HOUTWERKVERENIGING VAN PRETORIA
WOODWORKING ASSOCIATION OF PRETORIA

METODES OM TAFELBLAAIE TE MAAK
METHODS TO MAKE TABLE TOPS

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Daar is seker meer verskillende soorte hout tafel-, kantoor-, en ander blaaie as wat mens op jou tien vingers kan tel. Dit sluit natuurlik blaaie van soliede hout en mensgemaakte bord in. Laasgenoemde sal meestal met fineer aan beide kante bedek wees. Soms word kaal splinterbord (chipboard) of MDF (medium density fibre) ook vir laekoste blaaie aangewend. Hierdie asook Melamine en Formica blaaie gaan nie bepreek word nie.

Die volgende beskrywings van ‘n aantal verskillende tipe blaaie, en hoe om dit te vervaardig, kan nie in fyn besonderhede hanteer word nie – dit sal net te omslagtig wees. Dit word dus aanvaar dat persone wat ‘n besondere tipe blad wil vervaardig binne sy vlak van vaardigheid sal beweeg, of verdere navraag sal doen waar onsekerheid voorkom. Die werklik komplekse blaaie word nietemin in meer besonderhede behandel.

Die volgende tipe blaaie word bespreek wat ondermeer vir eettafelblaaie, kroegtoonbankblaaie, muureenheidblaaie, kantoor werktafelblaaie, konferensiekamer tafelblaaie ens, toepassing sal vind.

- **Soliede hout blaaie**
- **Blaaie van mensgemaakte borde met fineer beide kante**

Die artikel word gedeeltelik in Afrikaans en gedeeltelik in Engels gedoen. Kom ons begin in Engels.

1. SOLID WOOD TOPS

Solid wooden planks or boards for various and many applications have been made by humans for thousands of years. In the British museum there are examples of solid wooden coffins made by Egyptians in ancient times. Looking at these one could almost think that the planks were put through as thicknesser! What is also clear is that these ancient people understood wood movement. We should also be aware of this when making and fitting solid tops, and allow for wood movement, whether expansion, contraction, warping or twisting, etc. The following examples explain various methods for making solid tops.

1.1 Single thickness tops

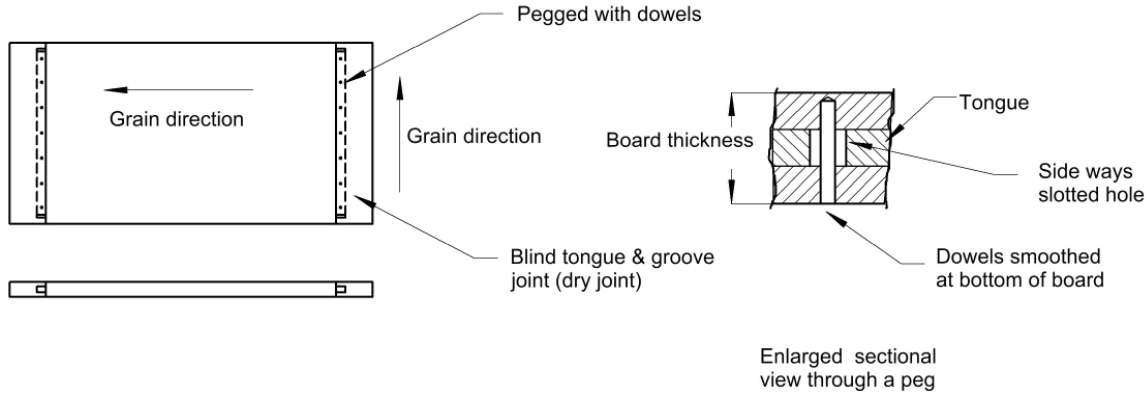
This refers to tops of single thickness solid board made from laminated planks. The thickness of the solid wood can be from say 20 mm up to say 40 mm or even thicker. Edges in this case are of the same thickness as the top. In some cases the top will form the backbone of the table and hence the leg structure will be joined directly to the top.

1.1.1 Simple laminated tops

Not much need to be said about making such tops due to their simplicity. When making solid tops, planks can be laminated over the width by several means. Plain butt joints, so-called "f" joints and "biscuits" or splines may be employed. I prefer plain butt joints. In order to cut "F" joints it is necessary to use an automatic feeder machine along with a spindle jointer. This type of joint is really intended for mass production. Nonetheless, it always looks awful at the ends, especially with profiles and raised panels. Tops may have straight lined sides (square, rectangular hexagonal, etc); or part curved and part straight, circular or any combination of curves. The edge can of course be profiled with a router. Just keep in mind that biscuits or splines should not show at the ends. An excellent article is available in *Fine Woodworking* Dec. 1989 issue 79 page 68. Further elaboration here is not deemed necessary.

1.1.2 The bread board ends

Bread boards are intended for rectangular, or perhaps square tops, but not for highly curved line sides. We know that any solid wooden board or top, laminated or not (unless laminations are very narrow), can and usually does, warp and/or twist when left free to do so. People often do not realise that solid table tops remain flat only because they are "clamped" down firmly on the table frame. The bread board technique helps to stop warping and some twisting. It can also provide a visual effect to top. Bread board tops in solid wood are always single thickness tops. This technique is shown in **Drawing 1**.



Drawing 1: Bread board top

The tongues are cut with a router on both ends of the plank on both sides across the grain. Grooves in the end pieces (long grain) can also be cut with a router. The thickness of the tongue can be 1/3 the board thickness, or slightly thicker, and be centred in the middle of the thickness. Depth of grooves should be slightly deeper than tongue length. The slots in the end pieces should be blind, the tongues should be cut back by this amount plus allowance for expansion (about 1 mm per 100 mm of top width). Tongues should be long enough to give a sturdy fit, say at least 35 mm for a table top.

When the end pieces have been successfully dry fitted, holes of about 6 mm dia. can be drilled from the bottom side of the top as shown in the drawing, going almost through the top. Space holes about 150 – 200 mm apart. Remove end pieces and slot holes only in the tongues sideways leaving the middle holes unslotted. I prefer to slot the holes more and more moving from the middle (as wood movement increases further from the middle, remember about 1 mm per 100 mm from the middle). Finally re-assemble the ends without any glue, and peg the holes with 6 mm dowels with a bit of glue to just keep dowels fixed. The dowels can be levelled afterwards.

It is also possible to do breadboards with mortise and tenon joints spacing the joints say 200 mm apart, but I prefer the described method. It should be pointed out that the where the end pieces meet the side edges of the top wood movement will occur which will become apparent sooner or later. Bread boards are mostly left with square edges i.e. without profiles.

1.2 Verdikking van bladrande

Daar is dikwels ‘n behoefte of rede waarom ‘n blad vir ‘n tafel, kroeg, of ander enige blad dikker moet vertoon. Dit is meestal vir estetiese of sterkte redes, selfs albei. Daar is natuurlik baie tegnieke om dit te doen, elk met sy voordele en nadele. Daar is uiteraard makliker en moeiliker tegnieke en die houtwerker sal self moet besluit watter een vir enige besondere projek die beste pas.

Beide soliede hout en mensgemaakte blaaie se rande kan natuurlik verdik word dmv ‘n addisionele rand. Nietemin is daar uitsettings-/inkrimpingsprobleme met soliede hout wat agv verandering van voginhoud in die hout swel en inkrimp. Die uitsetting/inkrimping van hout is geweldig kragtig en mens moet nie probeer om dit te beperk nie. Daar moet voorsiening in die blad se ontwerp hiervoor gemaak word.

