

'the new way to enjoy beekeeping - safely!'



Introduction to New Beekeeping

with

Dartington hives

Robin Dartington

Spring 2008

The cover shows the demonstration apiary in Letchworth Herts.

Dartington long deep hives are designed to modern standards of convenience, safety, economy and style to make recreational beekeeping reliable, more fun and less work.

- *The Dartington Long Deep hive keeps the weight of individual parts below 7kgs (16 lbs), which observes the safety guidance issued by the UK Health & Safety Executive. The hive is therefore safe for use by everyone.*
- *The design of the hives is derived from classic precedents – but the management system takes advantage of recent published work on bee behaviour.*
- *The construction uses modern materials widely available in DIY stores.*
- *The clean lines can match the style of a modern garden.*

Try a Dartington hive and increase the pleasure from your beekeeping

Booklet published and printed by

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The hive for recreational beekeeping



Dartington Long Deep hives (DLD)

The **Dartington Long Deep hive** holds up to 21 BS deep ‘14x12’ frames (14”wide x12” deep) with an insulated dummy frame front and back. The body is raised to a convenient working height on long legs and supports four **honey-boxes** each holding 5 Manley honey frames or 6 BS shallow frames (14”x 5½”). To reduce weight, the **long roof** can be made in two pieces.

The hive comes with a **division board** to divide the body into two separate compartments. A fifth honeybox allows the beekeeper to exchange an empty box for a full one in the honey season and can also be used to mate a spare queen. Accessories include two **carry-boxes**, each holding six ‘14x12’ frames for winter storage. A carry-box can also be used in summer as a **nucleus hive** to start a new colony, using the fifth cover board as a roof.

Plastic trays can be clipped under the **open mesh floor** monitor varroa at any time. The plastic frame **feeder** holds up to 3.5 pints of syrup.

The Dartington Long Deep hive with its accessories provides everything essential for managing a colony of bees throughout the year. A pair of framed wire queen excluders will cover the length of the body but are regarded as ‘optional extras’ as they are not generally essential if the hive is managed carefully.

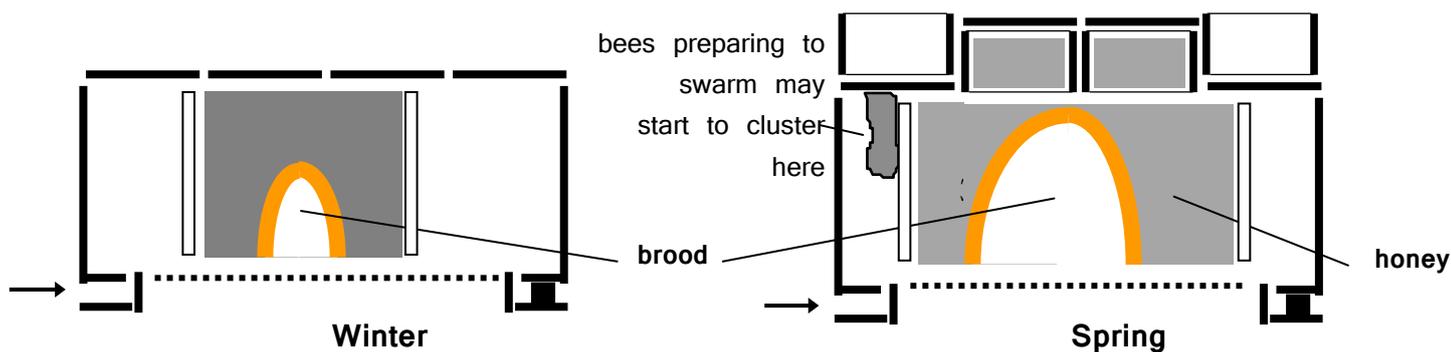
MANAGING A HONEYBEE COLONY IN A LONG DEEP HIVE

Dartington hives are specifically designed to make the work easier at the most difficult times of year. The hive enables the beekeeper to satisfy the swarming urge by artificially swarming the colony within the hive – this avoids a swarm actually leaving the hive.

