineering and their applications. This book also contains safety precautions for using power operated tools.

I hope this handbook will be quite useful for improving the efficiency and performance of artisan staff of Civil Engineering department.

CAMTECH, Gwalior **(S.C.Singhal)**
31-12- 2010 **Executive Director**

भूमिका

स्टेशन इमारतें, कार्यालयों, आवासीय तथा अन्य भवनों के रूप में भारतीय रेल बृहद एवं विस्तृत रूप से फैली हुई है।

उपरोक्त इमारतों का अनुरक्षण कार्य वरिष्ठ खण्ड अभियन्ता (कार्य) द्वारा कराया जाता है। प्रत्येक वरिष्ठ खण्ड अभियन्ता के पास निर्धारित संख्या में विविध विधाओं के कारीगर जैसे बढ़ई, मिस्त्री, फिटर, प्लम्बर एवं लोहार आदि कार्य करते हैं। वर्तमान में रेल परिसम्पति में बढ़ोत्तरी एवं उपलब्ध कारीगरों की संख्या दिनोंदिन घटती जा रही है। कारीगरों की कमी को ध्यान में रखते हुये यह आवश्यक हो जाता है कि उपलब्ध कारीगरों की ही क्षमता बढ़ायी जाये।

अभियात्रिकी विभाग मे कार्यरत कारीगरों की उत्पादकता उनके द्वारा अच्छे शक्ति चालित औजारों के उपयोग से बढ़ायी जा सकती है।

शक्ति चालित औजारों के उपयोग से प्रति व्यक्ति प्रतिफल बढ़ाया जा सकता है। पुनः कार्य या निरस्तीकरण को समाप्त किया जा सकता है। कारीगरों की सुरक्षा एवं कार्य की गुणवत्ता बढ़ायी जा सकती है इस कारण से अनुरक्षण लागत में कमी एवं कार्य क्षमता एवं उत्पादकता बढ़ायी जा सकती है। विभिन्न प्रकार के औजार बाजार में उपलब्ध हैं, परन्तु इस पुस्तक में उनमें से कुछ सन्दर्भ हेतु लिये गये हैं।

उत्पादकों की सूची मात्र तत्काल सन्दर्भ हेतु है। यह कोई वेण्डर सूची नहीं है।

इस पुस्तक का ध्येय विविध कारीगरों के उपयोग में आने वाले शक्ति चालित औजारों की जानकारी एवं उनके उपयोग बताना है।

इस पुस्तक को अभियात्रिकी विभाग में उपयोगी एवं त्रुटिहीन बनाने हेतु यथा सम्भव प्रयास किया गया है यदि कोई कमी रह गई हो तो केमटेक प्रशासन को सूचित करें।

यह पुस्तिका रेल्वे बोर्ड, आर डी एस ओ, भारतीय रेल कार्य संहिता इत्यादि द्वारा जारी निर्देशों का किसी भी प्रकार से विस्थापन नहीं करती। यह पुस्तिका वैधानिक नहीं है, इसमें दी गई जानकारी का उद्देश्य केवल मार्गदर्शन है। इसमें दिये गये अधिकतर ऑकडे, चित्र एवं दी गई जानकारी किसी न किसी रूप में विभिन्न पुस्तकों एवं अन्य छपी हुई सामग्री में उपलब्ध है।

हम अपने पाठकों के बहुमूल्य सुझावों का स्वागत करते हैं ताकि इस पुस्तक को और अधिक सुधारा जा सके।

कैमटेक, ग्वालियर
31, दिसम्बर – 2010

एस.के.सक्सेना
उप निदेशक/सिविल

PREFACE

Indian Railways having a lot of station buildings, offices, residential accommodation is a vast network spread all over India.

Maintenance of above assets should be carried out by the SSE (Works). Each SSE has a limited no. of artisans and workers like carpenter, fitter, plumber, mason and black smith etc. Now-a-days, the strength of workers/ artisans is reduced and civil assets have grown rapidly. To accommodate the shortage of labour it is essential to increase the performance of the available labour.

The productivity of artisan staff of Civil Engineering department of Indian Railways can be improved by providing the better power operated tools.

By using power tools the per capita output increases; the rejection or rework is practically eliminated; the quality of workmanship is improved; and worker safety is enhanced, resulting in reduction in cost of maintenance and increased job efficiency/productivity as well as availability. So many tools are available in the market but in this book a few tools are described for reference only. The list of the manufactures are not a vender list, it is just for ready reference.

Objective of this book is to provide information about the power operated tools and their applications for various trades of artisan.

