Rotabroach™

The original name for hole cutting systems… Known and trusted Worldwide for Quality, Performance and Reliability

Guide to get the most out of your New Rotabroach Product

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1. History of Rotabroach

Rotabroach Ltd was established in 1975 with an agreement with Hougen Manufacturing Inc to manufacture and market Rotabroach® products under licence.
Since that time we have grown and gained years of experience in developing, manufacturing and supplying our products. We now distribute to over 35 countries worldwide and are continuing to expand.
The name Rotabroach is now one of the most established names in this industry and is generally used for the generic name of all Annular cutters.

Rotabroach continue to grow by constantly working on new products and innovations

Our on-site facilities include production planning, purchasing, warehousing and distribution, accounts, design, customer support, machine repairs and sales.

Rotabroach products are as follows
Magnetic Drills Electric, Pneumatic and Hydraulic.
Annular cutters
Magnetic Drill Accessories
Drilling Accessories
Rail Drilling Machines
Rail Drill Cutters
Rail Drilling Accessories
Cutting Fluid.

2. Rotabroach Products

Rotabroach products are split into 3 groups Cutters, Machines and accessories.

Cutters

M2 Cutters - SRC(25mm Depth), SRCL(50mm Depth)

M42 Cutters – SRCV(25mm Depth), SRCVL(50mm Depth)

The above cutters are also available for laminate as well.

TCT Cutters – CWC(35mm Depth), CWCL(50mm Depth), CWCX(110mm Depth) and SCRWC(25mm Depth special for rail).

Mini Cutters – RCM(metric), RCE(Imperial)

Solid Indexible Cutters – CRWD

Pilots

Machines

Electric drills – Puma(CM/300), Panther(CM/125), Cobra(CM/200), Hawk(CM/400), Scorpion(CM/500).

Rail drilling – Rhino 2 (RD07A 2 stroke petrol), Rhino 4(RD074, 4 stroke petrol), Rhino E (CM127 electric)

Air and Hydraulic – CM/330/C(Air), RD130C(Air), RD140(Hydraulic).

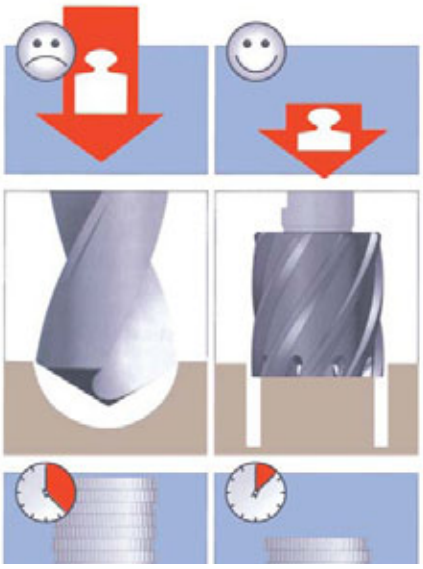
Accessories

Cutters – Twist Drill Adaptors, Competitor Cutter Adaptors, Rotabroach Cutting Fluid, Countersinks.

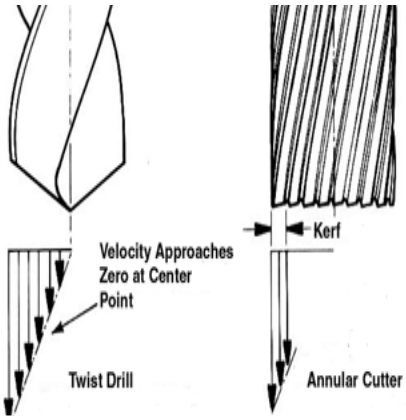
Machines – Morse Taper Arbors, Extension Arbors, Pipe Adaptor Kit, Vacuum Pad(Air powered for non magnetic material), Keyless Chuck (Air and hydraulic machines only)

Rail Machines – Hole Centre Locators, Multi-form Templates.