Swarm control using conventional hives involves lifting heavy boxes containing 10 or 11 frames, exceeding the limits in guidance from the Health & Safety Executive, and putting the beekeeper's back at risk. When using a Dartington hive, the beekeeper need lift no more than the **half-sized honeyboxes** containing only 5 or 6 frames and weighing at most 7kgs (16 lbs) plus individual brood frames weighing at most 3kgs.

The basic method for management of the DLD hive is outlined below – the roof is not shown.

In **WINTER**, the colony occupies only nine deep '14x12' brood frames between two insulating dummy frames. (A further twelve deep frames are stored away from the hive in the two **carry-boxes** and got ready for use next spring).

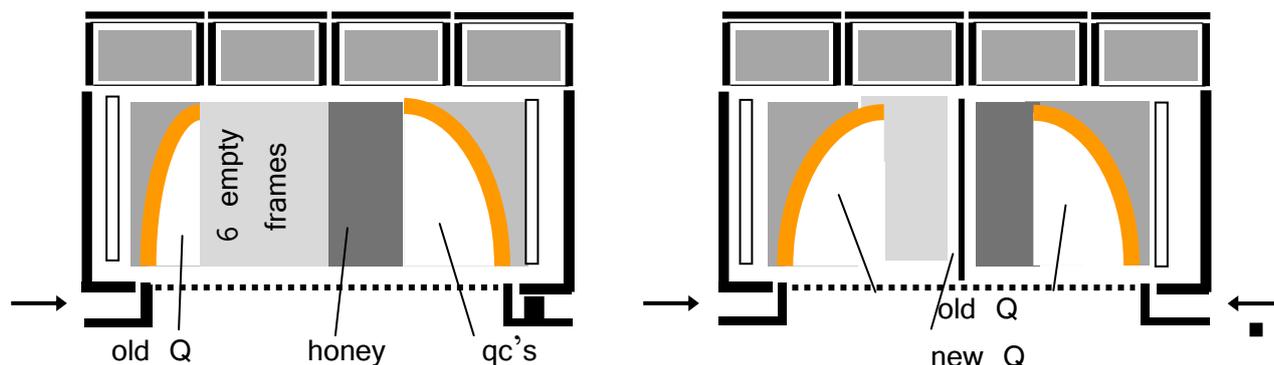


In **SPRING**, the 6 frames in the first carry-box are added as needed to enable the nest to expand. Three foundation frames are added in front of the brood and three drawn combs behind. At least two honeyboxes are brought and placed over the brood to provide space for spring nectar. The remaining honeyboxes in the set of four are placed **above** the end cover-boards to support the roof.

Before the bees start to swarm naturally, usually May/June, **the beekeeper separates the queen from the brood** – the queen and 'swarm bees' are moved onto the front three frames and the fully-developed brood nest to the back. Six empty frames with foundation are placed in between, to give room for the swarm bees to develop a new nest as a swarm would do in nature. *Building the new nest suppresses the swarming urge – for the time being!*