Every effort had been made to make this book useful to civil engineering personnel. Though, every care has been taken in preparing this handbook, any error or omission may please be brought to the notice of IRCAMTECH/Gwalior

This hand book does not supersede any existing information from Railway board, IRWM, RDSO etc. *This hand book is not statutory and contents are for the purpose of guidelines only.* Most of the data, sketch and information mentioned herein are available in some form or the other in various books or printed matters.

We welcome valuable suggestions from our readers for further improvement.

CAMTECH/ Gwalior **(S.K.Saxena)**

31, December-2010 **Dy. Director/Civil**

वि ाय – सूची

शीर्षक क्रमांक	विवरण	पृष्ठ क्रमांक
-	*प्राक्कथन*	***i***
-	*भूमिका*	***ii***
-	*विषय सूची*	***iii***
-	*संशोधन पर्चियों का प्रकाशन*	***iv***
1.0	**बढ़ई के द्वारा उपयोग किये जाने वाले शक्ति चालित औजार**	**1**
1.1	बहुउद्देशीय रोटरी ड्रिल	1
1.2	बहुउद्देशीय प्लानर	2
1.3	जिग शॉ	3
1.4	रॉउटर	4
1.5	वृत्तीय आरी (सर्क्यूलर शॉ)	5
1.6	बहुउद्देशीय आरी	6
1.7	चेन शॉ	6
2.0	**मिस्त्री के द्वारा उपयोग किये जाने वाले शक्ति चालित औजार**	**7**
2.1	इमपेक्ट ड्रिल	7
2.2	मार्बल/टाइल कटर	7
2.3	बस्टर	8
2.4	कंक्रीट कटर	9
2.5	कंक्रीट वाइब्रेटर	9
3.0	**लोहार, प्लम्बर एवं फिटर के द्वारा उपयोग किये जाने वाले शक्ति चालित औजार**	**10**
3.1	ब्लोअर/डस्टर	10
3.2	हॉट एअर गन	10
3.3	मिनी ग्राइंडर	11
3.4	स्ट्रेट ग्राइंडर	12
3,5	बहुउद्देशीय आरी	12
3.6	निबर्लस	13
3.7	बैंच ग्राइंडर	13
4.0	**अन्य शक्ति चालित औजार**	**14**
4.1	बैटरी से चलने वाली ड्रिल	14
4.2	ग्रास कटर/लॉन मूवर	15
4.3	वेक्यूम क्लीनर	15
4.4	निकासी पम्प	15
4.5	चलित जनरेटर	16
4.6	चलित घरेलू औजारों की किट	17
5.0	**विभिन्न विधाओं के द्वारा उपयोग किये जाने वाले परम्परागत औजार**	**19**
6.0	**सुरक्षा निर्देश एवं दोष निवारण**	**20**
	नोट्स	*22*

CONTENT

Heading No.	Description	Page No.
-	*Foreword*	*I*
-	*Preface*	*II*
-	*Content*	*III*
-	*Correction Slip*	*IV*
1.0	**Power tools used by Carpenter**	**1**
1.1	Multi purpose rotary drill	1
1.2	All Purpose Planner	2
1.3	Jig Saw	3
1.4	Router	4
1.5	Circular Saw	5
1.6	All Purpose Saw	6
1.7	Chain Saw	6
2.0	**Power Tools used by Mason**	**7**
2.1	Impact Drill	7
2.2	Marble/Tile cutter	7
2.3	Busters	8
2.4	Concrete Cutter	9
2.5	Concrete Vibrator	9
3.0	**Tool for Black smith, plumber & fitter**	**10**
3.1	Blower/Duster	10
3.2	Hot Air Gun	10
3.3	Mini Grinder	11
3.4	Straight Grinder	12
3,5	All Purpose Saw	12
3.6	Nibblers	13
3.7	Bench Grinder	13
4.0	**Other power tools**	**14**
4.1	Battery Operated Drill	14
4.2	Grass Cutter/Lawn Movers	15
4.3	Vacuum Cleaner	15
4.4	Dewatering Pump	15
4.5	Portable Generator	16
4.6	Portable Home Kit	17
5.0	Traditional Tools used by Trades	**19**
6.0	Safety Instructions & Trouble Shooting	**20**
	Notes	*22*

संशोधन पर्चियों का प्रकाशन

इस लघु पुस्तिका के लिये भविष्य में प्रकाशित होने वाली संशोधन पर्चियों को निम्नानुसार संख्यांकित किया जायेगा।

कैमटेक/सि/2010/पी ओ टी/1.0 सीएस # XX दिनांक----------

जहॉ "XX" सम्बन्धित संशोधन पर्ची की क्रम संख्या है (01 से प्रारम्भ होकर आगे की ओर)

प्रकाशित संशोधन पर्चियॉ

क्र.सं.	प्रकाशन की तारीख	संशोधित पृष्ठ संख्या तथा मद संख्या	टिप्पणी

ISSUE OF CORRECTION SLIPS

The correction slips to be issued in future for this handbook will be numbered as follows:

CAMTECH/2010/C/POT/1.0/CS.# XX date ….....