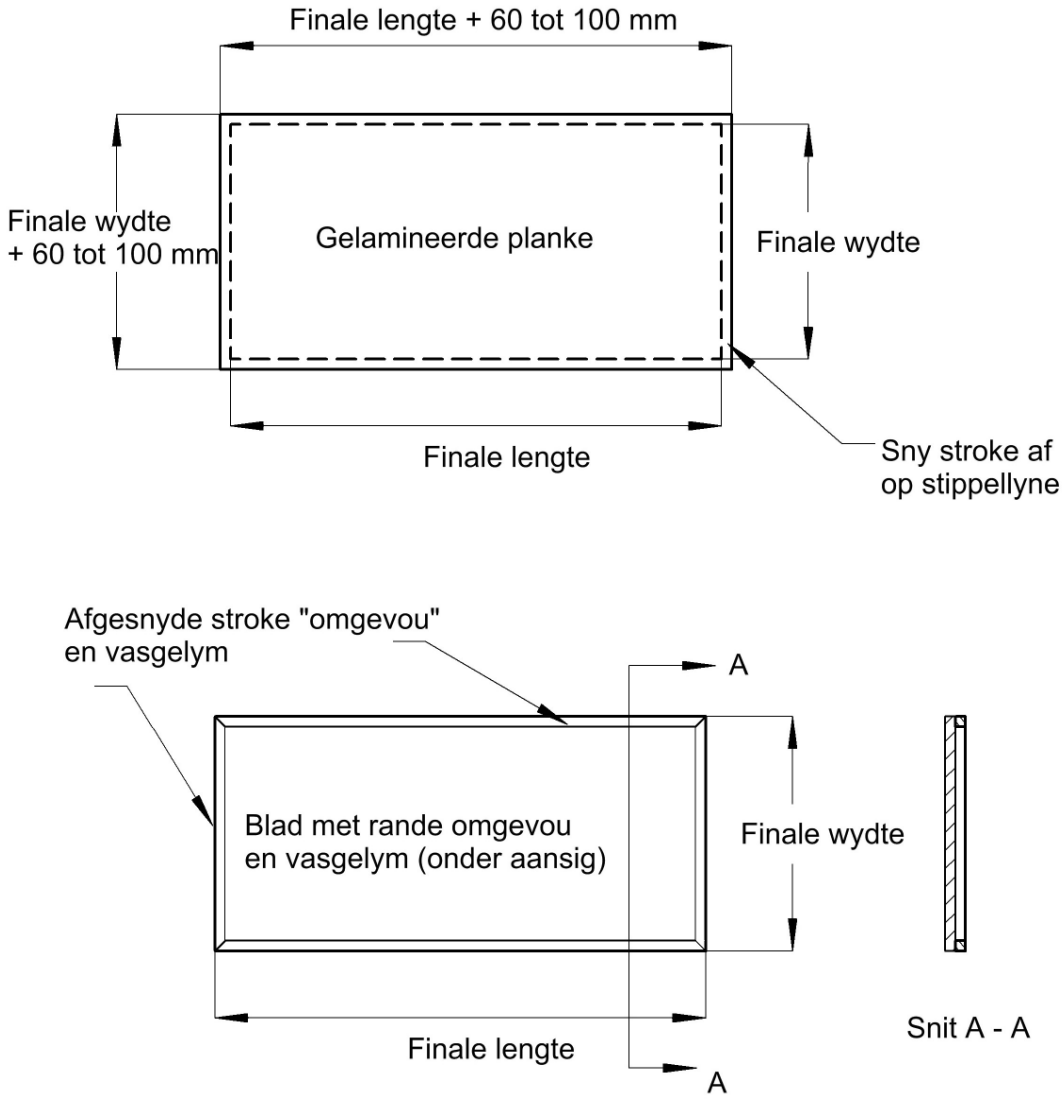
Soos welbekend vind daar seisoenale uitsetting en inkrimping van soliede hout oor die dwarsdraad (grein) van ‘n plank. Mens kan vir elke tipe hout, voginhoud en hoe die planke oorspronklik gesaag was, gaan navorsing doen om toelating vir die beweging te bereken. Ek werk egter op 1 mm per 100 mm toelating vir beweging en tot dusver het dit goed gewerk in die praktyk. Dit wil sê as die blad bv. 900 mm wyd gaan wees laat toe vir 9 mm beweging. In die praktyk is dit my ondervinding dat dit minder kan wees met oond-gedroogde hout. Dan moet ek byvoeg dat ek uitsluitlik met oondgedroogte hout werk.

1.2.1 Verdubbeling van randdikte met die blad se eie hout

Die doel hiermee is om te die skyn te gee dat die blad se hout dubbel so dik is as wat dit werklik is. Die dubbelrand word meestal glad met die blad se buitelyn afgewerk sodat dit lyk soos een stuk hout. In werklikheid lyk dit soos ‘n visgraat op die endgrein, veral as die jaarringe effens skuins lê. Met hierdie metode kan net verdubbeling gedoen word (ek het nog nie vertrippeling probeer nie!). Langs die sykante vloei die las mooi saam. Hierdie metode verskaf weinig versterking oor die dwarste van die blad. Die bladstroke kan, soos in par. 1.1.2 verduidelik, ook ongelyk met die blad sy se rand geplaas word (sien **Tekening 4**).

a) Blaaie met reguit sye:

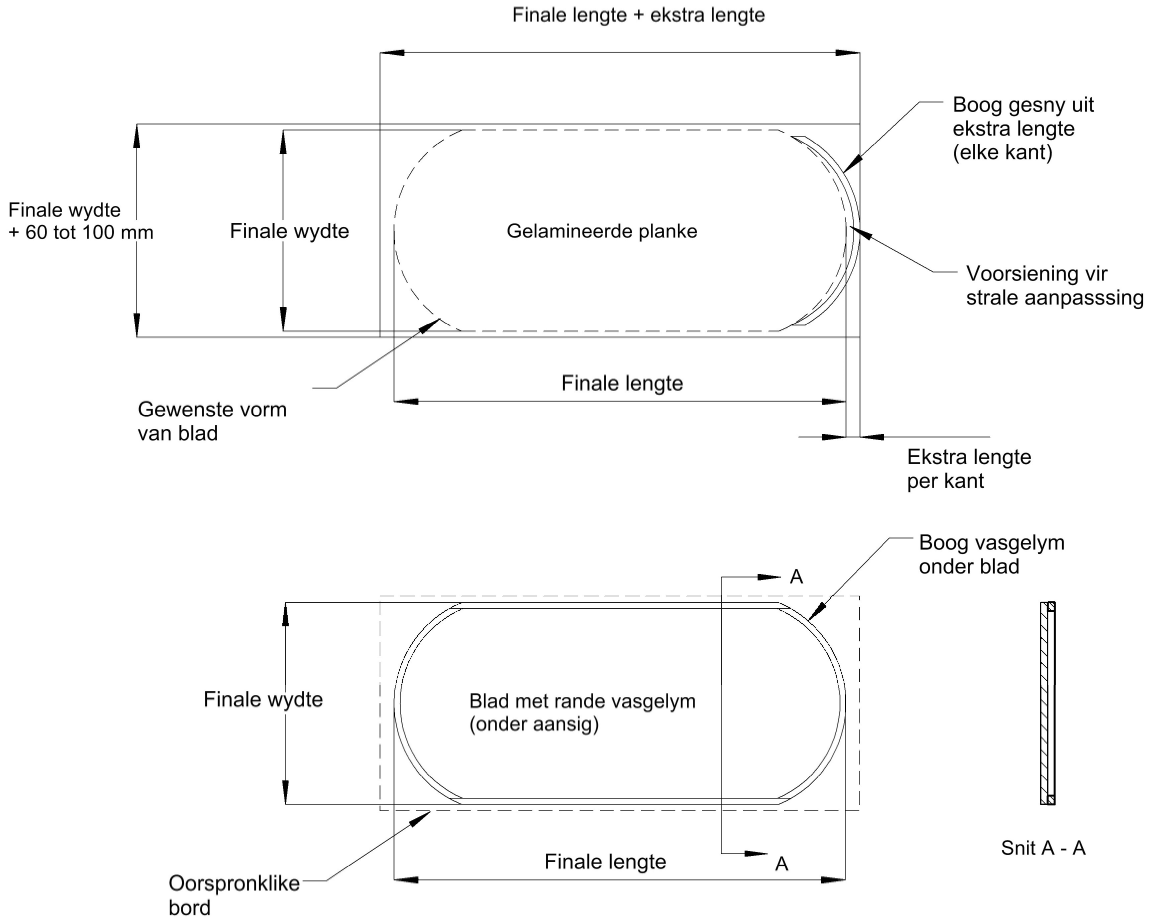
Die metode word in **Tekening 2** verduidelik. Die blad word opgemaak met ekstra lengte en breedte. Die stroke wat die verdubbeling sal opmaak kan tussen sowat 30 mm tot 50 mm of selfs wyer elk wees. Die twee rande oor die lengte van die blad kan selfs van aparte stroke van dieselfde hout (en dikte) gemaak word, sou jy verkies om nie die blad ekstra wyd te maak nie. Verstekke (mitres) van 45 grade by die hoeke is verkieslik. Die blad moet aan albei kante deeglik en plat geskuur word voordat die stroke afgesaag word. Gebruik ‘n draagbare rolsaag met gids. Saag eers die blad presies op finale die grootte plus 2 maal strookwydte plus saagsnit. Saag dan die stroke af. Wees versigtig want die dwars gesnyde stroke breek maklik. Die stroke word nou “omgevou” onder die blad presies waar dit afgesaag is sodat die jaarringe presies paar. In hierdie posisie word die verstekke gemerk, sodat dit na sny van verstekke, weer so terug geplaas kan word. Neem die posisie van plasing van die stroke, soos verduidelik in **Tekening 4**, in ag by die uitmerk van die verstekke. Die belangrike kwessie is nou om al die “omvou” stroke stewig vas te lym onder die blad sodat dit as ‘n eenheid saam met die “moederblad” kan swel en krimp.