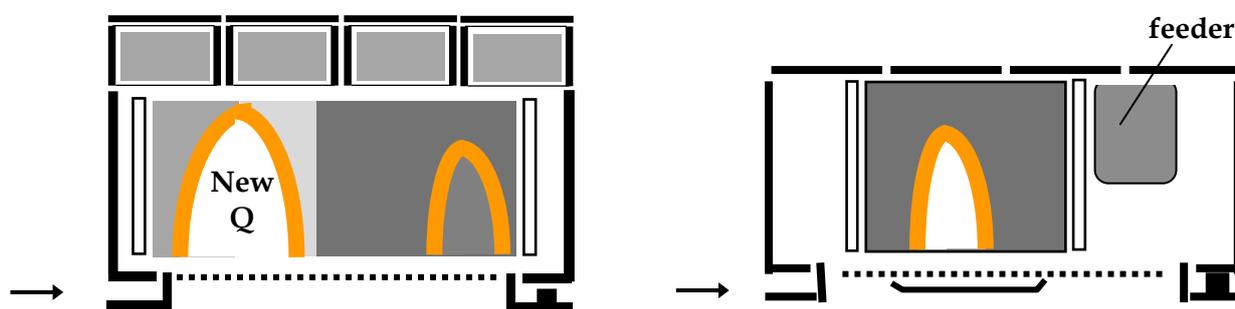
Seven days later the queenless part at the rear will have started queen cells (qc's) and the two parts are then **completely divided** by inserting the **division**

board. The ‘parent nest’ will now rear a new queen who flies to mate from the rear entrance that **must** now be opened.



When the new queen has started to lay and has proved herself, she is substituted for the old queen at the front of the hive – and the two parts of the colony are re-united simply by removing the **division board**. This needs to be done before the new nest at the front has been completed or the swarming urge can peak again. Once a colony is headed by a new queen, the risk of swarming is normally over for the year. The rear entrance is closed after around six weeks when the bees using it have died out.

The brood in the parent nest emerges within three weeks and the bees then use the rear combs for storing honey. *If the beekeeper does not wish to extract honey from deep frames that have contained brood, those frames can be replaced with clean combs or foundation frames as soon as the brood has emerged. Note that these operations make it possible to treat the two parts of the colony for varroa mites separately at a time when each part is clear of sealed brood – and so all the mites are on the bees and fully exposed to treatment with say powdered sugar.*



Risk of swarming has ended when the colony is headed by a new queen.

Autumn feeding (varroa tray in)

In **AUTUMN**, the 12 deep frames at the back are taken away in the carry-boxes to extract the honey, leaving the colony to winter on only the front nine frames. Those nine frames were all drawn from foundation this year – *such annual comb*

renewal suppresses brood diseases. The bees are fed sugar syrup in the trough **feeder** to top-up the sealed stores to around 40lbs – or whatever is needed in your area.

This basic method involved finding the queen bee three times. Alternative and simpler ways are outlined in the ***Manual of New Beekeeping.***

WORKING SAFELY WITH A DLD HIVE

The UK Health & Safety Executive (HSE) publishes guideline weights for safe lifting: ‘*Getting to grips with manual handling – a short guide for employers*’.

The DLD hive is the only type of hive that keeps normal operation within those guidelines.



Alternatively the roof can be made in two parts – they still fit together to form a ramp.

Honeyboxes can be lodged at the rear of the hive when removed to allow inspection of brood frames (above), so avoiding need to lower to ground level. The two ‘entrance blocks’ are pushed endways into the rear entrance to form temporary brackets. Honeyboxes can then be handled within HSE safety limits for both men and women.



‘14 x12’ brood frames can each weigh up to 3.5kgs, which can be heavy on the fingers. However, the long lugs make it easy to grip the frame.

Raising the hive body to waist height on long legs enables a frame to be rested on the top-bars and twiddled for inspection of both sides. This takes the weight off the fingers without requiring the beekeeper to



A full set of four honeyboxes can weigh around 23 kgs (50lbs) – about equal to two ‘supers’ for a National hive.

However, the beekeeper can carry the smaller boxes closer to the body, so reducing strain on the back.

The HSE guideweight for small boxes at knuckle height is 25kgs for a man; but only 16kgs for a woman, so women should lift no more than two honeyboxes at one time.



Whatever the type of hive, it should only ever be lifted between two people when it contains bees – the weight far exceeds the safe limit for one person. The legs of a DLD hive can be swivelled outwards to provide handles for easy carrying (left).