Where "XX" is the serial number of the concerned correction slip (starting from 01 onwards).

CORRECTION SLIPS ISSUED

Sr. No. of C.Slip	Date of issue	Page no. and Item No. modified	Remarks

Go to index

वरिष्ठ खंड अभियंता कार्य हेतु शक्ति चालित औजार
POWER OPERATED TOOLS FOR SSE (WORKS)

The productivity of our artisan staff has been poor and one of the reasons i.e. their working with obsolete tools. Now a day, modern power tools are available in the market. By using power tools the per capita out put increases, the rejection or rework is practically eliminated. The quality of workmanship is improved and worker safety is enhanced, resulting reduction in the cost of maintenance and increase in job efficiency/ productivity.

1.0 बढ़ई के द्वारा उपयोग किये जाने वाले शक्ति चालित औजार
Power tools used by carpenter

1.1 बहुउद्देशीय रोटरी ड्रिल / Multi purpose rotary drill
(This tool may be used by Mason, Plumber and fitter also.)





उपयोग / **Application :**

- Drilling in wood for fixing tower bolts, hinges, pad locks etc. to fix and maintain.
- Drilling in doors to fix locks.
- Metal drilling.
- Drilling in walls for fixing bathroom fittings, wash basins, mirror etc., in quarters and service buildings.

उपसहायक / **Accessories:** Chuck key, Side handle.

व्यवहारिक मार्गदर्शन / **Operational Guidance:** As per operation manual supplied by manufacturer.

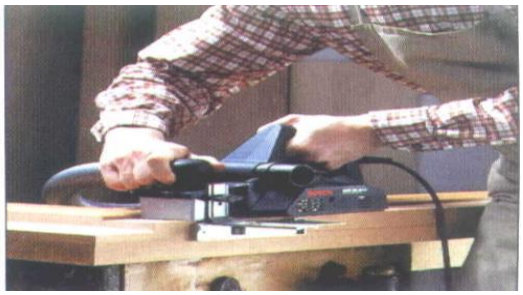




1.2 बहुउद्देशीय प्लानर / All Purpose Planner







उपयोग / Application:

- For planning wood work and other interior repairs and to make planning an effortless task for wood workers.

उपसहायक /Accessories: Reversible Carbide blades, rebate width stop, rebate depth stop.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.

1.3 जिग शॉ / Jig Saw



उपयोग / Application:

- For all purpose wood cutting in curves and straight directions. It is a reliable tool of craftsmen for straight and especially curve cutting in wood and even aluminium, plastic and steel.

उपसहायक एवं लक्षण /Accessories & Features:

- Extensive range of saw blades for different surfaces.
- Adjustable 4 step pendulum action for faster cutting in all materials.
- SDS system for quick saw blade change.
- Adjustable pivoting for angle cuts up to 45 and for cutting close to edges.
- Anti splintering device for clean cuts.
- Roller guide for precise cutting.
- Adjustable chip blower for clear view of cutting line.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.





1.4 रॉउटर / Router



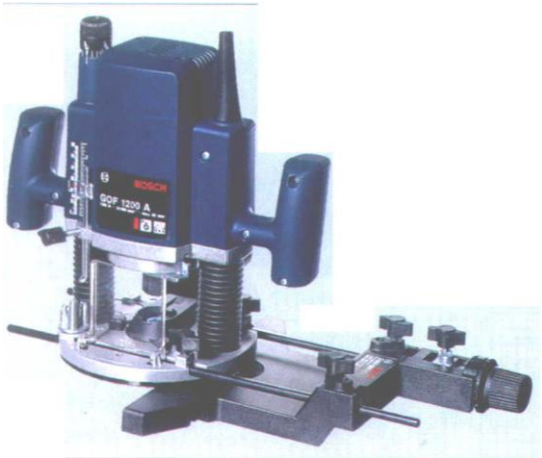
उपयोग / Application:

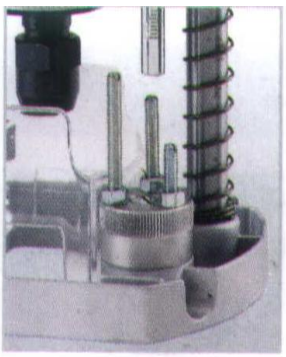
- For all edge routing works and also jointing works in wood, Nuwood panels etc. Also for making exquisite patterns and shaping wood and furniture.

