"ProFrame®'s 7 Golden Rules For Successful On-Site Fabrication Of Timber-Framing!"

How to work efficiently and know that what you are doing will be good enough!

How long any home takes to be framed and erected isn't simply a matter of pure chance, or even how many people are working on it! What really matters is how well planned the work is and how efficiently the necessary tasks are carried out. Nor is efficiency about finding 'short-cuts'; in fact; the time taken working around the 'knock-on' consequences of tackling the work 'out-of-sequence' with the recommended sequence, or trying to rectify the problems caused by doing things differently virtually guarantees it will end up being a very inefficient project with disproportionately significant time and cost consequences!

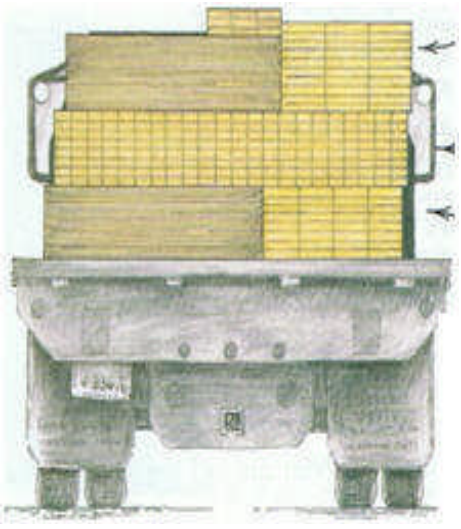
However; that doesn't mean that working to the desired level of accuracy has to be tedious or time-consuming, quite the contrary in fact, as the ProFrame® approach to erecting timber-frame houses have been evolved by the "Self-Build-Pro" over nearly four decades in order to expedite the whole process of achieving a high-quality 'build' without needing to waste time rectifying problems and/or re-doing wall-panel framing!

So apart from familiarizing yourself with the whole framing process advocated by ProFrame®; there is much to be gained from assessing the nature of the building site in terms of working space, delivery accessibility relative to the actual build area, etc. and the why's and wherefore's of doing things a particular way.

(Rule 1) Pre-Plan What You Will Be Doing ~ So That You Don't Have To Move Materials Around More Than Necessary!

Obviously; if (as usual) the overall timescale is important, it will be necessary to get the framing materials delivered whilst work is still in progress getting the foundations constructed, so they can be prepared ready to be framed together immediately the foundations are completed. Accordingly; the delivery and preparation area for framing materials needs to be kept out of the way of the construction work but must still be adjacent in order to minimize subsequent handling; i.e. as near as possible to where they are going to be used.

EXAMPLE
If delivery is scheduled to occur when it is known that suitable 'plant' will be available for unloading and/or moving 'packs' of timber; it would be advantageous to get the supplier to load the timber for delivery so that the timber, that will be used first, ends up readily accessible by being 'on top' by the time the timber is stacked on-site; e.g. floor joists, wall-framing, floor joists, wall-framing, roof timbers; depending upon the type of ground floor construction, how many storeys there are, etc.

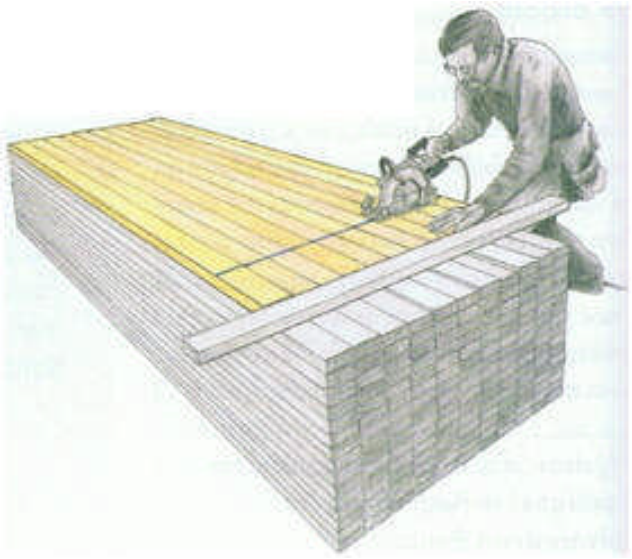


The principle objective is to ensure that once the materials are delivered and 'stacked' onsite, they don't get moved any more than absolutely necessary; i.e. if you do have to move timber, plan so that you only have to move it once! Ideally; they should be 'stacked' onsite so that once cut to length, they are ready to be incorporated straight into the framing as it progresses.