An empty body (weight 20kgs) can be handled safely on its own (below) – but should be slid into a long car, rather than lifted right in. *The legs swivel inwards to fit even a*



WHY IS A DARTINGTON HIVE GOOD FOR A BEGINNER?

- **The bees stay quiet** when you open a Long Deep hive since you have not cut horizontally through the patches of brood and the bees do not have to suddenly protect any exposed areas.

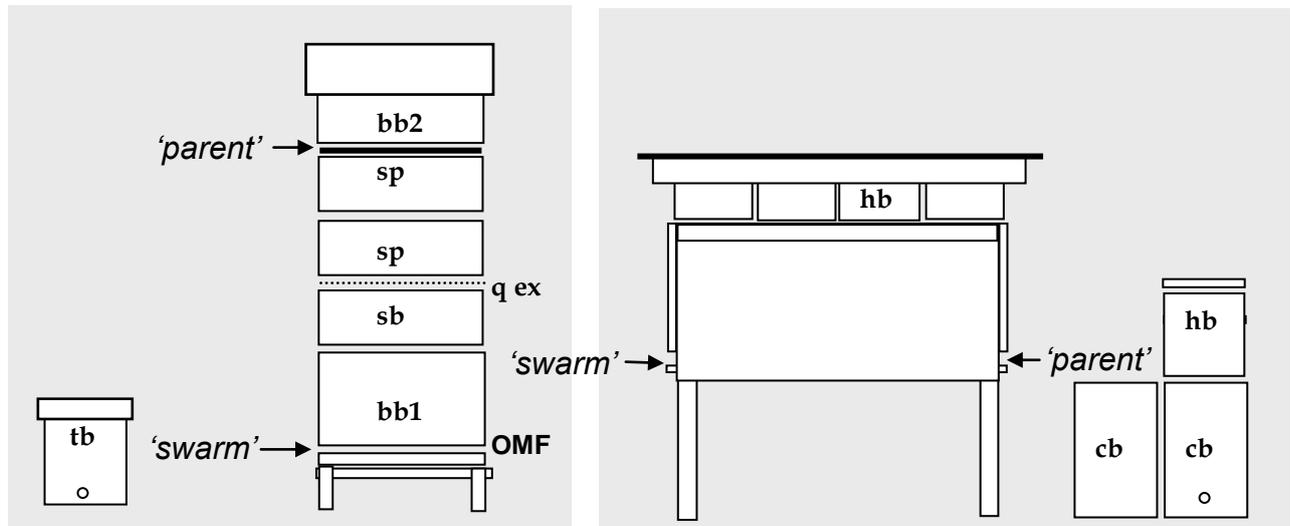
It is easy to avoid alarming the bees by bumping or jerking the frames as there is space to loosen each frame in turn by levering gently **sideways** before lifting **upwards**.

The heaviest box you handle when opening the hive is a honeybox weighing up to 7 kgs (16 lbs). You can replace these light boxes without thumping the hive.

- **Deep brood frames 14x12 enable you to interpret what you see when you open the hive** as each frames provides a complete cross section of the nest.
The frames are in one long row and can be quickly separated into groups – **honey and pollen** at the front, the **brood nest** and finally **more honey**. You can quickly check if there is enough food, if the brood nest is normal and if the bees need more room.
- **The queen** can be found quickly by splitting the **brood frames** into groups of three, with gaps between the groups. Search each group in turn, looking first at the middle frame of each group since the queen will often run away from the outermost faces that are exposed to the light. Lifting the middle frames of each group in turn gives you 50% chance of finding the queen – so check all the middle frames first and then keep checking all frames in each group of three until successful.