3. *Annular cutters against conventional drills*



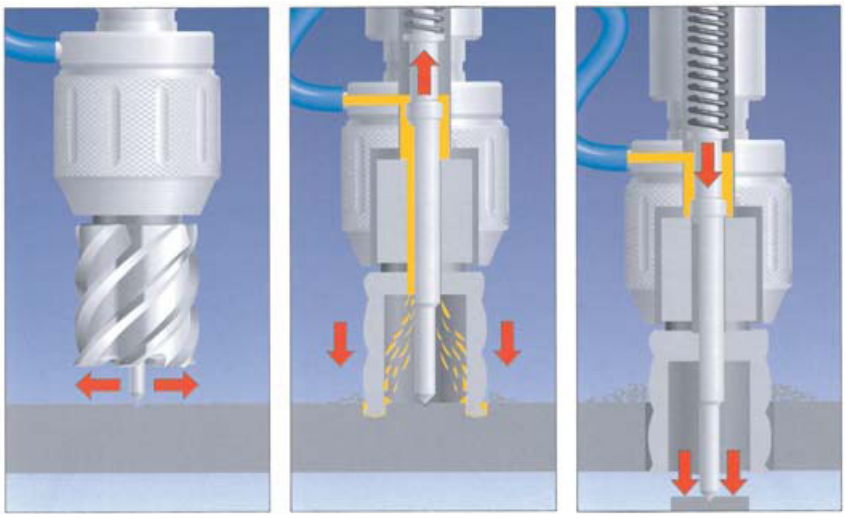
The main advantage of annular cutters is how they work. Conventional twist drills techniques cut the entire hole into chips. The Rotabroach Annular Cutter hole making concept only cuts the periphery. The innermost portion or "slug" is the "energy saver". We cut less material, make less chips. This translates into less unit horsepower required less force less time and less money. The larger the cutter, the bigger the savings achieved.



A twist drill's most noticeable feature—its point—is not really a point at all, but the tangent line where two cutting angles intersect at the web of the drill, or the "dead zone." This dead zone causes the surface speed of the cutting edges to drop to zero.

Because annular cutters are hollow, there is no dead-zone resistance to overcome. All cutting edges are located near the periphery of the tool, and surface speeds are consistent throughout the entire cut.

An additional advantage is also the coolant system of an annular cutter the coolant can get where it is needed. This is shown below; as the cutter approaches the material the pilot is forced up inside the cutter which then allows the coolant to flow down the pilot so it can get right to where it is needed. When finished the cut the slug is ejected by the pilot thus the pilot returns to the original position and the flow of coolant is stopped.