Tekening 2: Verdubbeling van randdikte: Reguit sye

b) Blaaie met geboë ente:

Hierdie metode kan gebruik word vir blaaie met geronde ende soos bv. ovaal tafels. Hoe meer geboë die ente is hoe meer hout word vermors oor die lengte van die blad. Sien T**ekening 3**. Let op die verskil in binne- en buitestrale van die geboë stroke. Die metode is nie prakties vir ronde blaaie nie, selfs nie eens vir blaaie met halfrond ende nie. In lg. geval word te veel hout vermors vir die "ekstra lengte" (sien tekening). Let op dat die boë nie omgevou word nie maar net "teruggeplaas" word. Die res van die metode is soortgelyk aan die vorige, buiten dat die geboë stroke met 'n wipsaag uitgesny sal moet word. Die skuur van die geboë stroke asook die geboë dele van die blad is natuurlik nie maklik sonder 'n geskikte skuurmasjien nie.



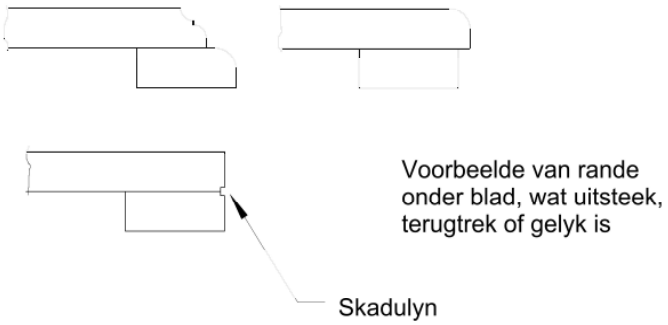
Tekening 3: Verdubbeling van randdikte: Geboë ente

1.2.2 Verdikking van rande met aparte soliede stroke

Daar is verskeie variante van hierdie metode. Dit sal die beste wees om elkeen afsonderlik te hanteer.

a) Verdikking met soliede stroke min of meer so dik as die blad

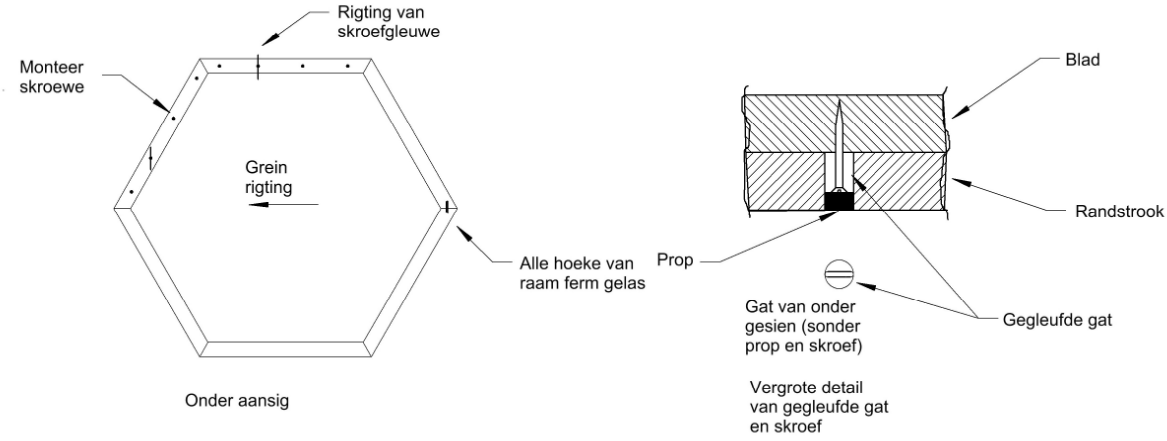
Hierdie metode laat mens toe om die rande van die verdikstroke of gelyk met die blad se rand te plaas, dit effens onder die blad, of effens uitstekend van die bladrand te plaas. Soliede stroke mag nooit onder 'n blad met lym bevestig word nie. Dit sal nie toelaat dat die blad vryelik kan uitsit/inkrimp nie. Die stroke kan dikker (of dunner) as die bladdikte wees. **Tekening 4** wys snitte van uitstekende, gelyk, en teruggetrokke randstroke.



Tekening 4: Randstroke

- Blaaie met reguit sye:

Sien **Tekening 5**. Hierdie tipe blaaie is taamlik maklik om te maak. Die blad word eerstens opgemaak en geskuur. Stroke van diesefde hout as die blad word opgemaak vir elke reguit lengte van die blad (ses stukke vir blad in **Tekening 5**). Die wydte van stroke kan sowat 40 tot 60 mm wees, en die dikte volgens smaak (d.w.s dieselfde as die blad of dikker/dunner). Vanselfsprekend word stroke op die langgrein gesny. Sny dit effens langer as nodig om verstekke gemaklik te kan sny. Die ende van die stroke word met verstekke gesny, inaggenome die hoek wat ingesluit moet word. Voorsiening aan die lengte van die stroke word vir die "trap" effek, soos hierbo in **Tekening 4** verduidelik, gemaak.