- With a Dartington hive you are always **ready to deal with whatever turns up**. For example, a colony may start to expand quickly with risk of starting preparations to swarm. One way to instantly take control is just to insert the **divider** half way down the hive. This instantly splits the large colony into: a small colony with a queen; and a small colony without a queen (a 'nuc') **without need to actually find the queen** – you then open the rear entrance. You will not know which half has the queen unless you see her – but next week you will find eggs in only one part (the small colony) – and queen cells in the other (the nuc). Ideally, the queen should be at the front of the hive – but it works either way. Leave the 'nuc' to rear a new queen – then reunite the two parts by removing the divider when the new queen is laying, say after three weeks. Remove the old queen if you can find her – or leave it to the bees to sort out before winter.
- **Varroa mites** can be effectively controlled without chemicals at the stage when the colony has been divided for swarm control – each part is broodless in turn, so can be treated with icing sugar at a time when all the mites are exposed on the adult bees.

- **FAQ 1: How does a Dartington Long Deep hive compare in size with a conventional hive?**



A National and a DLD hive are both shown with the boxes needed when the colony is at its largest in spring / summer. The colony then needs to be divided into two parts – an ‘artificial swarm’ and ‘parent colony’ (shown above) – in order to control swarming and to raise a new queen.

Area of occupied frames¹ – sq. inches of double-sided comb.

| National hive | | | DLD hive | | |
|--------------------------------|---------|-------------|-----------------------------|---------|-------------|
| <i>Lower brood nest</i> | | | <i>Front brood nest</i> | | |
| <i>(swarm):</i> | | 1063 | <i>(swarm):</i> Body: | 11 | 1628 |
| 10 standard brood frames | | <u>725</u> | 14"x12" | | |
| 11 SN5 shallow frames | | 1788 | | | |
| <i>Top brood box (parent):</i> | | | <i>Rear brood nest</i> | | |
| 10 Hoffman DN5 frames | | 1063 | <i>(parent):</i> | | 1480 |
| | | | 10 14"x12" | | |
| two honey supers: | | | four honeyboxes <i>hb</i> : | | |
| 22 SN5 shallow frames | | 1450 | 20 Manley frames | | 1320 |
| TOTAL | sq. ins | 4301 | TOTAL | sq. ins | 4428 |
| | | 100% | | | 103% |

¹ Frames in support boxes not included in this comparison

FAQ 2: How does a Dartington Long Deep hive compare in cost with a National hive?

The cost of a DLD hive kit needs to be compared against a National hive bought 'in-the-flat' to which the necessary 'extras' have been added (including the support boxes) in order to match all the features built-in to every Dartington hive as standard.

On that basis, a Dartington hive is some 15% cheaper.

FAQ 3: How much honey does a Dartington hive get compared with a National?

The same – it is the bees that get the honey, how much depends on the strain, the forage in the area, the weather, how much the beekeeper lets them get on unhindered and whether they swarm or not. There is no real difference hive v. hive. – except in the last factor, swarming. It is possible, with care, to reduce the overall level of swarming in an apiary where long deep hives are used, since the operations of dividing/re-queening/re-uniting are easier to carry out. Reducing the number of swarms will increase the apiary average, because every colony that swarms loses half or more of its foragers at a critical time.

FAQ 4: How easy is it to learn beekeeping with a Dartington hive?

The foundations of beekeeping lie in understanding the nature of a honeybee colony – its needs for shelter, food and water, how it grows in spring and contracts in autumn, how the spring peak culminates in swarming, how bees suppress pests and diseases. These fundamentals are the same whatever the hive and can most easily be learned in a local beekeeping course.

The illustrated *Manual of New Beekeeping* explains how the classic principles of beekeeping are applied to Dartington hives. The Manual uses series of photos to illustrate one particular way to tackle each stage in the annual cycle – and once you can visualise what to expect, you will be able to apply your basic knowledge of beekeeping and move on to a lifetime's pleasure through trying more and more of your own variations year by year, planning to get more honey next season! You can always ask questions by e-mail or letter.

Whilst the classic principles for managing bees are common to all hives, the differences starts to show when you compare the physical effort involved in operating different types of hive. So the best advice is to handle as many types of hive as you can before deciding which to use.