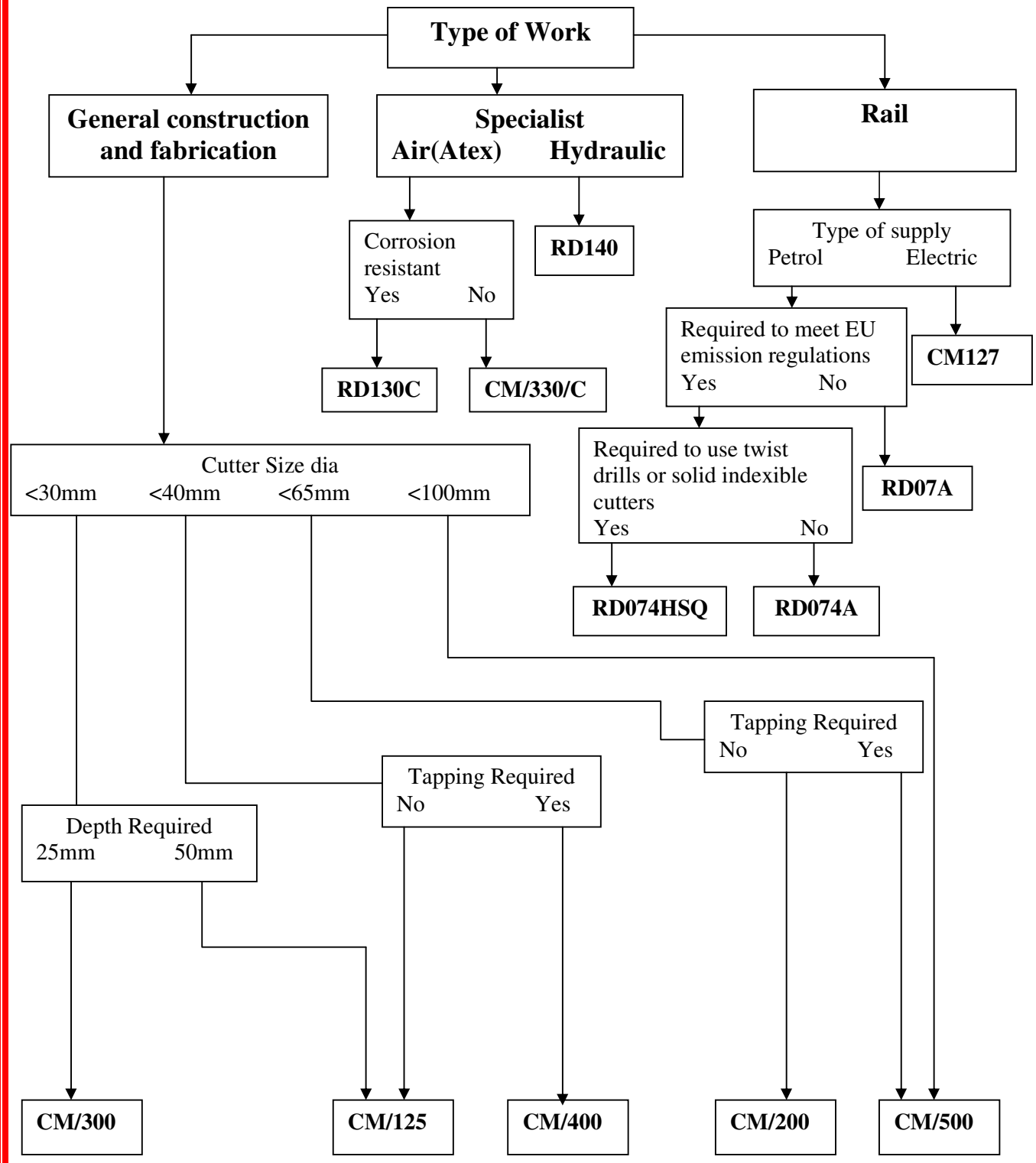
4. Which cutter to use for your application

Material	Material hardness	Cutter
Mild and Free cutting steels	<700N/mm²	SRC or SRCL
Mild and Free cutting steels	<850N/mm²	SRCV or SRCVL
Steel angle and joists	<700N/mm²	SRC or SRCL
Steel angle and joists	<850N/mm²	SRCV or SRCVL
Plate and sheet steel	<700N/mm²	SRC or SRCL
Plate and sheet steel	<850N/mm²	SRCV or SRCVL
Aluminium	<700N/mm²	SRC or SRCL
Aluminium	<850N/mm²	SRCV or SRCVL
Brass	<700N/mm²	SRC or SRCL
Brass	<850N/mm²	SRCV or SRCVL
Cast iron	<700N/mm²	SRC or SRCL
Cast iron	<850N/mm²	SRCV or SRCVL
Stainless Steel	<700N/mm²	SRC or SRCL
Stainless Steel	<850N/mm²	SRCV or SRCVL
Stainless Steel	>850N/mm²	CWC, CWCL or CWCX or SCRWC
Rail track	>850N/mm²	CWC, CWCL or CWCX or SCRWC
Tool Steel	>850N/mm²	CWC, CWCL or CWCX or SCRWC
Die steel	>850N/mm²	CWC, CWCL or CWCX or SCRWC

Note : the above chart is only a guide, Material hardness is represented as Newton's per mm² most material hardness can be found on the web as well as converters.

5. *Which machine is right for your job?*

Choosing the right machine can always be difficult it all depends on your application. Below is a chart to help with you in choosing the right Rotabroach product for you.