उपसहायक एवं लक्षण / Accessories & Features:

- Precise routing with exact depth setting in 1/10 mm increments.
- Spindle lock for simple router bit changes.
- Light and rust proof, stable aluminium base plate.
- Rubber sleeves for protection against dust.
- Over 100 types of router bits are also available.

व्यवहारिक मार्गदर्शन / Operational guidance: As per working manual supplied by manufacturer.







1.5 वृत्तीय आरी (सर्क्यूलर शॉ) / Circular Saw
(This tool may be used by Plumber and fitter also).



उपयोग / Application:

- Used for straight cutting applications in wood works. Circular saw is ideal if thickness and cutting lengths are more.

उपसहायक एवं लक्षण /Accessories & Features:

- Different cutting blades available with varying nos. of teeth for woods of different thickness.
- Exact setting of cutting depth possible.
- Adjustable cutting depth angle up to 45^0.
- Parallel cut guide.
- Automatic spring locked safety guard.
- Spindle lock for fast and easy blade change.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.





1.6 बहुउद्देशीय आरी / All Purpose Saw
(This tool may be used by Plumber and fitter also).



उपयोग / **Application:**

- Very useful for cutting metal, as well as in wood also. Can be used by carpenters for small cutting/finishing work in wood/plywood etc.

उपसहायक एवं लक्षण /**Accessories & Features:**

- Blades of different sizes.

व्यवहारिक मार्गदर्शन /**Operational guidance:** As per working manual supplied by manufacturer.

1.7 चेन शॉ / Chain Saw



उपयोग / **Application**: For cutting of tree etc.

***

Go to index

2.0 मिस्त्री के द्वारा उपयोग किये जाने वाले शक्ति चालित औजार POWER TOOLS USED BY MASON

2.1 इमपेक्ट ड्रिल / Impact Drill

(These tools may be used by Plumber, fitter and black smith also.)



उपयोग / **Application:**

- To drill holes for fixing sanitary fittings, anchoring various hooks and also for electrical fixings.

उपसहायक /**Accessories:** Auxiliary handle, depth stopper, Chuck key.

व्यवहारिक मार्गदर्शन /**Operational Guidance:** As per operation manual supplied by manufacturer.



2.2 मार्बल / टाइल कटर / Marble / Tile Cutter



उपयोग / Application:

- For precision cutting of marble, tile and concrete etc. in flooring and tiling work.

उपसहायक एवं लक्षण /Accessories & Features:

To be supplied by manufacturers as part of standard supply list. Some of the features are as under.

- Water cooling system controlled through self locking tap lever.
- Variable adjustable cutting depth up to 34 mm for effortless cutting even in thick materials.
- Clear view of cutting line, for accurate in all positions.
- For wet and dry cutting both useful.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.

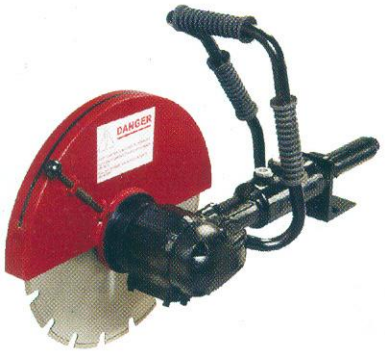


2.3 बस्टर/Busters



उपयोग / Application: Excellent for medium to heavy concrete demolition, cutting large rivets and bolts and other cutting and repairing operations.

2.4 कंक्रीट कटर / Concrete Cutter/Saw



उपयोग / **Application**: Concrete cutter/ saw are designed to cut variety of surface including concrete, asphalt and stones.

2.5 कंक्रीट वाइब्रेटर / Concrete Vibrator



उपयोग / **Application**: Used for pours of low slump concrete in columns, footings, slabs and walls etc. Different types of vibratos are available in the market.

***

Go to index

3.0 लोहार, प्लम्बर एवं फिटर के द्वारा उपयोग किये जाने वाले शक्ति चालित औजार /Power tools used by the blacksmith, plumber & fitter

3.1 ब्लोअर/डस्टर /Blower / Dust Extractor



उपयोग / **Application:**

- It is versatile blower and used for smithy blowing purposes. Suction mode is also possible. It can also be used for cleaning of pipe joints, valves etc.

आवश्यक उपसहायक एवं लक्षण /**Required accessories & Features:**

- Blowing and suction, both operations can be done. Lock on switch for continuous operations are provided. Dust bag for use in suction mode as standard accessory provided.