There is an open invitation to beekeepers to visit the demonstration apiary at Letchworth, 35 miles north of London, just off the A1(M). (shown on the front cover). There are about 20 colonies in Dartington hives and empty examples of a WBC, a National and a Langstroth. Ring 01462 450 707 to agree a time.

If you choose to use a Dartington hive, free follow-up advice is available by e-mail or letter. Tutorials can be given in your own apiary provided the journey is practical, subject to a charge for time and travel.

THE NEED TO CONSIDER SAFETY IN BEEKEEPING

Beekeeping is a fascinating occupation – but it can involve heavy lifting. The most common hive – the **National** – was designed in the 1920's for commercial use, to encourage beekeepers to move hives to farms for pollination, and so raise agricultural productivity. A full honey super weighs 15kgs (33lbs), and the size of the box means that it has to be held away from the body. Sixty years ago this was acceptable but beekeepers today are in constant danger of hurting their backs – ‘beekeepers’ back!

Today safety is given high priority. **Guideweights** published by the **Health and Safety Executive (HSE)**² tell employers how to assess the risks of employees lifting excessive loads. It is however almost impossible to stay within that guidance if you work a **National hive** on your own.

The new features of Dartington hives solve the problem. The hives allow you to grow a large colony, control swarming, deal effectively with disease and varroa infestation - all without exceeding the HSE guidelines.

THE FEATURES OF DARTINGTON HIVES THAT REDUCE RISK

- ❖ Small honey-boxes (half-size supers) both halve the weight to be lifted and reduce the distance of the load from the beekeeper's body, *cutting strain on the back by more than half.*
- ❖ Rear brackets can be formed on which to lodge honey-boxes when the hive is open – *so eliminating need to lower honeyboxes to ground level.*
- ❖ Long legs raise the body to waist height – *saving need to stoop when inspecting the brood frames .*
- ❖ Sidebars at the top of the body – and no loose bits below that could fall off – *avoids lifting a complete hive with a bent back if ever the hive has to be moved.*

ALWAYS REMEMBER that any occupied hive should only be lifted between two people. The weight of a full-sized colony will always exceed safe limits if a beekeeper is working alone, and this applies to EVERY type of hive.

² Getting to grips with MANUAL HANDLING. A short guide. Free copy obtainable from HSE Books, tel: 01787 881165.

The HSE guidance is shown opposite for reference.

HSE GUIDELINES FOR SAFE LIFTING

The guidelines of the **UK Health & Safety Executive** are published to protect employees from risk. The guidelines also enable assessment of risks from lifting by the self-employed, including hobby beekeepers.

For example, Fig 2 below indicates that the safe weight for lifting a box 450mm square at elbow level is 15kgs for a man (averaging the 20kgs and 10kgs zones) – which corresponds with the weight of a full National super. But the guideline is only 10kgs for a woman, so a woman can always be at risk by handling a full National super. If the super is lowered to the ground, the guidelines drop to 7.5kgs for a man (a super only half full) – and only 5kgs for a woman. **So beekeepers should be aware of the risks and consider how to avoid handling full**

National supers on their own.

Using a Dartington honeybox (a half-size super) both halves the weight and allows the smaller

box to be held closer to the spine (within the inner zones). The guideline weights for lifting a smaller box at elbow level rise to 25kgs and 16kgs respectively – whilst the weight of a full honeybox is reduced to only 8kgs. A honeybox can even be lowered to the ground with only

little risk since it will be close to the feet where the safety limits are 10kgs and 7kgs.

General risk assessment guidelines

There is no such thing as a completely 'safe' manual handling operation. But working within the following guidelines will cut the risk and reduce the need for a more detailed assessment.