6. Speed and feeds

The data listed below is for reference purposes only, and indicate potential starting conditions. It is the responsibility of the site operation manager to determine correct application requirements.

Rotabroach	Cutting surface speed Meters/min	Cutter diameter/Material/RPM relationship													
		13		14		18		22		30		50		65	
Material to be cut	**L**ower - **U**pper	L	U	L	U	L	U	L	U	L	U	L	U	L	U
Aluminium	60 - 90	1469	2203	1364	2046	1061	1591	868	1302	637	955	382	573	294	441
Brass & Bronze	40 - 50	979	1224	909	1137	707	884	579	723	424	530	255	318	196	245
Iron: cast(soft)	30 - 50	734	1224	682	1137	530	884	434	723	318	530	191	318	147	245
cast(hard)	15 - 21	367	514	341	477	265	371	217	304	159	223	95	134	73	103
cast(malleable)	15 - 30	367	734	341	682	265	530	217	434	159	318	95	191	73	147
Steel: mild	24 - 30	588	734	546	682	424	530	347	434	255	318	153	191	118	147
high tensile	3 - 5	73	122	68	114	53	88	43	72	32	53	19	32	15	24
stainless (free cutting)	15 - 18	367	441	341	409	265	318	217	260	159	191	95	115	73	88
stainless (heat resisting)	6 - 13	26	318	136	296	106	230	87	188	64	138	38	83	29	64

These are only starting points. They will vary with application and work piece condition.

Material or Application Type	Feed Per Tooth (mm)
Thin Walled Workpieces Oblique Entry / Curved Surfaces Semi-Circles / Fragile Setups	.0254 / .0508 (.0762 FPT with Work Hardening Materials)
Soft / Gummy Materials	.1016 / .127
Typical / Average Applications	.0762 / .1016
Deep Holes	.1016 / .127

Difficult-to-machine materials will require reduced feed rates.

7. How to make the best hole

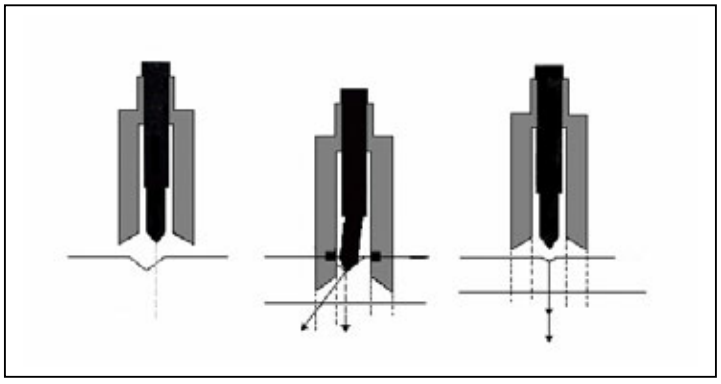
1. Ensure your machine is in full working order. Check that there are no damaged parts.

2. Check you have the correct magnetic adhesion; reduced magnetic performance will result if the magnet is not in full area contact with the work piece, caused by damage to the magnet face, debris between the magnet and work surface, or uneven work surface. Magnet performance will also reduce on material less than 25mm thick. Inadequate magnetic bonding may result in machine instability, resulting in reduced cutter life, premature cutter failure, or the machine separating from the work surface.

3. Ensure that you are using the correct cutter for your material. Make sure cutter is in good condition re-sharpen your cutter if wear is too great. Failure to ensure the correct profile may result in extended operating cycle time, reduced cutter life, or premature cutter failure. All Rotabroach cutters are designed to allow some degree of re-sharpening. The amount that can be ground should not exceed half the length of the internal taper (approx 5mm).We offer a re-Sharpening service at Rotabroach but we can also provide a dimension drawing to assist 3rd parties.

4. Use only Rotabroach approved pilot pins. The precision relationship between ROTABROACH cutter and pilot ensures accurate and consistent positioning over the required hole location. Failure to maintain the correct relationship may result in positional errors, reduced cutter life, or premature cutter failure.