व्यवहारिक मार्गदर्शन /**Operational guidance:** As per working manual supplied by manufacturer.

3.2 हॉट एयर गन/ Hot Air Gun/Hot Air Blower



उपयोग / **Application:**

- Hot air blower is used for smithy purposes and can be used by Blacksmith and Fitter also.

उपसहायक एवं लक्षण /**Accessories & Features:**

- It is for all purpose use. BOSCH make tool is having 2-stage airflow regulation and step less temperature control with rotary knob. Also having removal heat protector for working in tight places.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.



3.3 मिनी ग्राइंडर/Mini Grinder

So many grinders are available in the market. Some of them are described as under.



उपयोग / Application:

- Used for multipurpose metal grinding and sanding work on concrete and metals also can be used for cutting works by fitting discs. Also can be used for rigorous concrete applications like wall chasing, chamfering marble, granite tiles/stone grinding works.

उपसहायक एवं लक्षण /Accessories & Features:

- Protective guard, grinding wheel, cutting disc, two pin spanner, wire cup brush, rubber backing pads with nuts with flat gear housing. Provision of auxiliary handle.
- Spindle lock for easier disc changing.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.



3.4 स्ट्रेट ग्राइंडर / Straight Grinder



उपयोग / Application:

- Used for precision grinding in metal and internal portion of die etc. and pipes & pipe joints. Very useful for fitter as it facilitates one hand operation.

उपसहायक एवं लक्षण /Accessories & Features:

- Very handy and one handed operation. Protected switch avoids unintentional switching on.
- Cooling vents are not covered by the operator hand.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.

3.5 बहुउद्देशीय आरी / All Purpose Saw



उपयोग / Application:

- Very useful for cutting metal, as well as in wood also. Can be used by carpenters for small cutting/finishing work in wood/plywood etc.

3.6 निबर्लस / Nibblers





उपयोग / Application:

- It is used for cut-outs in all types of sheet metal. Well suited for high-alloy steels and stainless steel sheets also. Can be used by Blacksmith also. By this a tool cutting is simple even in the middle of the sheet.
- **Attention -** Cutting line must be lubricated to avoid the cutters burning out.

उपसहायक एवं लक्षण /Accessories & Features:

- Punch, die etc.
- Handy equipment.
- Protected slide switch prevents unintentional start-up.
- Pivoting die automatically turning up to $360^{0.}$
- Cutting tools may be easily changed. One can easily work along scribing line and template guides.

व्यवहारिक मार्गदर्शन /Operational guidance: As per working manual supplied by manufacturer.

3.7 बैंच ग्राइंडर / Bench Grinder.



उपयोग / Application:

It is very useful for various grinding operations. To be placed in the workshops. Very useful for sharpening/grinding of drill bits, other handy tools etc. for above categories of artisan staff.

उपसहायक एवं लक्षण /Accessories & Features: As per working manual supplied by manufacturer.

***

Go to index

4.0 अन्य शक्ति चालित औजार
Other power operated tools

4.1 बैटरी से चलने वाली बेतार ड्रिल/ड्राइवर/Battery Operated Cordless Drill/ Driver.

(This is a common tool and may be used by Carpenter, Mason, Plumber and fitter also)

Battery operated Jigsaw, Grinder, Different type of Screw Drivers, Rotary hammer are also available in the market.





उपयोग / **Application:**

- It can be used by above all three artisan trade during emergency and where there is no any power supply exist. Also can be used at remote and typical locations. It can be used as for drilling in metal, wood and for screw driving purposes (in both directions).

उपसहायक एवं लक्षण /**Accessories & Features:**

- Interchangeable 132 V battery pack. 11 No. –cells with 1.5 AH
- Electronic switch for soft start-up.
- Quick-action stop for flush screwing.
- Reversible function.
- 2-speed planetary gear with high torque in 1st year for screwing operations, high speed in 2nd gear for drilling.
- 7-stage torque setting for constant screwing operation results.
- Drilling stage with max. torque of up to 18 Nm.
- Auto-spindle-lock for convenient change.
- Quick-action clamping ∅10 mm.
- Set includes: 1-hour changer, PH screwdriver bit size-2.

व्यवहारिक मार्गदर्शन /**Operational guidance:** As per working manual supplied by manufacturer.

4.2 ग्रास कटर/लॉन मूवर/Grass Cutter/ Lawn Mover

उपयोग / **Application:** To maintain lawn and gardens of offices and bungalows.