(Rule 2) 'Batch-cut' Whenever Possible!

Even whilst the foundations are still being built; the bulk of the framing members and sheathing can be cut to size and/or length ready for use. Once the 'anchor-plates' are cut and fitted to the foundations; the final overall framing dimensions for the entire house are fixed and the final length of the remaining 'end' wall-panels and floor joists & headers can be adjusted as necessary ~ allowing the remaining 'end-bay' sheathing sheets and the remaining pairs of wall-panel top and bottom-plates, the floor joists and header-joists, all to be cut to the correct length and/or width ready for use.

EXAMPLE

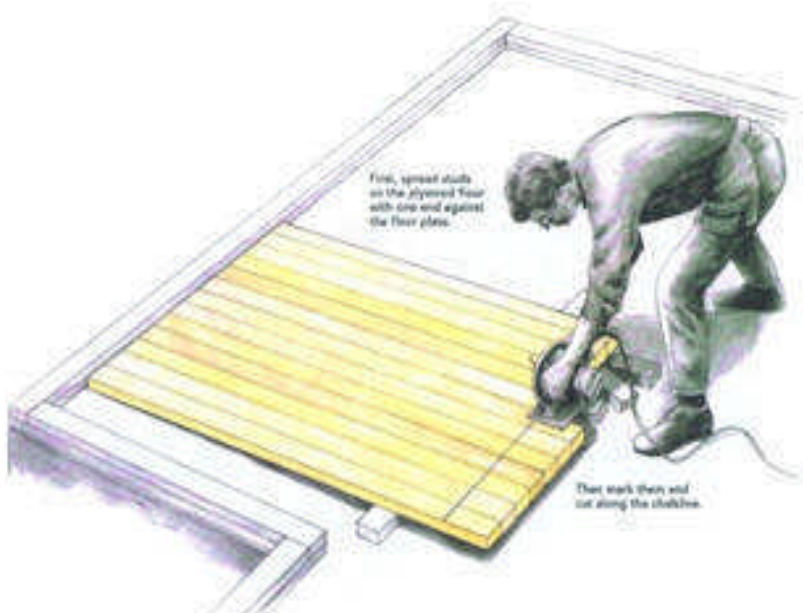


Whilst it should be obvious to one-and-all that it is quicker to cut two lengths of timber at once than it is to measure and cut each length separately ~ it is very much quicker to cut batches of 15 – 20 pieces to length each time by using a simple 'jig'!

This works particularly well for the 'wall-studs'; which can number anything from several dozen upto several hundred pieces of identical length for a single house; but it also works for any other framing member where there are several pieces of identical length required.

If you have a stack of studs that need to be cut the same length; cut an individual stud to length to act as a 'template' for the rest ~ making sure it is cut accurately to length! Align one end of the top row, use the 'template' to mark off the required length and mark the cutting-line across, then cut studs to length right on the 'stack'.

Alternatively; spread them out on the floor, shoving one end against a wall, etc., then mark off the cutting-line as before and cut them all at once ~ this works particularly well for cutting 'batches' of floor joists to length as having something to push them against makes it easy to ensure the opposite ends are kept correctly aligned!



Batch-cutting' is even more efficient if you use a portable 'DIY' electric power-saw rather than a hand-saw; especially as 'batch-cutting' minimizes the time when electric power is needed onsite if a generator has to be used! It is very rare for the cutting of framing and sheathing to extend beyond a day's work for anything less than a 250 m^2 house when properly planned and executed!