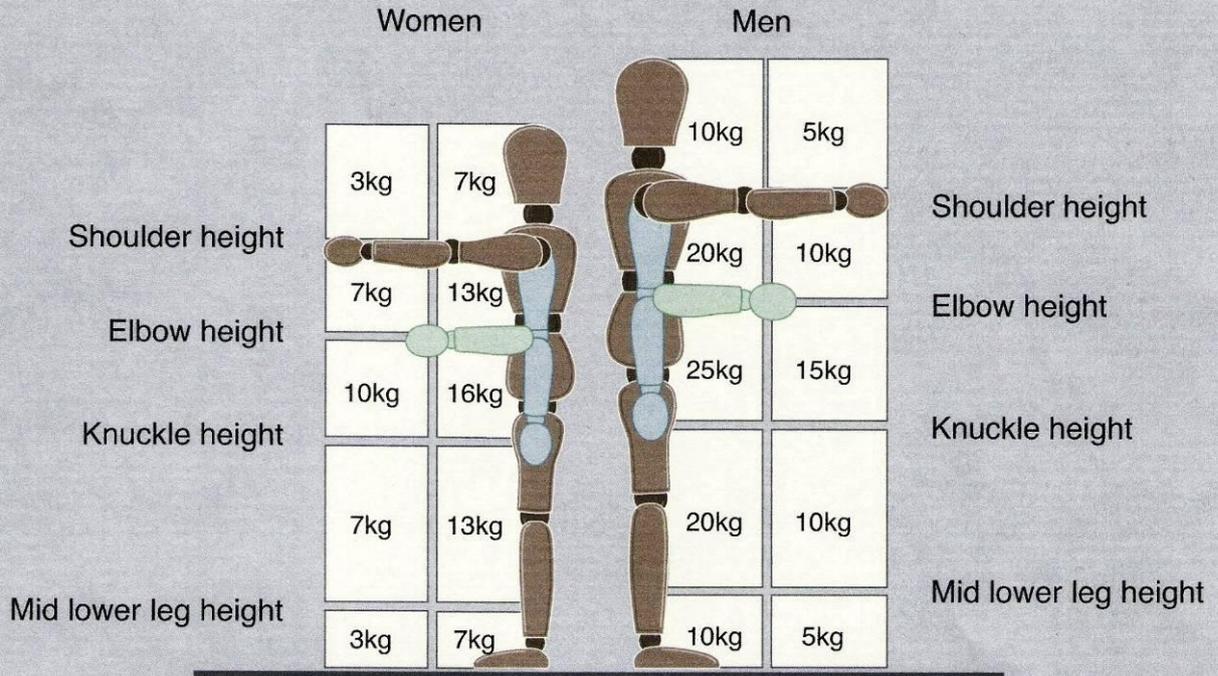


Figure 2, Getting to grips with MANUAL HANDLING. A short guide. HSE Books

HSE ADVICE ON ASSESSING YOUR PERSONAL RISK

- Use Figure 2 to make a quick and easy assessment. Each box contains a guideline weight for lifting and lowering in that zone. (As you can see, the guideline weights are reduced if handling is done with arms extended, or at high or low levels, as that is where injuries are most likely to occur.)
- Observe the work activity you are assessing and compare it to the diagram. First, decide which box or boxes the lifter's hands pass through when moving the load. Then, assess the maximum weight being handled. If it is less than the figure given in the box, the operation is within the guidelines.
- If the lifter's hands enter more than one box during the operation, use the smallest weight. Use an in-between weight if the hands are close to a boundary between boxes.
- The guideline weights assume that the load is readily grasped with both hands and that the operation takes place in reasonable working conditions, with the lifter in a stable body position.

Twisting

Reduce the guideline weights if the handler twists to the side during the operation. As a rough guide, reduce them by 10% if the handler twists beyond 45°, and by 20% if the handler twists beyond 90°.