Tekening 5: Blaaie met reguit sye

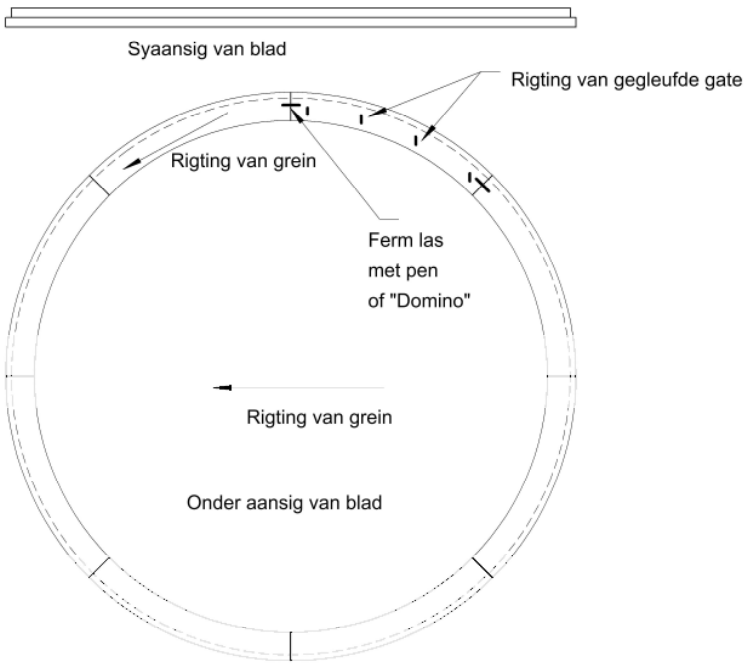
Die stroke met word dan aanmekaar gelas om 'n raam te vorm wat die blad se buitelyn sal volg. Dit is 'n uitdaging want die stroke is taamlik smal en dun. Dit kan nietemin met penne (dowels) of sg. "dominoes" gedoen word. Die raam moet afgeskuur word, en die profile(e) rondom gesny word voor montering op die blad. Eweneens word die blad se profiele rondom gesny voor montering van die raam. Gate vir monteer skroewe moet voor montering in die raam voorberei word. Spasieer gate sowat 200 mm uitmekaar. Versinkgate van 10 tot 12 mm deursnee en sowat 6 mm diep word eerstens geboor. Daarna word die gate verder dwarsdeur geboor met 'n boorpunt diesefde deursnee as die skroewe wat gebruik gaan word. Die belangrike stap is om die gate te gleuf in 'n rigting dwars met die blad se grein. Die lengte van die gleuwe is soveel as die deursnee van die vooraf geboorde propgate (10 of 12 mm). Meer verlenging van die gleuwe kan verkry word deur die gate skuins "weg" te boor, dit gee die blad ekstra kans om te beweeg relatief tot die raam. Die raam word op die blad vasgeskroef sonder lym. Dit help altyd om die raam met klampe vas te knyp sodat die voeg

deeglik toe is en dan die skroewe in te draai. Hout proppies, wat verkieslik met ‘n propsnyer uitgesny is omdat die grein van die hout dan horisontaal is, word dan in die versonke gate ingelym.

Indien die blad en raam presies gelyk opgelyn word sal die hout se swel/krimp veroorsaak dat die kontaklyn mettertyd effens ongelyk raak weens die soliede blad se beweging. Die beste is om ‘n skadulyn in te bring sodat die afwyking effens verdoesel word. **Sien Tekening 4,** wat ook wys hoe ‘n skadulyn geskep kan word. My advies is om die skadulyn in die blad en die raam te sny voordat die raam gemonteer word. So ‘n skadulyn kan ook ‘n v-gleuf of konkaaf (cove) wees.

- Blaaie met geboë rande:

Wanneer die blad se vorm gedeeltelik of geen reguit lyne sal kry nie, bv. ronde of ovaal, of ‘n meer komlekse vorm, moet die onderste raam dienooreenkomstig vervaardig word. **Sien Tekening 6**. Om dit te vermag sal dit nodig wees om die geboë gedeeltes met segmente te bou. Die segmente word voorberei vir pen- of “dominoes”-lasse. Maw. die tegniek is baie soortgelyk aan die vorige metode, maar die segmente is nou geboë en moet sodanig gevorm word. Die segmente van die raam moet eerstens verstek word en voordat die buite- en binnekant van die segmente na die presiese vorm van die blad gebandsaag word. Skuur of skaaf nou die binne- en buitekante van die segmente. Die gesegmenteerde raam kan dan aanmekaar gelym word, en finaal afgewerk word. Daarna kan die raam aan die blad gemonteer word, soos reeds hierbo bespreek. Onthou weereens om geen lym te gebruik. Profiele word weer gesny voor montering. Gleuf skroefgate in die rigting van die dwarsgrein, soos in die tekening verduidelik en skroef die raam aan die blad vas sonder lym.



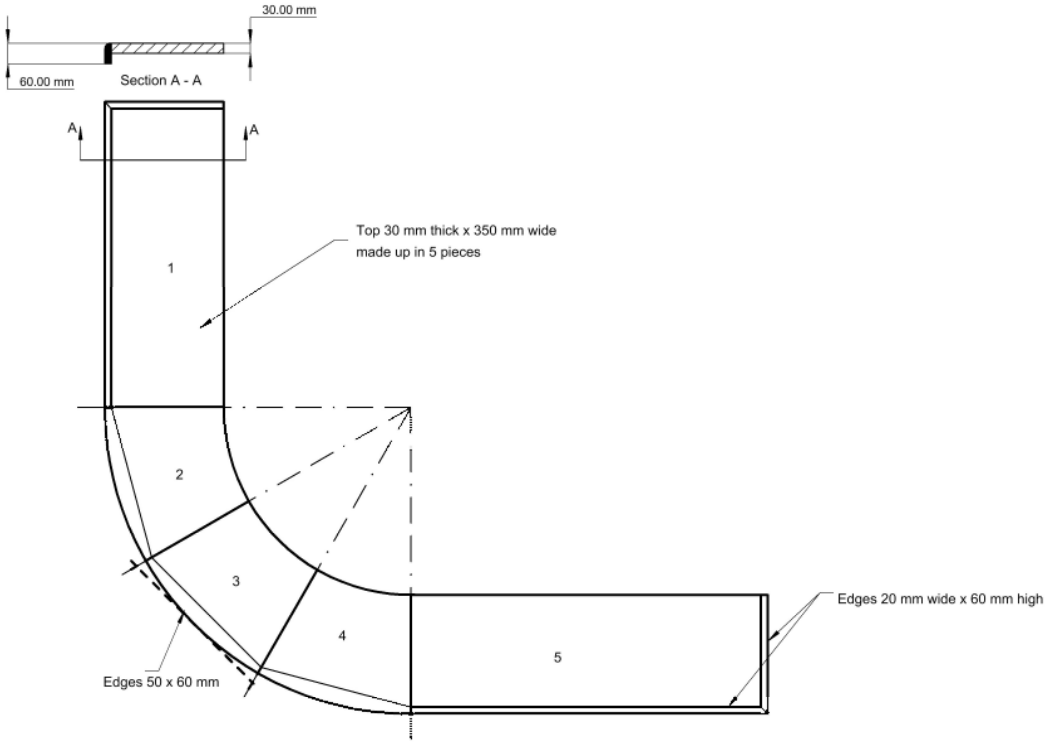
Tekening 6: Blaaie met geboë rande

b) Thickening of tops with high solid edges

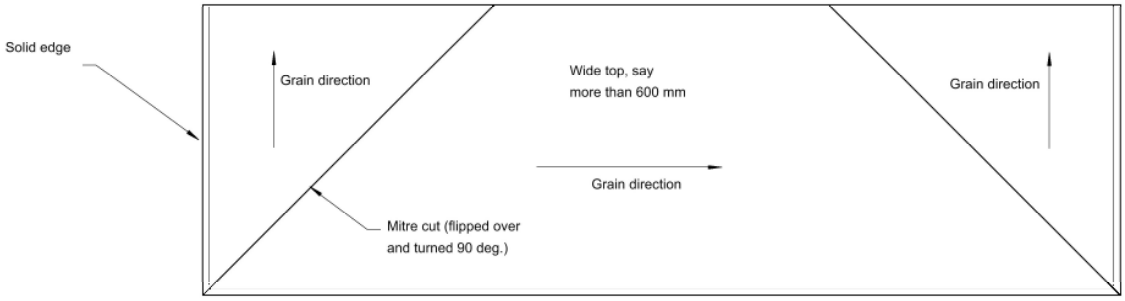
To give the appearance of a very thick top, solid edges can be added that are quite high, e.g. 100 mm. The edge would then be at least some 20 mm thick. **Drawing 7** shows an example of a bar counter top which is partly straight and partly curved. Edges can be attached to the top with “biscuits” and glue. I prefer to go around a curve with straight segments cut into the

