

Moving & Dismantling Printing Presses

by John B Easson

MOST PRINTERS probably realise they need engineering information or help only when they first hit a major problem: a breakdown in their press, or the need to move a really large machine. What they need is either factual information – just what you do – or else a general idea of what can be done by an engineer for them, and how to explain it to an engineer especially a non-printing engineer who won't know anything about printing machines. These last two points demand an explanation of engineering techniques (what can be done) and of engineering jargon (how to explain it). Fortunately, moving machines is not a subject that requires (in its simplest form anyway) much of these two. I will try to concentrate on what facts I can give from my own experiences.

Firstly, if you want to move a machine, try if possible to move it in one piece. If it is small and light enough for this to be possible it will save all the complications I am about to describe later; it will reduce the danger of damaging parts by removing or fitting them wrongly; and especially, it will mean that the machine will probably not need to be readjusted to run again properly. This particularly applies to small offset machines, which tend to have a lot of small spring loaded parts, which may be impossible to re-assemble properly without expert help. The disadvantages of keeping the machine whole are of course that it may mean moving a fairly heavy object, rather than several lighter pieces, you may have to be careful that projecting parts are not bent or broken off (or don't damage doorframes, etc), and the machine may be too big to manoeuvre through the spaces available.

The biggest problem in any move is time: trying to move heavy equipment in a hurry is a recipe for disaster, so try to allow yourself plenty of time, especially to pause and think before you start on each step, and if possible to avoid situations where something has to be moved urgently (eg off a vehicle stopped in a narrow street!). At each stage, take time to think through how it is going to work, any problems or risks, and what you are going to do if it goes wrong. There are times you have to commit yourself to some action, say tipping the machine onto a platform, which has to be completed once started, but whenever possible, leave your options open to changes of plan as events unfold.

Some stages may be best broken down into smaller steps to make them safer or easier. For example, lifting a heavy piece up may be done by lifting or jacking, supporting in its new place, and then repeating the process. I have raised pieces of several hundredweight single-handed by doing this, the trick being in finding a way of putting in safe supports that allow further lifting. Have a look at catalogues of equipment hire firms to see what is available (likewise check what aids can come with any hire vehicle); you may not need them unless an emergency arises, but you may find something that makes life much easier.

So the first step in any move is to survey the machine and the ground. How big is the machine? How heavy (can you lift it – can two people lift it – will the vehicle to be used take it?) Where must it be moved? Are there any narrow places? Are there any steps? Is the floor or ground level and is it smooth? Ideally, this is done on a preliminary trip (when buying the machine, perhaps), and it is worth taking a few tools on this trip to remove what can be taken easily (eg rollers, flywheel, ink duct, etc), to save weight and space later. Measure the machine carefully, and note too how much room it needs round it for working so that its final position is practical. If you are going to dismantle it, you will also need to watch it running, and check if any special tools are going to be needed; look and see what you will be taking apart, and check if a screwdriver or spanner will do the job. It is worth seeing the machine running in any case. Listen to it, and if possible have it actually printing. Try to note if it runs smoothly or vibrates; whether there are any intermittent jarrings or noises. When you have moved it and got it going again, a comparison of these is a valuable guide to errors on the move, and nothing is worse than moving a machine and not being sure afterwards if that 'thud' every so often is because you've got a bit misaligned.

Having got any transport, tools, and assistance required ready, and prepared the place of arrival (check the floor is strong enough – lay a drip tray if required – take up loose rugs etc. in the path), the next step is the actual move. If the machine is an old letterpress one, it will probably be a cast-iron one. (The sort of thing one thinks of as 'Victorian' machinery is cast-iron). This has one main disadvantage apart from weight; it is brit-

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tle, and you must be careful not to drop it on a hard surface or it will smash. Projections are liable to snap off, and difficult to re-attach. Modern machines can be castings (usually alloys such as aluminium alloy), which are not so brittle, but often are a steel chassis with thin sheet-metal cover plates. The snag with this is that you will need to be careful where to lift or rest them, as the thin cover will not take the weight. Just as with a car, which can only be jacked at the correct places, which are strong enough, you need to locate the right points on the machine. Crucial too is having a clear idea of where the weight of the machine lies and its centre of gravity, for only by knowing this can you be sure to lift it securely, avoid overbalancing it, and control it when tipping it over onto a support or platform. You may be able to judge this by experimenting with tipping or lifting it slightly to see how it moves, but observing and knowing its construction is equally important. For example, many small-offset machines are top-heavy because of the substantial printing cylinders near the top.