Which brings us neatly onto the next "Rule of On-Site Framing"!

(Rule 3) Finish Each Task Before Starting The Next One!

There is a tendency; even amongst experienced 'time-served' carpenters; to believe that the only 'proper' way to do things is to 'cut and fit' one piece at a time ~ generally because experience has taught them that it is the only way to achieve a reasonable standard of workmanship when they are constantly having to compensate for and accommodate the dimensional and/or structural inaccuracies that are inherent with the UK's so-called 'traditional' construction methods! There is a similar reluctance to finally fix things in place before they can be sure everything will fit together properly which has led to a 'cut, fit and tack in place' approach, with carpenters returning to fix everything permanently into place only after everything has been fitted together and they are happy it is okay. As a consequence; everything inevitably takes longer to get done, making it slow and expensive to make a decent job of anything!

Fortunately; neither approach is appropriate or necessary when framing a timber-frame house. 'Batch-cutting' of the framing members works because every dimension is known before any framing-up even starts. Consequently; every wall-panel, every opening, every floor joist, etc. can be confidently framed-up and fully nailed together first-time around with no need for further measuring and/or cutting of component pieces.

'Batch-cutting' framing members, pre-cutting and half-nailing header-joists, top and bottom wall-panel plates, etc. as advocated by ProFrame® makes for a quick and accurate framing-up process. Once the initial marking-up of wall-panel plates and header-joists is done; there is virtually no need to use a tape-measure, apart from

a quick 30-second check to ensure that wall-panel diagonals are equalized before the sheathing is nailed in place!

Being able to get virtually all the cutting and measuring done in 'one-go' means no distractions from the job in hand. Similarly; framing-up is a simple matter of aligning the various members and hammering home the half-nailing to fix them all together; again there are no competing tasks to do or come back to, so again there are no distractions from the job in hand, because each wall-panel can be fully completed in turn ready for erection confident that they will all fit together properly. Similarly; when the wall-panels are erected; there will be no need to use either a spirit-level or a plumb-bob to ensure that all the walls are truly vertical and correctly aligned!

Such an approach not only prevents tasks from being forgotten or overlooked by removing the 'traditional' piecemeal, stop-start approach to completing things but also removes the risk of distraction from the job in hand by removing the need to be constantly switching between tasks!

(Rule 4) Work In A Logical Order!

One huge advantage of concentrating upon just one task at a time is that it makes it very easy to establish an efficient routine for each phase of the work; i.e. by following the logical sequence that ProFrame® advocates which allows things to be done the same way every time. Such 'standard' procedures can have an immense effect upon reducing mistakes and improving efficiency! Even complete newcomers to onsite-fabrication, can establish familiarity with the processes involved within a few hours of starting and quickly develop a working 'rhythm' that makes the liberal 'labour-constants' used by all the standard UK construction pricing books look like utter nonsense!

NB: Using the methods that ProFrame® advocates; the "Self-Build-Pro" has regularly framed and erected 12 - 15 metres of external structural wall-panels per day; i.e. 8 hours work; working alone ~ compared to the 3 metres that should be the 'norm' according to pricing book 'labour-constants'!

Within a couple of days; even novice 'DIY' enthusiasts are usually managing to frame and erect wall-panels at least 2 – 3 times faster than the time the 'books' claim it should be taking ~ although, in fairness, it needs to be pointed out that the pricing books' 'labour-constants' are all based upon the typical time taken by experienced carpenters to 'frame' basic stud partition walls and cut and nail plywood lining to one-side using the UK's 'traditional' construction methods!

Incidentally; 'batch-cutting' can be used to great effect for internal partition walls, etc. too. Of course; unlike structural wall-panels, there is no sheathing to attach so it is possible to frame-up and erect virtually all the partitions for a typical three-bedroom spec. house-builder's bungalow in a single day, or six bungalows in six days as the "Self-Build-Pro" did to get a builder-client out of a 'mess' back in the early 1980's!

(Rule 5) Work Within The Required Tolerances To Achieve High-Quality!