5. If you are using a centre punch mark ensure that it is as light as possible. Excessive centre punch size may result in reduced cutter life. Make sure that your pilot is correctly lined up with the punch mark as shown



6. Only use approved ROTABROACH cutting oil. ROTABROACH cutting oil is formulated to reduce friction at the cutting edge, improve cutting debris evacuation. Failure to use an approved, or, inadequate oil supply, may result in reduced cutter life or premature cutter failure.

7. When cutting keep your feed rate constant. Failure to maintain constant feed pressure may result in debris entrapment between cutting teeth and work surface, or debris compacting in the cutter flutes, which may result in reduced cutter life or premature cutter failure.

8. Don't apply too much pressure only enough to ensure optimum speed. Too much pressure may result in slower surface cutting speed, Cutter jamming, cutter breakage and reduced machine life.

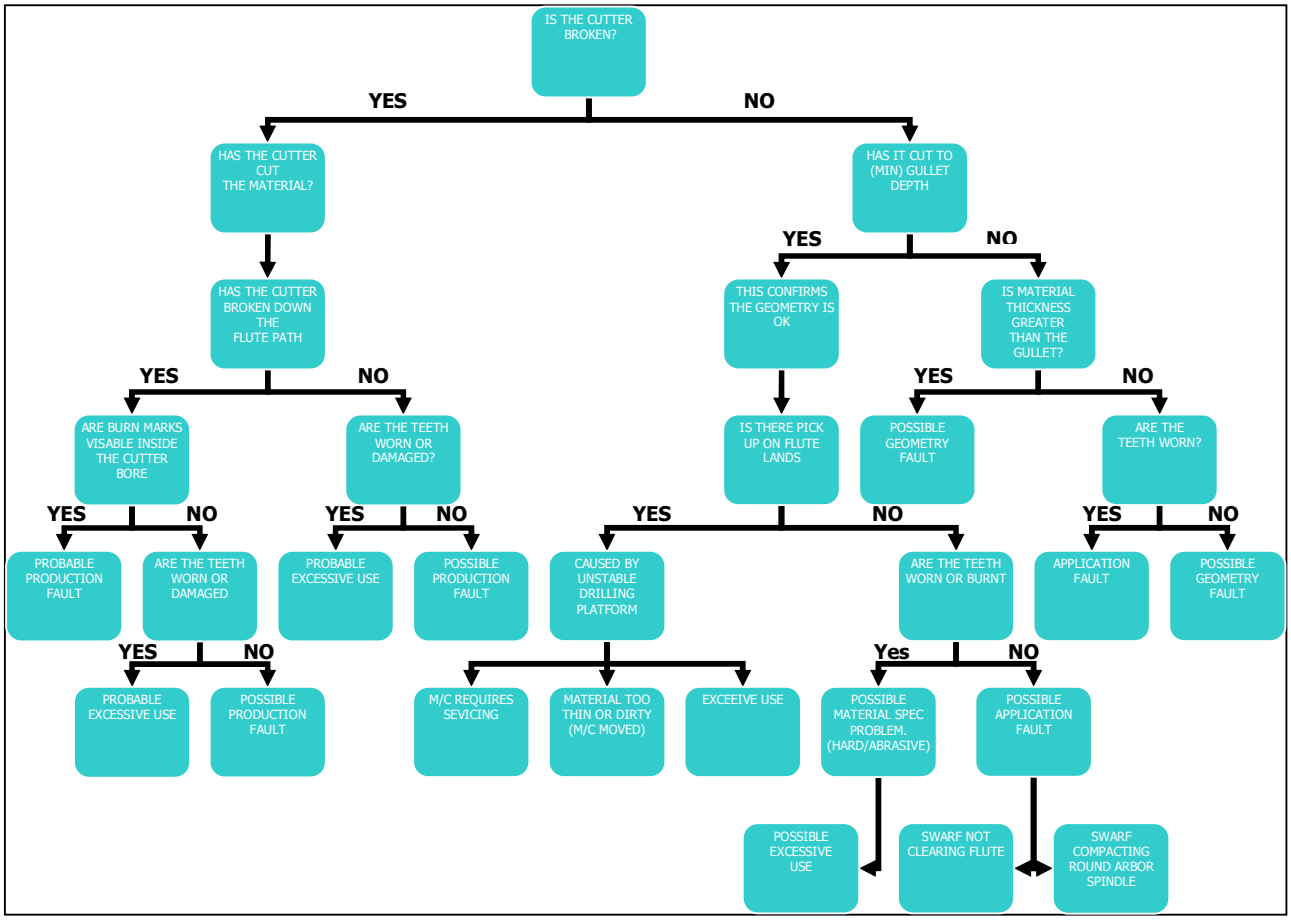
9. Ensure your slug has ejected after your cut. When performing sequential cuts performance will be affected if slug has not been removed this may result in reduced cutter life or premature cutter failure.