Supporting the machine is usually best done on some hefty pieces of timber: these give a little to prevent damage, and leave you a flat bottom surface to move. If you do lift the machine bodily, be very careful. In emergency remember it is replaceable but you aren't. Lift by bending your knees and getting a good grip, then standing up, not by bending down and straightening up (the latter will give you a bad back). Support the weight by your body as much as possible rather than by your hands. Be sure the floor is clear and safe; that you can see where you are going (or have a guide) and that you have a safe place to put the machine down. Much better than lifting, though of course you often have to resort to lifting at least over obstacles, is using the wheel. The simplest method is to put the machine on a barrow or trolley. The lower the platform the better (a wheelbarrow for example is too high, besides being too weak for most machines). A sack barrow is very useful for medium-sized machines of a few hundred-weight, but a pallet truck will be needed for heavier machines. The larger the wheels, the less rough ground will be a trouble, and barrows with triple wheels for going up or down steps are available. A few short pieces of scaffolding pole (say 18ins. long) are very useful.

Planks or boards under the machine can be levered up at one end by tilting the machine carefully, and a roller pushed under. Now push the machine forward gently until it just balances on the roller and put the next roller under the front of the support (the first roller will by now be under the middle of the machine of course). On two rollers the machine will be level (you need to keep holding it to prevent it falling sideways), and can be pushed forwards gently until the third roller is needed at the front. By now the first roller can be retrieved from the back ready to re-use. To turn corners, put a roller in at 45 degrees to the others, and with a bit of persuasion, the plank and machine will turn as it goes forward. This method works on smooth floors and thin carpets, but any irregularities will mean juggling the rollers around and possibly tilting the machine to free a roller. On rough ground, a long heavy plank laid down first will make the process easier, once you get onto it. Both it and any planks supporting the machine need to be as wide as possible to avoid the risk of the machine falling sideways.

Always remember the usefulness of levers: given enough leverage (and a good solid support) you can move almost anything. A machine can be levered around a few inches at a time if you have a suitable lever, and steel crowbars for this are available from hire shops that have a narrow tip to get under machines with flat bases. You may need these as well to lift the machine enough to get supports or rollers under it, though some machines have points that let you lift them with simple wood beams or metal poles.

Getting the machine up or down steps the same methods can be used, perhaps with a barrow with big and strong wheels (with manpower both back and front to control every movement), or by using a plank laid on the steps: the steep angle means you must have enough manpower around to be able to hold the weight, and there must be enough space for the necessary people to get a good hold.

Loading and unloading onto a vehicle probably means lifting bodily. If the vehicle is small, so you cannot hold the machine at the point of loading, you may need to lift the machine onto a platform first at the right height to roll it onto the floor of the vehicle with rollers along a plank. Alternatively, roll it up a long plank

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(which needs to be supported and strong) to the vehicle, or try backing the vehicle up to the kerb and use the kerb height to help. If you take suitable precautions to protect the machine, you may find the best method is to get the machine standing right next the vehicle tail, and then lift the foot of the machine furthest from the vehicle, so rolling the machine onto its back on the floor of the vehicle, and sliding it in. Be very careful with this as you do it, as the machine may easily slip against the vehicle as you lift it: you must push as you lift. An old carpet on the floor of the vehicle may help with the sliding. With very heavy or awkward machines as a last resort use of the services of a breakdown truck with lifting gear may be feasible (if there is a helpful garage close-by). However check charges first in case they are prohibitive.

Travelling in the vehicle, you need to be sure the machine is secure, and won't overbalance, or slide when braking. In any vehicle, it is best to get the load well forward to give the best handling while driving.

Finally, when moving heavy machines, make sure any assistants understand what you mean quite clearly. 'Left' is unclear – is it your left or theirs? Get people you can trust – your hand or foot may be under the machine if they let go, and it's amazing how foolish some helpers can be. Have cleaning and first-aid facilities ready: you are almost bound to skin your knuckles or bruise a finger, so stop and get it cleaned and bandaged at the time.