top. It can be seen in this example that the top employs 3 segments to go around the curve. The segmented edges are pre–mitred and shaped on the curve before gluing onto the top. In this case 50 x 60 mm pieces were sufficient to allow for the curves. This technique allows for biscuits on all the segments of the edge. It will be noticed that the edges are not only attached to the long grain of the top, but also to the ends of the top. I must admit that I have done this, but not to the cross grain of a top more than 300 – 350 mm wide. In such a case I've broken the rule and merely ignored the cross grain/long grain dilemma. So far, even after 6 – 10 years I've never had a complaint.

If a substantial "return" is required, one can mitre the top so that the end is also long grain. See **Drawing 8**. This is not really wasteful provided one can flip the cut-off over. The mitre joint on the top can also be done with "biscuits". Remember we are looking at methods to attach solid edges to solid tops with glue. If a long solid edge is to be attached to the cross grain of a solid top without glue, then other techniques must be sought. Where high edges (say 70 – 100 mm) join at the mitres it is advisable to also utilize "biscuits". Such mitres are best cut with a mitre cut-off saw or a radial arm saw.



Drawing 7: Bar counter top which is partly straight and partly curved



Drawing 8: Mitred top

2. MAN-MADE BOARD TOPS

Man-made boards refers mostly to chipboard or MDF (medium density fibre board) with veneer on both sides. Plywood is not commonly available here in veneered boards but can of course also be used. Of course, bare boards can also be veneered afterwards, and this will also be discussed.

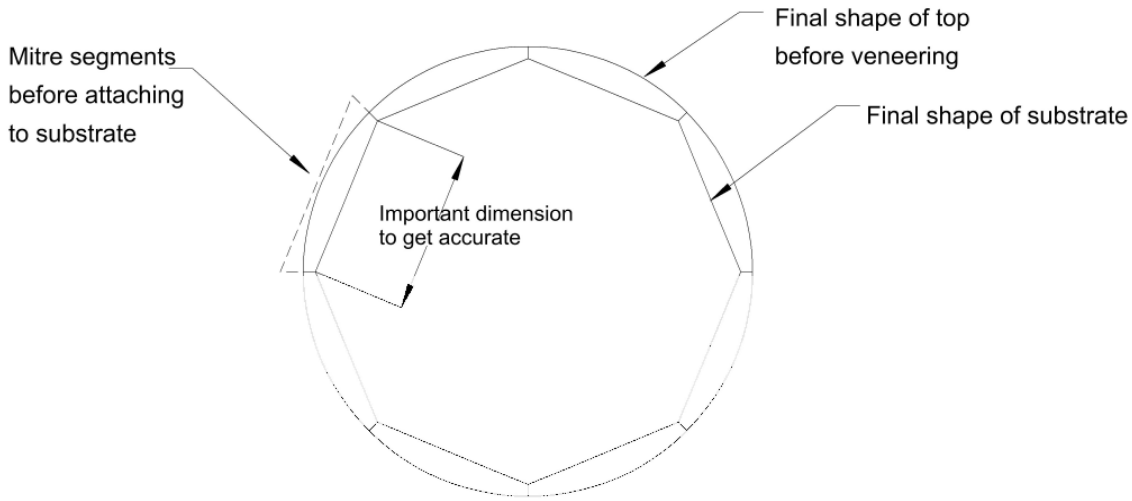
A lot of people want nothing to do with veneered man-made boards. However, I want to say something in praise of this material. Some very good furniture employing veneers have been made over hundreds (and even thousands) of years and outlasted many generations. How else can, for instance, a beautiful walnut burl be utilized for a top. What about those book-matches. Leaving beauty aside, pre-veneered boards are so convenient and ready to use. Veneered substrates are very stable; hence no allowance need be made for wood movement. Veneering also makes the most economical use of precious woods. Think about it, over the last couple of years imbuia, Honduras mahogany, stinkwood, yellow wood, jacaranda and many more have become unavailable. I think even kiaat will soon be hard to find.

There are on the other hand some good reasons for not using pre-veneered boards. One reason is that commercial veneering may not be aesthetically good enough for your project. Another reason is that some veneers may not be available in pre-veneered board. A third reason would be that a special figure, such as "book match" may be desired. One can do your veneering yourself or have it done by a specialist firm. Doing veneering yourself can be very satisfying but of course needs training and practice.

2.1 Tops made from bare man-made boards to be veneered afterwards

Whether chip board or MDF is used for a substrate, it will require a solid edge. **Drawing 9** shows a board that will end up as a circular top. The same process can be employed on a straight line or any curved edge. The technique is to attach solid wood pieces, or segments, with "biscuits" or splines around the edges of the bare substrate. The pieces must be exactly the same thickness as the substrate. When this is finished the whole top must be put through a wide belt thickness sander. This is extremely important since the slightest unevenness will show through the veneer. The final shape can now, or prior to sanding, be cut around the edge, but hold back with the profiles.

Veneering is done according to the desired design and type of veneer on the top side and with a cheaper veneer on the reverse side. Veneering should be done right over the solid edges. It may be advisable to first trim the overhanging veneer back to the edge and then cut the required profiles around the edge top and bottom. This brings the veneering right up to the very edge of the top and blends in beautifully with the solid edge. Such a solid edge not only provides a lot of protection for the veneer against the abuses a table sometimes must suffer, but looks extremely beautiful.



Drawing 9: Edging with veneered top

2.2 Tops made from pre-veneered boards

The name of the game is to attach some form of edge to a pre-veneered board. I will discuss various edgings ranging from the simplest to very complicated techniques. One will normally be using the same solid wood for the edge as the veneer on top, but certainly any wood can be employed. I prefer to have my boards cut up by professionals. They do it for some R40-00 per board. The layout of the pieces is done by a computer aided programme and wastage is the minimum. Cutting accuracy is, however, not always accurate to the millimetre.