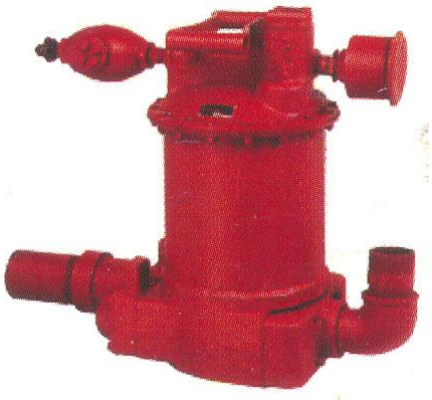


4.3 वेक्यूम क्लीनर/Vacuum Cleaner



उपयोग / **Application:** To clean curtains, Carpet and furniture of offices and rest houses.

4.4 निकासी पम्प/Dewatering Pump



उपयोग / **Application:** Ideal for removing water from trenches, ditches, manholes, industrial sumps and excavation.

4.5 चलित जनरेटर / Portable Generator

Useful for Artisan Trade: All types of Artisan trades using power tools in remote areas/load shading areas as a power backup**.**



उपयोग / **Application:** It can be used as a power backup for operation of power tools at any location where no electricity/load shading is available. Various models with different fuel options and rated capacities of various makes are also available in the market. It can be lifted by two to three persons. Compact in size, so movements through doors & passage of train is easy and may be easily transported by pickup Jeep, Autoloader, Cycle Rickshaw, and manual Cart/Trolley.

उपसहायक एवं लक्षण /**Accessories & Features:**

- **Instant start:** Start the set with the push of a button. No ropes to pull. No knobs to fumble with in the darkness as in petrol/kerosene generators. Just push a button and it is on.
- **Diesel:** Fuel is easily available even in remote areas. Gensets are also available in different fuel options i.e. Petrol start & running, Petrol start Kerosene running, Diesel-Petrol mixture (80%+20%).
- **Economical performance:** Well known diesel economy. Fuel consumption is about half of petrol/kerosene generators. Running cost is about ¼ of petrol and ½ of kerosene generators.
- **Compact and light weight:** The combination of a brush-less alternator and Greaves diesel engine make the generator very compact in size and light in weight.
- **Rugged reliable Greaves diesel engine:** The generator is powered by the trusted Greaves lightweight air-cooled diesel engine, known for its trouble free performance.
- **Brushless alternator:** The brushless alternator with a condenser type voltage regulator ensures stable voltage output and requires no maintenance.
- **Extra large fuel tank :** A 10 litres capacity fuel tank ensures continuous non-stop operation.
- **Minimal maintenance:** The prime mover being a diesel engine there is no carburettor and no spark plug. The generator works continuously for hour without maintenance.
- **Options:** Rope start. Trolley kit for easy transportation.

व्यवहारिक मार्गदर्शन /**Operational guidance:** As per working manual supplied by manufacturer.

4.6 चलित घरेलू औजारों की किट / Portable home kit

The *HOME KIT* comes with a impact Drill plus a range of accessories and hand tools, all in a tough durable multipurpose tool kit. Now, you will be ready to tackle most jobs around your home. Jut position the drill bit on concrete, wood, metal or plastic for greatest accuracy.

Home kit contents



(1) Fully insulated impact drill m/c.
(2) Drill bit set (5-6-8 mm)
(3) Wood Drill bit
(4) Hack Saw
(5) HSS Drill Bit
(6) Measuring tape
(7) Fischer Nylon Fixings
(8) Screwdriver Set
(9) Hammer 200 g.
(10) Combination Pliar – 7"
(11) Adjustable Wrench – 8"
(12) Insulation Wonder Tape
(13) Triangular File – 16 cms.
(14) Adjustable Knife
(15) Case (moulded to suit the requirements)

Magnum Drill



Fully insulated impact drill machine

Contents of Magnum Drill:

(1)	Dia. in Concrete	: 10 mm
(2)	Dia. in Metal	: 8 mm
(3)	Dia. in wood	: 20 mm
(4)	Power input	: 400 Watt/230 Volt
(5)	Impact rate	: 44800 / min.
(6)	Rated Speed	: 2200/2800 rpm
(7)	Weight	: 1.4 Kg.

उपयोग / Application:

- Drilling in wood and plastic for fixing tower bolts, hinges, pad locks etc. to fix and maintain.
- Drilling in doors to fix locks.
- Metal drilling and to work with thin metal sheets.
- Drilling in walls for fixing bathroom fittings, wash basins, mirror etc., in quarters and service buildings.
- To drill holes for fixing sanitary fittings, anchoring various hooks and also for electrical fixtures.
- And other petty works related to carpenter, fitter, plumber etc.