Having said all that, you can see why it is tempting to dismantle the machine to make it lighter and smaller. But beware; you must be quite sure you know how it works before you rush to take it apart.

If You Have to Dismantle

Look closely at the parts you are going to take apart. If possible, number all the bits so you can tell where they go (you should number in pairs – number the bolt and the hole it goes in the same) either with a wax crayon, a felt pen, or adhesive tape and biro (adhesive labels will probably come off, as will those others if you aren't careful). If the reassembly is not to be immediate, numbers scratched on or painted on are probably best. Some old machines will have some parts already marked. Mark everything. Do not assume any parts are

interchangeable even if it seems pretty obvious; they may have worn slightly differently.

Where wheels, flywheels, cylinders or cogwheels fit on shafts, mark a line on shaft and wheel so they can be re-fitted at the same angle. (Timing marks, ie small slots or dots stamped into matching teeth of meshing cogs are usually visible on machine parts that must be correctly meshed.)

Have a container for small parts. Keep parts together as much as possible (eg many bolts can be put back in once the part they held is removed). Groups of parts can be tied together with wire or string, or put in a plastic bag and sealed.

Only dismantle what you must, and check before you start just what is needed to achieve your aim. For example, you might wish to remove a litho press cylinder to reduce the weight. Examine the machine to see what has to be removed to release the cylinder: maybe the bearings holding it come off and the cylinder can be juggled out without any other work, or maybe you have to take off several other parts above it to clear the way.

Use the correct tools as much as you can: a wrong screwdriver can damage a screw head and make it impossible to remove at all. An adjustable wrench is not as good as the correct size of spanner (it tends to round the corners on the nuts). You will need a set of Allen Keys (hexagonal L-shaped rods which fit into the holes in special nuts). Old machines tend to be made with Whitworth nuts and bolts (or even completely non-standard ones), modern machines are more likely to be British Standard or Metric, and the spanners aren't interchangeable.

If the machine was running recently, you may have no problems, but check on the preliminary visit: take some penetrating oil (eg 3-in-1 Penetrating Oil, or WD-40) to squirt into bolts that look as though they might be seized or rusted. If you need to get any shafts through holes, check they are not rusted or ink-caked so that they won't go through. If necessary, coat them with paint-stripper (eg Nitromors) or rust-remover (eg Jenolite).

To dismantle, take screwdriver(s), spanner(s), adjustable wrench, Allen keys, a hammer, a mallet, emery paper (to clean shafts), a hacksaw (only for dire emer-

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gencies), a torch, a crowbar or scaffolding pipe about 3 feet long to use as a lever, rags (to tie on vulnerable parts, and to protect hands when lifting sharp parts), some strong rope (to drag machine in tight corners, and secure it), and old clothes, as well as the various items already mentioned.

When you reassemble the machine, be particularly careful to put back all washers and spacers ('shims', the thin pieces of brass or copper used to space out critical parts) correctly. Check bolts are undamaged and clean before re-screwing them, and put on a dab of grease first. Tighten them up firmly, but never strain yourself or them to get them overtight, {If afterwards you find one works loose with vibration, put a drop of 'Loctite' on it, and re-screw it). Check as you go that moving parts move smoothly and freely, and that nothing is being distorted as you tighten up bolts. Turn the machine over by hand before working it at full speed, and try to feel if there is any resistance to movement that there shouldn't be. When reassembling bearings, re-grease them. (As a general rule, slow-moving parts with heavy loads need thick grease, fast moving parts need oil. Lubrication is a full topic in itself, and I can't go into it here). In the absence of better advice, use car grease and engine oil (not used oil of course), but not thinner oils like 3-in-1.

The hammer? Well, you may need to 'encourage' some parts to come apart; usually it's shafts that are awkward and won't come out. Don't (1) hit cast iron with a hammer – it'll shatter, or (2) hit the ends of steel shafts with a hammer, they'll burr and never come out. Use a piece of wood to cushion the blows, or use a mallet. And if a shaft gets stuck halfway, don't stick a screwdriver in the hole and bang it with a hammer, use a wooden rod.

Well, I hope you get it there, with no crushed fingers or broken-off levers, that you haven't lost any of the parts, and there's room to get round the back to change the rollers.

(This is a revised version of an article published in the 1980s.)