There is great stress placed upon the need to work accurately because any timber-frame is an engineered structure that depends upon the correct grade of timber and sheathing being cut to the right size and all nailed together with the correct nails at the required centres. Rough sawn timber banged together with 100 mm oval nails it definitely isn't! However; it isn't high-quality joinery work either!

It is important to get the 'anchor-plates' right. They need to be level, straight, parallel and square because everything else 'fits' to them; including determining the final dimensions of the timber-frame structure itself. However if they need to be slightly longer or shorter than planned in order to achieve a square, parallel 'base' fixed to the foundations within the permitted (statutory) tolerances; that doesn't matter.

Unlike the frequent problems arising with 'factory-produced' components; i.e. wall-panels or 'SIPS'; the timber-frame simply gains or loses a bit to one or two wall-panel lengths, floor joists and header-joists; and then everything carries on exactly as planned.

However; 'anchor-plates' can be cut 4/5 mm short of exact length without causing problems. Top and bottom-plates to wall-panels are deliberately cut so that the 'waste' (width of timber removed by the saw-blade itself) is taken from the required length; i.e. the timber is cut against the inside the marked cutting-line instead of the normal outside. This is a simple technique that offsets the effect of 'creep' whenever two or more wall-panels are fixed together. Double-header plates that run along the tops of the wall-panels can also be cut 4/5 mm short to facilitate tying in adjacent walls at corners and junctions.

It is important to ensure that the diagonal lengths of each framed wall-panel are equalized before the sheathing is nailed into place; but it is sufficient to 'eye-through' along one or other 'edge' to check that the top and bottom-plates are straight before and after 'nudging' the framing 'square'. Similarly; aligning the top and bottom edges of adjacent wall-panels, whether by touch or 'eye', will guarantee a vertical corner and that

both panels are truly vertical too! Simply 'eyeing' through between corners is sufficient to check that the wall in-between is also vertical. If the worst comes to the worst; the statutory tolerances do allow walls to be upto 6 mm out of vertical alignment over the full height of the wall, but, in practice, simply following ProFrame®'s recommended methods will ensure accuracy to within a couple of millimetres!

(Remember; tolerances are there in case you genuinely need them; simply using them as a 'target' to aim for is a recipe that will guarantee trouble!)

(Rule 6) Rhyme And Reason!

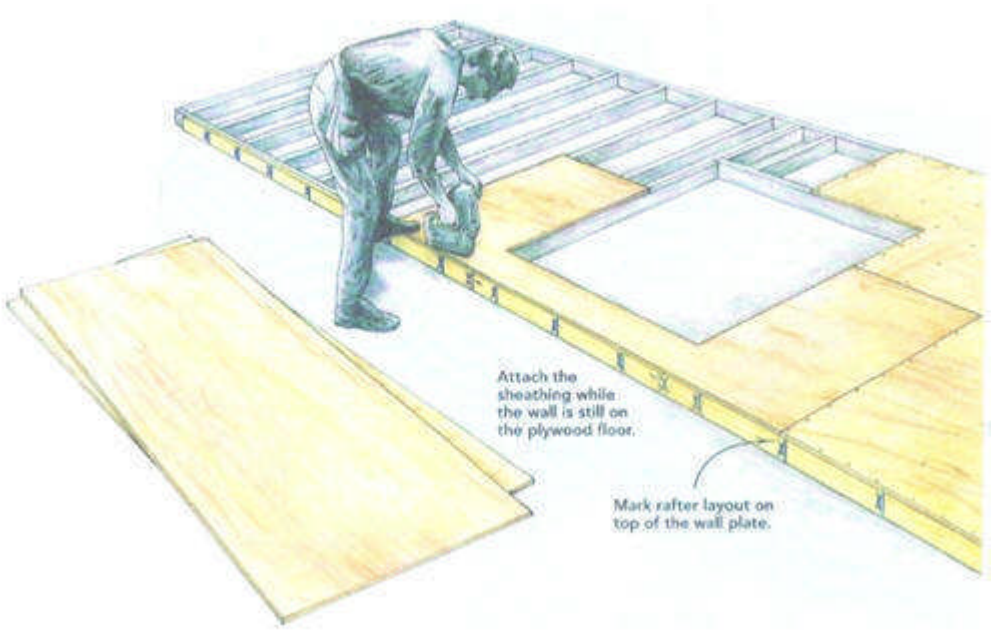
Despite onsite-framing being widely associated with North American 'stick-building' and despite the relatively high productivity achieved by American and Canadian carpenters; waiting until walls are raised before nailing on the sheathing means that you have to brace and 'square-up' the open-framing when you raise it and then work off either a ladder or scaffolding to fix the sheathing to it. It also takes at least two people to hold and nail the sheathing into place. All of which is extremely time-consuming and wasteful.