10. When cutting sequential holes, it is imperative to ensure that all swarf around the cutter has been removed from any previous hole before starting the next.

11. Ensure you clean the work surface before performing your next cut. Make sure there is no swarf under the magnet.

8. Why Cutters break and how to reduce it

Cutter breakage can happen all too often whether it's a new cutter or an old first cut or many and all too often it is unknown as to why it happens. Below is a fault tree guide showing some of the more common reasons as to why this happens.



Eventually your cutter will fail but there are a number of preventative actions you can take to prolong its life.

1. Always make sure your drill is stable and cannot move. Ensure all machine parts are tight.
2. Ensure that the material under the magnet is at least 25mm thick.
3. Always use Rotabroach cutting fluid.
4. Always use a Rotabroach pilot.
5. Ensure that you punch hole is lined up with your pilot.
6. Ensure that your arbor is running concentric.
7. Ensure the teeth on the cutter are not too worn. If so have your cutter reground.
8. If you cutter breaks do not use the same pilot with your new cutter. Always use a new one.
9. Ensure your cutter is fastened correctly in the arbor with both grubs screws located on the flats.
10. Do not use excessive drill pressure.
11. When using a new cutter for the first time be careful on the first few cuts as cutter teeth will need to dull slightly for the cutter to work at it optimum performance.

9. Tips for keeping your machine in correct working order.

In order to 'get the best life' out of your Rotabroach machine always keep in good working order. A well maintained machine is a happy machine.

A number of items must always be checked on Rotabroach machines.

Always before starting any job make sure the machine is in good working order and that there are no damaged or loose parts. Any loose parts must be tightened.

Before proceeding with any maintenance work be certain that the power supply is disconnected

ADJUSTMENT OF SLIDE AND ARBOR SUPPORT BRACKET

An essential requirement of the machine is that the slide can move in a smooth and controlled manner, free of lateral movement and vibration.

This situation can be maintained by periodic adjustment of the slide and is accomplished in the following manner:

- Place the machine in an upright position and, by means of the capstan, raise the slide to its highest position. Clean the brass gib strips and apply a small amount of light machine oil to the wear surfaces. Now lower the slide back to its lowest position.

- Bring the slide into the centre of the dovetail slide housing and loosen screws thus allowing free movement of the arbor support bracket.

- Commencing with the middle screws, gently feed in all the screws until slight resistance is encountered.

- Operate the slide up and down a few times to test the movement and make any further necessary adjustments. Try to ensure that all the screws are exerting a uniform pressure on the slide from top to bottom.

- A perfectly adjusted slide will operate freely up and down without any sideways movement.

- Now raise the slide to its highest position. Slightly undo the arbor bearing bracket and, using fingers only, tighten the screws.

- Place the machine on a steel plate, connect to supply and switch on magnet. Start up the motor. If the arbor is incorrectly aligned, the arbor support bracket will be seen to oscillate. Make any necessary further adjustments to the bracket to ensure correct alignment of the spindle and finally tighten the screws using a spanner. Lastly tighten the arbor bearing bracket.

Machine Brushes - should be checked regularly to make sure there is no abnormal wear present this should be checked at least once a week if used frequently. If the brush has worn more than 2/3 the original length the brushes should be changed.

Rotabroach™

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