***

Go to index

5.0 विभिन्न विधाओं के द्वारा उपयोग किये जाने वाले परम्परागत औजार Traditional tools used by various trades

By visiting some workshops of SSE (Works), on an average the following traditional tool are available with the artisans. As well as concerned with power operated tools only a tile cutter or marble cutter is available.

S.N.	Carpenter	Mason	Black smith	Plumber/ fitter
1	Planner of various sizes	Trowels of different sizes	Hammers of different sizes and weight	Hacksaw with blade
2	Cross cut saw	Racking needle	Sledge hammer	Pipe wrench of different sizes
3	Adzes	Round calipers	Locally made chisels, drift, chisel, scrapers and centre punch	Set of spanner
4	Hammer and mallets	Sprit level	Spanners of different sizes	Thread making die
5	Chisels of various sizes	Square	Plair	Caulking tool
6	Braces and Ratchet with bits set	Measuring Tape	Holding tongue of different sizes	Chisel set, drift and punch
7	Measuring tapes, steel scale and square	Iron claw for aggregate	Shaping mould (Steel)	Pipe anchor
8	Nail pillar cum hammer	Tiles cutting blade	Tommy bar	Hammer
9	Nail pulling tounge	Wooden floats of various sizes	Inside/ out side calipers	Screw driver set
10	Files of various sizes	Powrah	Blower with stands	Holding tongue set
11	Screw drivers of different sizes	Pickaxe	Anvils	Tommy bar
12	Locally made chisels, drift etc.	Bucket and mug	Jim crow (screw type)	Plair
13	Tommy bar	Concrete chisel set of different sizes	Pan (small)	Measuring tape
14	Marking knife and marker	Tommy bar (long)	Fork	Pickaxe
15	Side cut planner and frame offset planner	Hammer	Measuring tapes, steel scale and template making arrangement	Powrah
16	Augers	Hammer for making brick bats	Files of different sizes	Bucket and mug
17	Glass cutter	Plumb bob	Powrah (small)	File
18	-	Sandsieve (small)	-	Edging tools

***

Go to index

6.0 सुरक्षा निर्देश एवं दोष निवारण
Safety instructions and trouble shooting

Warning! When using power tools, ALWAYS comply with the following basic safety precautions to prevent electric shock and reduce the risk of personal injury and fire.

Before you use the power tool, read and comply with these instructions. Keep the safety instructions in a safe place.

1. **Keep the work area tidy.**
   An untidy work area is an accident hazard.
2. **Consider environmental influences.**
   Never expose power tools to rain. Do not use power tools in damp or wet environment. Provide good lighting. Do not use power tools near flammable liquids or gases.
3. **Guard against electric shock.**
   Components / appliances (e.g. pipes, radiators, cookers, refrigerators), when working outdoors or if humidity or conductive dust can penetrate the tool, we recommend that the tool is connected via residual current operated circuit breaker (FI, RCD, PRCD) with a max. 30 mA tripping current.
4. **Keep children/passengers away.**
   Do not let children touch the power tool or cable. Keep children/passengers away from the work area.
5. **Store your power tools securely.**
   When not in use, tools should be stored in a dry, locked room and out of the reach of children.
6. **Do not overload your power tool.**
   The tool performs better and more reliably if used within the indicated performance range.
7. **Use the correct power tool.**
   Do not subject low-powered tools or attachments to heavy loads. Only use tools for the purpose for which they are intended, e.g. do not use portable circular saws for felling trees or cutting off branches.
8. **Wear suitable clothing**
   Do not wear loose clothing or jewellery. They could get caught in moving parts. When working outdoors, it is recommended to wear protective gloves and safety non-slip footwear. Cover long hair with a hairnet.
9. **Wear eye protection**
   Ensure safety glasses / goggles are worn at all times.
10. **Do not misuse the cable**
    Do not carry the tools by the cable and do not use the cable to pull the plug out of the socket. Protect the cable from heat, oil and sharp edges. Check condition of cable and plug before every use.
11. **Secure the work piece**
    Secure the work piece with clamps or a vice (the work piece cannot be held securely with your hand). Both hands are then free to operate the power tool.

12. Do not over reach

Avoid abnormal posture. Ensure a secure footing and always keep your balance.

13. Look after your power tool attachments

To ensure good and reliable performance, keep your power tool attachments sharp and clean. Comply with the maintenance instructions and with the instructions for changing power tool attachments. Inspect the plug and cable regularly and, if damaged, have them replaced by a qualified technician. Inspect extension leads regularly and replace any damaged ones. Keep handles dry and free of oil and grease.