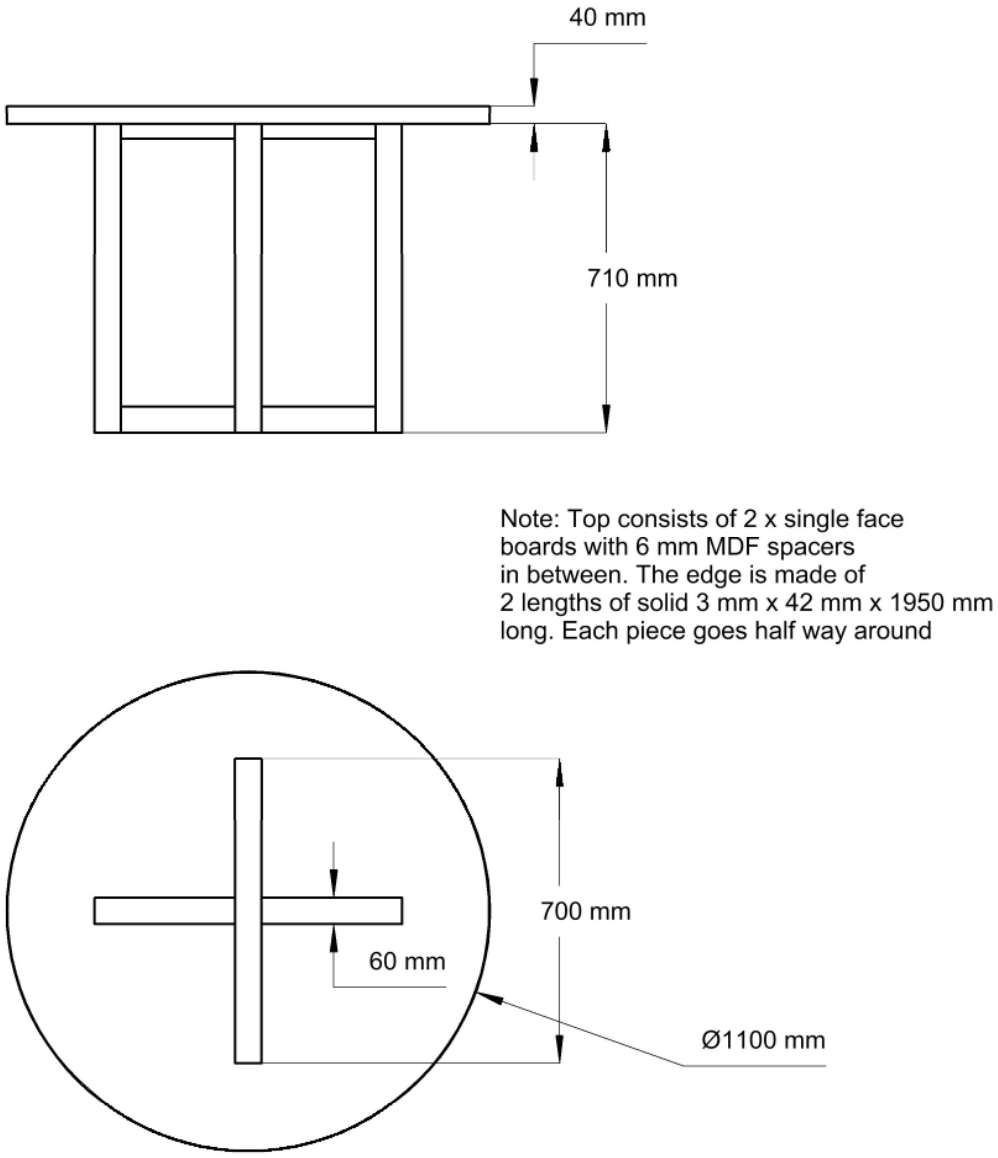
2.2.1 Simple edges for tops

- The simplest edge is veneer. This method can be employed along straight lines and curves. A lot of people have this kind of edging done by professional shops with edge banding machines. Edge banding machines can only edge along straight lines, but hand edging can be done along curved lines. Also tops with added thickness edges up to say 50 mm thick can be hand edged. Some people prefer pre-glued edging that is attached with a laundry iron, but I prefer unglued veneer edging which is attached with contact glue. Wide veneers say up to 50 mm, will have to be made from veneer sheets or made up yourself with some difficulty. This type of edging is, to say the least, pathetic. It is only mentioned because it is widely used and for completeness.

- Employing 2 or 3 mm solid wood edging. This makes a much superior top compared to veneer edges. It can be used on tops thicker than 16 mm and along curved edges. Edges of 2 mm thick can be attached with an edge banding machine up to 32 mm thick, again only on straight lines. These edges are always finished with a small round over profile on the top and bottom by the edge banding machine, which I found undesirable in some cases. Many, but not all kinds of 2 mm solid wood edges, are available.

3 mm thick solid edging cannot be fitted with edge banding machines but can be made by yourself. Use a plank of suitable length thicknessed to 1,5 or 2 mm thicker than the board thickness to be edged, but no thicker. Both edges of the plank are surfaced and then ripped 3 mm wide on the table saw. After cutting two strips, the plank edges are re-surfaced before ripping another two strips. These edging strips are attached sawn face down with contact glue and hammered with a rubber mallet to get good adhesion. It is not usual to mitre at corners.

The bit of protrusion of the edges can be sanded level with an orbital sander and coarse paper. Economical yet quite acceptable office furniture can be made using 3 mm thick edging. **Drawing 10** shows an economical office table with round top. I prefer to attach the first 20 mm or so of the edging with PVA glue clamped across the top. Continue the rest with contact glue ending the last bit again with PVA glue. This ensures that the edging will never lift up. Depending on the diameter of the top and the length of the solid edging, one may have to have two or three joints along the way. The edging can finally be rounded over with a 3 mm radius router cutter.



Drawing 10: Economical office table with round top

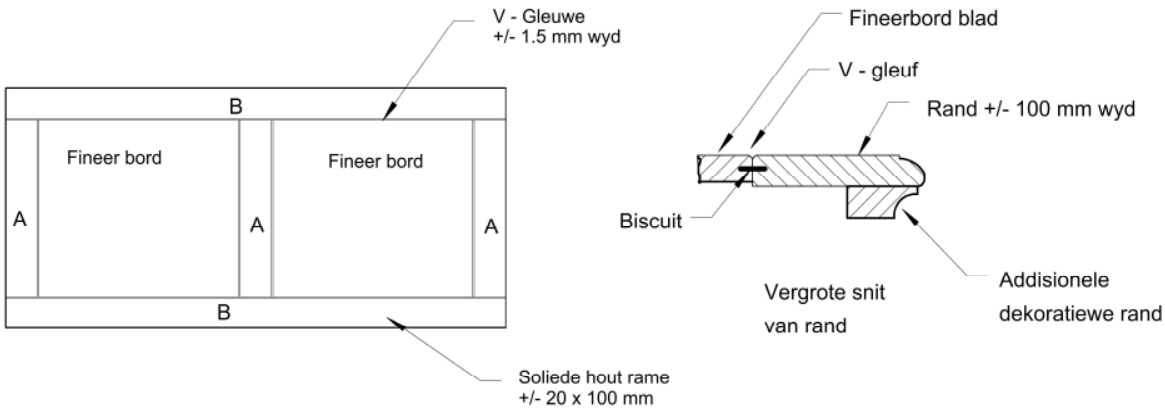
- Wider and/or thicker solid wood edges. This will provide more attractive and sturdier tops. Not much need be explained when these are applied to straight lined edges. Narrower edges of 16 to 20 mm wide may be glued directly to the board using PVA glue. Using "biscuits" on such narrow edges may result in the "biscuits" being exposed when a profile is cut. Wider edges of say 30 to 100 mm wide by 16 mm thick had better be attached using "biscuits". High edges of say 20 mm thick by 100 mm high can similarly be attached with "biscuits". It is time consuming to mitre corners accurately. That's why we often see factory made tables with butt

joints on the corners, yet the mitrered corner looks more professional. The enthusiast may even endeavour finger joints! However, don't sneer at butt joints, it is much easier to make, the end grain can be quite pretty – it is often seen on restaurant, coffee and office tables. Remember that not every top we make is intended as an heirloom.