Frequent lifting and lowering

The guideline weights are for infrequent operations - up to about 30 operations per hour - where the pace of work is not forced, adequate pauses to rest or use different muscles are possible, and the load is not supported by the handler for any length of time. Reduce the weights if the operation is repeated more often. As a rough guide, reduce the weights by 30% if the operation is repeated once or twice per minute, by 50% if the operation is repeated five to eight times a minute, and by 80% where the operation is repeated more than 12 times a minute.

REMEMBER - YOU ARE RESPONSIBLE FOR YOURSELF

Beekeepers do not generally have an 'employer' and so are solely responsible for their own safety. However, anyone giving advice – say through a beekeeping course or when selling equipment – should assist a beekeeper to assess whether operating any particular hive will be safe for that person.

Your own height, strength, suppleness and how you arrange your apiary will affect your personal level of risk. If you have special needs, you should make a more careful assessment.

WHAT TO CHECK WHEN TRYING OUT A DARTINGTON HIVE

The heaviest lifts which you should check **for yourself** are:

1. Carrying an empty body
2. Removing the roof
3. Lifting the honeyboxes (half-size supers)
4. Handling individual brood frames.

If lifting does not exceed the Guidelines overleaf there is generally no need to reduce the risk. *Lifting weights heavier than the guidelines however increases the risks and needs individual assessment.*

Reference to the **HSE Guidelines** suggests that operating a Dartington hive will generally be safe – *but individual circumstances vary and should always be checked.*

1. An empty body weighs 20kgs. It can therefore be carried just below waist level by a man within the guidelines but a woman should carry only one end.
2. A gabled, kit roof weighs 10kgs. Lifting at waist height is at the edge of the guidelines for men and women. Lowering down to the ground can exceed the guidelines, in particular by women. However, propping one end of a long roof into the hive entrance saves need to lower to ground-level. *The weight can also be halved by making the roof in two parts.*
3. A Dartington honeybox can weigh up to 7kgs. A single box can therefore be lowered to the ground by both men and women – but it is safer to lodge the honeyboxes at the level of the rear entrance (knee height), which keeps well within the guidance.
4. 14x12 deep frames used for honey can weigh up to 3.5kgs. Each is lifted individually out of the body – the toe can then be rested for inspection.

The guidelines indicate it is safe for a man to carry six full 14x12 frames in a carry-box, but a woman should carry only four at a time.

*Note that you do not need to lift the **body** of an occupied Dartington hive during normal operations. For example ,just closing the front entrance and opening the rear entrance is equivalent to moving the whole hive three feet and turning it through 180 degrees.*

Further information

❖ *Manual of New Beekeeping*

90 pages, spiral bound, A4 book describing the hive and how to manage a honeybee colony. Many photo sequences illustrating the key seasonal operations.

£15+90p p&p

Contents:

- Dartington hives – a new design for recreational beekeepers’
- Principles for managing a honeybee nest ’
- The annual cycle with a Dartington Long Deep hive
- The annual cycle with a Dartington Long Standard hive
- The principles for hive design incorporated into Dartington hives
- The features of Dartington hives illustrated in the Dartington standard hive
- Obtaining bees for Dartington hives
- ‘*How it can be done*’:
photo sequences of some important seasonal operations
-



❖ *Manual of New Beekeeping plus Construction Information on a CD for homw reading or printing*

– all documents are in ms word 2003.

£10 + 30p p&p

Send your cheque to:

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ROBIN DARTINGTON
designer

Robin Dartington has enjoyed keeping bees in all types of hives for more than 40 years, in the city and in the country. He made his first Long Deep Hives in 1975 to simplify keeping bees on the roof of a five-storey London house. Robin has now developed the hive and the management systems to make keeping bees in every situation more enjoyable and less work. The system addresses, in particular, the new problems facing beekeepers on controlling varroa mites.



Robin Dartington with a Dartington Long Standard hive

Robin Dartington lectures and demonstrates the system of *New Beekeeping* to local associations. He welcomes visitors to his demonstration apiary at HoneyWorks in Hitchin Herts, and will run day courses or give private tuition on request.