14. Pull out the main plug.

When not using or before servicing the power tool or when changing an attachment, e.g. saw blade, drill bit and all types of tools, always disconnect plug from power supply.

15. Remove keys /wrenches from the power tools.

Before switching ON the power tool, remove any keys and wrenches.

16. Prevent unintentional starting.

Do not carry the plugged in power tools with your finger on the trigger / switch. Before plugging in the power tool, ensure that the trigger / switch is OFF.

17. Outdoor use of extension leads.

Extension leads may be used outdoors only if they are authorised and identified for outdoor use.

18. Be alert.

Watch what you are doing. Use common sense. If you are tired, do not operate the power tool.

19. Check your power tool for possible damage.

Before using your tool again, carefully check guards or slightly damaged parts to ensure that they will function properly and as intended. Check that moving part function correctly, that they do not jam and that there are no damage parts. To ensure proper operation of the power tool, all parts must be correctly installed and satisfy all the required conditions. Any damage guards and / or parts should be properly replaced by an authorised service centre, unless otherwise indicated in the operating instructions. Defective switches should be replaced by an authorised service centre. Do not use power tools which cannot be turned ON or OFF with the switch.

20. Warning ! for your safety

Use power tools, accessories, attachments, etc. in accordance with these instructions and in the manner intended for the particular type of power tool, taking into account the working conditions and the work to be performed. The power tool must only be used for the purpose for which it is intended. The use of attachments or accessories other than those recommended in the operating instructions or catalogues may result in personal injury.

21. Repair to power tools should be carried out only by an electrical engineer/representative of authorized service centre.

Standard power tools have been constructed in accordance with the relevant safety regulations. Repairs may be carried out only by an electrician; otherwise the user may be put in considerable danger.

***

नोट्स / NOTES

गुणवत्ता नीति

रेलों में यात्री और माल यातायात की बढती माँग को पूरा करने के लिए गुणवत्ता प्रबंध प्रणली में अनुसंधान, डिजाइनों और मानकों में उत्कृष्टता तथा सत्त सुधारों के माध्यम से सांविधिक और नियामक अपेक्षाओं को पूरा करते हुए सुरक्षित, आधुनिक और किफायती रेल प्रौद्योगिकी का विकास करना।

QUALITY POLICY

To develop safe, modern and cost effective Railway technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs & Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the Railways.

डिस्क्लेमर/Disclaimer

The document prepared by CAMTECH is meant for the dissemination of the knowledge/ information mentioned herein to the field staff of Indian Railways. The contents of this handbook/booklet are only for guidance and not statutory. Most of the data & information contained herein in the form of numerical values are indicative and based on the tests/trials conducted by various agencies generally believed to be reliable. While reasonable care and effort has been taken to ensure that information given is at the time believed to be fare and correct and opinion based thereupon are reasonable. Due to very nature of research it can not be represented that it is accurate or complete and it should not be relied upon as such. The reader/user is supposed to refer the relevant codes/ manuals available on the subject before actual implementation in the field.

हमारा उद्देश्य

अनुरक्षण प्रौद्यौगिकी और कार्यप्रणाली को उन्नयन करना तथा उत्पादकता और रेल्वे की परिसम्पत्ति एवं जनशक्ति के निष्पादन में सुधार करना जिससे अन्तर्विषयों में विश्वसनीयता, उपयोगिता और दक्षता प्राप्त की जा सके।

यदि आप इस सन्दर्भ में कोई विचार और सुझाव देना चाहते हों तो कृपया हमें इस पते पर लिखें।

सम्पर्क सूत्र	:	उप निदेशक (सिविल)
पत्राचार का पता	:	भारतीय रेल उच्च अनुरक्षण प्रौद्योगिकी केन्द्र, महाराजपुर, ग्वालियर (म.प्र.) पिनकोड - **474005**
टेलीफोन	:	0751–2470869
फैक्स	:	0751–2470841
ई–मेल	:	**dircivilcamtech@gmail.com**

Our Objective

To upgrade Maintenance Technologies and Methodologies and achieve improvement in productivity and performance of all Railway assets and manpower which inter-alia would cover Reliability, Availability, and Utilisation.

If you have any suggestion & comments, please write to us :

Contact person	**:**	**Dy. Director (Civil),**
Postal Address	**:**	**Indian Railway Centre for Advanced Maintenance Technology, Maharajpur, Gwalior (M.P.) Pin code – 474 005**
Phone	**:**	**(0751) - 2470869**
Fax	**:**	**(0751) – 2470841**
Email	**:**	**dircivilcamtech@gmail.com**