When making a top for a wall unit or office work station (with straight lines) it is preferable to sandwich the top veneer board with another board, even employing a plain chip board (on wall units the underside of tops are sitting on the cabinets and are not visible). This gives a 32 mm thick top and adds solidity and firmness. A solid edge of anything from 3 mm up to 40 mm thick and as high as required may be glued to this double board. Of course the edges of the sandwiched board must be precisely lined up or sawn after laminating to even up before solid edging is applied. The solid edging must stand proud of the top by about 1 to 1,5 mm, which afterwards can be sanded level with the top. The difficulty arises when such solid edges have to be put around curved lines. Techniques to handle this will be discussed later in this article.

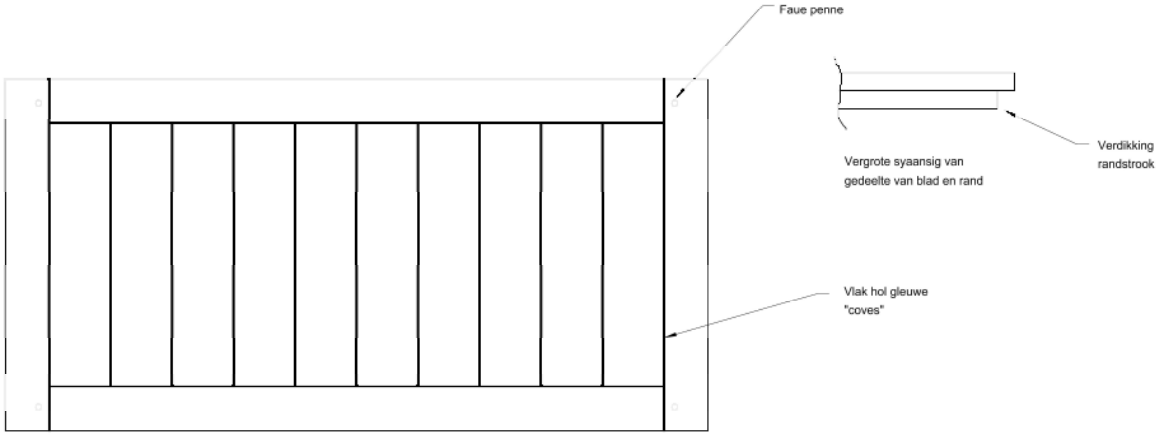
2.2.2 Enkele spesiale blaaie wat interessant is

- Dekoratiewe blad met wye rande en fineer panele: Sien **Tekening 11**. Die rande is 20 mm dik en 110 mm wyd. By al die lasse word, soos getoon, eers 'n V-gleuf van sowat 1,5 tot 2 mm wyd gesny. Die stroke A word eerstens met "biscuits" bevestig. Die word so effens langer as die panele gesny, so 1 mm langer. Nadat die lym droog is word die blad se sye, waar item B aangeheg gaan word, gelyk geskuur met 'n horisontale bandskuurder (of met 'n rolsaag). Die V-gleuwe word vervolgens gesny en die lang stroke B word dan bevestig. Agterna word die geheel liggies geskuur en dan word die profiele buite rond om onder en bo gesny. Die blad kan verder verfraai word deur 'n verdikkingsrand toe te voeg, soos in die tekening verduidelik. Laasgenoemde rand word op die hoeke geverstek.



Tekening 11: Dekoratiewe blad met wye rande en fineer panele

- 'n Eettafelblad wat ek onlangs gesien het, maar uiteraard nie self vervaardig het nie, word in **Tekening 12** gewys. Hoewel dit baie pateties in die tekening lyk, was die eindproduk werklik indrukwekkend. Alles was van MDF met dubbel gesig fineer sonder soliede rande. 'n Voorvereiste vir sukses met so 'n blad is dat die tafel agterna taamlik donker gebeits word sodat die fineer en rou MDF buiterande inbloei. Die tafel gee nogal 'n "broodbord" voorkoms.



Tekening 12: Eettafelblad uit MDF en fineer

- ‘n Ander variant van die vorige blad word deur die firma Weatherly’s en seker ook ander firmas verkoop. Hierdie blaaie word op baie deftige eettafels gesien. Mahonie dubbel gesig fineerde MDF word gebruik. Die randprofiele word direk in die bord rondom die blad gesny. Die pragtige mahonie fineer word so kunstig saam met die rande gebeits dat mens ‘n skerp waarneming moet hê om nie dit vir dat soliede hout aan te sien nie. ‘n Tekening is nie nodig om dit verder te verduidelik nie.

[Voordat ek voortgaan wil nou eers by ‘n masjien se naam stilstaan, in Engels bekend as ‘n **router**. Volgens die Departement van Nasionale Opvoeding se boek “Houtwerkterme” van 1980 word ‘n “routing machine” as ‘n verdieper of verdiepmasjien vertaal. Ek beskou dit as ‘n minder goeie beskrywing vir ‘n tipe handskaaf wat donkies se jare gelede gegee is daarvoor. Na alles doen die masjien veel meer as verdiep. Natuurlik beteken die Engelse woord router ook verdiep, maar in die gebruikstaal weet almal wat on bedoel met ‘n router. Waarom nie na die Nedelandse en Duitse benamings kyk nie. Dit is bovenfrees in Nederlands en Oberfräse in Duits, kortweg frees of Fräse. Ek gaan die woord **frees** eerder as verdieper gebruik. Onthou as jy ‘n frees aanskakel, vrees jy vir jou fingers – grappie.]

2.2.3 <u>Komplekse blaaie met soliede hout rande.</u>

Hierdie tipe blad is geskik om indrukwekkende kantoor tafels te maak. Dit kan natuurlik ook vir eettafels, ens. aangewend word. As voorbeeld word die vervaardiging van ‘n ronde blad beskryf.

Gewoonlik sal ‘n 12,7 mm (2000 W) frees nodig wees vir hierdie soort werk. Die reguit snyer sal tipies 12,7 mm of 16 mm dia. en minstens 40 mm snylengte moet wees. ‘n Snyer sonder ‘n gidslaer is nodig. Vir die sirkelsny met die frees word ‘n staal stang, gewoonlik 12 mm deursnee (wat in jou frees se doelgemaakte gate vir sulke stange sal pas) en met lengte van meer as die straal van die blad benodig. Die stang moet ‘n spilpunt gaatjie (so 5 mm dia) naby die een punt kry.

Hierdie tegniek behels die omsoom van ‘n ronde blad van vooraf fineerde bord met ‘n dik en hoë soliede rand. Die deursnee van die beoogte blad is nie beperk nie, maar uiteraard hoe groter die deursnee hoe omvattender en moeiliker is die proses. Hierdie metode is in elke geval vir gevorderde houtwerkers. Indien die blad groter as ongeveer 800 mm deursnee moet wees en die beoogde rand se hoogte groter as sowat 40 mm moet wees, is dit raadsaam om twee (16 mm dik) borde op mekaar te lamineer. Die onderste bord kan skoon splinterbord

wees indien mens koste wil bespaar en die klient nie te puntenerig is nie. Beits dit tog maar om dit beter te laat vertoon.