Ladders should only be used for accessing upper floors before the stairs are built-in!

EXAMPLE

Walls can be fully nailed and sheathed whilst lying flat on the deck and that has been the only method advocated by ProFrame® since the mid 1970's!

Interestingly; the idea finally seems to be starting to catch on in North America too!



The objective when constructing any timber-frame house is to achieve strength, efficiency and accuracy. Framing in accordance with the framing drawings and nailing specifications will ensure that the building will have the required strength; similarly following the 'batch-cutting', 'one task at a time' philosophy advocated by ProFrame® will take care of the efficiency and accuracy.

NB: Under English Law; the safe, correct construction of any building; so that it complies with all the legal requirements; is primarily the builder's responsibility, whether you are a professional builder, sub-contractor or 'DIY' enthusiast. However; following the framing layout drawings/nailing specifications that have been approved as complying with the Building Regulations, will always be your best protection against any problems. It is also a very good reason for not ignoring specifications, instructions or advocated methods and processes and for resisting any temptation to try to take any perceived 'short-cuts'; because if you do, it becomes entirely your responsibility!

There are other ways in which individuals can take personal responsibility and some have been mentioned above; e.g. judging and aligning walls 'by eye' rather than always measuring and checking with spirit-levels, etc. Although nailing centres are specified; it is very easy to become familiar with the requirements and to judge the nailing centres 'by eye' too! (You can always keep a short 'stick' of appropriate length handy as a reminder of just have long a particular spacing interval looks.) With practice; it also becomes quite easy to half-nail along an invisible 'line' running perpendicularly across header-joists; from the floor joist centre-line markings; ready for nailing to the ends of the floor joists later. These are all little things that will save time and speed up the work ~ once you can do it consistently ~ because however these 'jobs' are done, they always have to be done sufficiently accurately to keep the work within specified tolerances.

You will notice that none of these minor 'short-cuts' change the sequence of working or any other aspect of the framing process; they are simply efficiency improvements that emanate from the simple repetitive nature of the whole framing process.

(Rule 7) Last But Not Least!

Working safely should be at the very top of everybody's priority list. We all have a legal responsibility to work safely and not to endanger other people by what we do or how we do it. However; our personal safety isn't just about wearing safety glasses, hearing protectors, dust-masks, 'hard' hats, 'rigger' boots and gloves, even though they are all sensible precautions to protect ourselves against injury. Nor is accident prevention simply about using 'stop-blocks' and 'ratchet-straps' to prevent wall-panels sliding straight over the edge of upper floors or gable-panels falling from the top of gable walls before they are securely fixed in place; though it would be totally stupid to work without using them.

All the protective clothing and safety 'devices' imaginable won't help if your mind isn't on what you are doing.

Always pay attention, approach the work with a clear head, listen to that 'inner' voice that says that "This is too dangerous" and always be extra careful towards the end of the day when tiredness, rushing to finish something or simply thinking about what you intend doing when you leave the site; could all spell inattention and lead to an accident that's been just waiting to happen!

Please; don't work if you can't concentrate on what you are doing and always be aware of where anybody else is and what they are doing ~ particularly when people are working above or below you!

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