Die eerste operasie is om die blad van van fineerbord (met dubbeldikte indien nodig di. 32 mm dik) op te maak. Lamineer twee borde bo op mekaar met gewigte en klampe om die rand. Saag daarna die buite deursnee met ‘n wipsaag uit net buite die finale deursnee van die bord (wat met tweemaal die dikte wat die rand verminder moet word). Ek hou van 20 mm dik rande. Die blad word hierna presies rond gesny met die frees en ‘n reguit snyer (straight bit). Die spilskroef vir die stang word presies op die middelpunt van die blad gemonteer met ‘n netjies passende skroef. Mens het twee keuses om die spilpunt te monteer: of jy bevestig die skroef direk in die blad se onderkant (die gaatjie kan agterna gevul word), of jy plak ‘n dun blokkie hout met warmlym onder die blad en monteer die skroef daarin. Die frees word aan die ander ent van die stang gemonteer, deur een van die gate in die frees se basis te benut, sodanig dat dit in en uit verstel kan word. Let op dat daar ‘n regte metode van sny is, soos in **Tekening 14** verduidelik. Indien die stang deur die ander gat van die frees se basis monteer word, sal die snyer geneig wees om “in te grawe” tydens snyding. Sak die snyer tot voldiepte en sny met ligte snitte rondom totdat die gewenste deursnee verkry word. Andersins kan die snyer bietjie vir bietjie gesak word.

Dit is teen nou besluit hoeveel soliede hout segmente rondom die blad gebruik gaan word. Dit sal afhang van die deursnee van die blad en die wydte van die beskikbare planke wat gebruik gaan word. Bepaal dit gerus op volskaal, of met ‘n skaaltekening. Hoe meer segmente, hoe minder vermorsing van soliede hout, maar hoe meer werk. Die dikte van die planke moet nietemin die hoogte van die rand verteenwoordig, of minstens die helfde soos later verduidelik sal word. Skaaf die planke tot finale dikte plus sê 2 mm. Die segmente word eerstens verstek teen ‘n bepaalde hoek en ‘n presiese lengte. Sien **Tekening 13**. Bv. vir 6 segmente word teen 60 grade, en vir 8 segmente teen 67,5 grade geverstek.

Nadat die segmente presies verstek is, word dit met ‘n bandsaag uitgesny net buite die finale binne en buite strale. Lym dan die segmente met warmlym op ‘n afval splinterbord vas (wat in vierkant ietswat groter as die finale blad moet wees). Teken eers sirkels om die binne/buite strale te wys op die bord om te help hiermee. Monteer ‘n houtblok wat so dik is as die rand se hoogte met warmlym min of meer bo oor die middelpunt. Vind die presiese middelpunt. Monteer die gidsstang weer met ‘n spilskroef op die blok op die straal se middelpunt. Rus die frees op die segmente en sny die binne deursnee van die rand (gelykstaande aan die buite deursnee van voorbereide bord) gegids met die stang. **Sien Tekening 14.** Sak die snyer totdat die snyer die bord onder raps en bring dit dan bietjie vir bietjie nader tot dit begin sny by die hoogste uitsteeksel. Gaan al in rondte en stel na elke ronde die frees effens na buite. Dit is ook moontlik om te begin by die finale deursnee en stelselmatig die snyer te sak na elke rondte, of selfs ‘n kombinasie daarvan. Sny vervolgens die buitedeursnee. Die segmente kan daarna verwyder word.

Lym vervolgens die segmente rondom die blad deur een vir een regoor die blad te klamp met sê 3 klampe. Dit is esteties mooi om die lyn van twee teenoorstaande lasse met die rigting van die fineer se grein “op te lyn”. Geen “biscuits” of iets anders is nodig nie, net lym. Sorg dat die bokante van die segmente effens (sowat 0,5 mm) bo die blad pryk. Jy kan agterna die solied vlakker skuur maar nie die fineer bord nie! Lym ook deeglik waar segmente koppel. Die laaste segment sal hopelik effens korter aangepas moet word en nie ‘n opening laat nie. Beplan dit so!

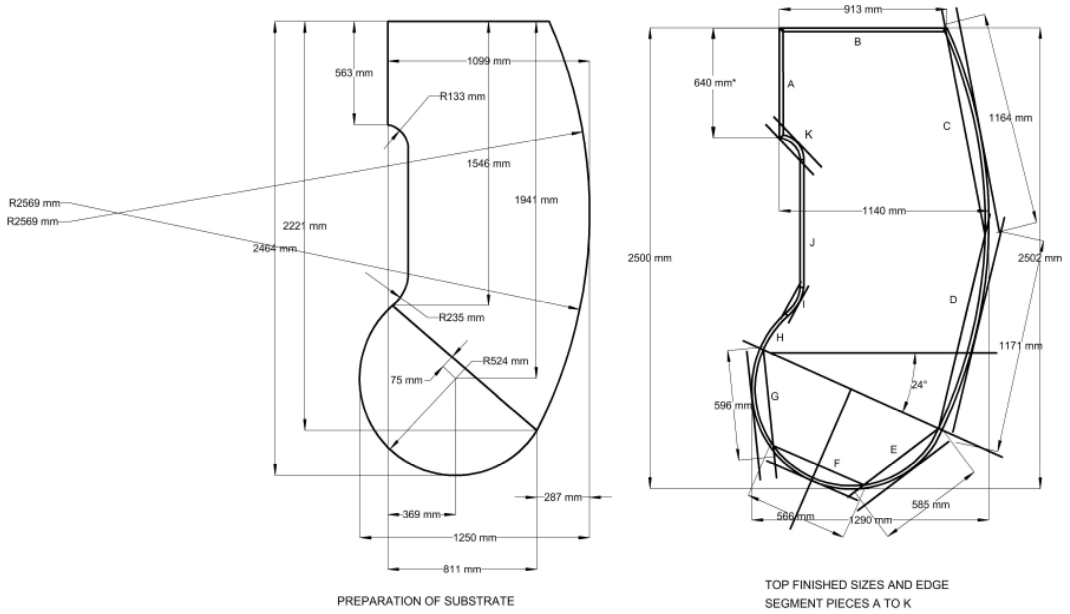
Dit kan moontlik gebeur dat die gewenste hoogte van die rand groter as jou beskikbare snyer, of as enige gekoopte snyer se snylengte is. Mens praat hier van hoogtes van 60 tot 80 mm.

Hier kan twee situasies ontstaan. Die rand word gemaak uit segmente wat die volle hoogte van die gewenste rand sal verskaf, of die segmente moet gelamineer word om die gewenste hoogte te verkry. In eersgenoemde geval word die segmente opgemaak net soos voorheen beskryf en gelym op die afval splinterbord. Sny vervolgens die binne/buite strale net soos voorheen beskryf tot so diep as wat die snyer toelaat. Hierdie diepte moet minstens effens meer as die dikte van die blad se bord wees en en ook meer as die helfte van die hoogte van die rand. Lym nou die segmente om die blad soos voorheen beskryf deur gebruik te maak van die "skoongemaakte" gedeelte van die segmente. Die res van die snywerk kan nou gedoen word deur weer die stang in te span.

Indien die beskikbare hout vir die rande nie dik genoeg is vir gewenste hoogte nie kan die segmente gemaak word in halfdikte en gelamineer word. Die voorvereiste is weer dat elke halfdikte groter sal wees as die bladbord se dikte. Gaan te werk soos voorheen beskryf maar maak twee maal soveel segmente. Lym die eerste stel op die spliterbord en sny die twee strale uit op finale mate. Lym hierdie stel rondom die voorbereide bordblad, weer soos reeds beskryf. Die tweede laag word bo op die eerste laag gelym nadat die eerste stel randsegmente aan die blad gelym is. Ek verkies om die segmente in 'n "baksteen" patroon te plak m.a.w. die segmente oorvleuel halfpad. Die hele saamgestelde blad word dan van weer van onder gesny om die gedeelte van die rand wat nie met die snyer bereik kon word nie skoon te maak. Die finale stappe is om die rand gelyk met die blad te skuur en laastens om profiele bo en onder te sny, indien dit verlang word.

2.2.4 Multi-curved complex solid edges

For an example of this kind of top refer to **Drawing 15.** This top was actually part of an expensive desk of which I made several variations.

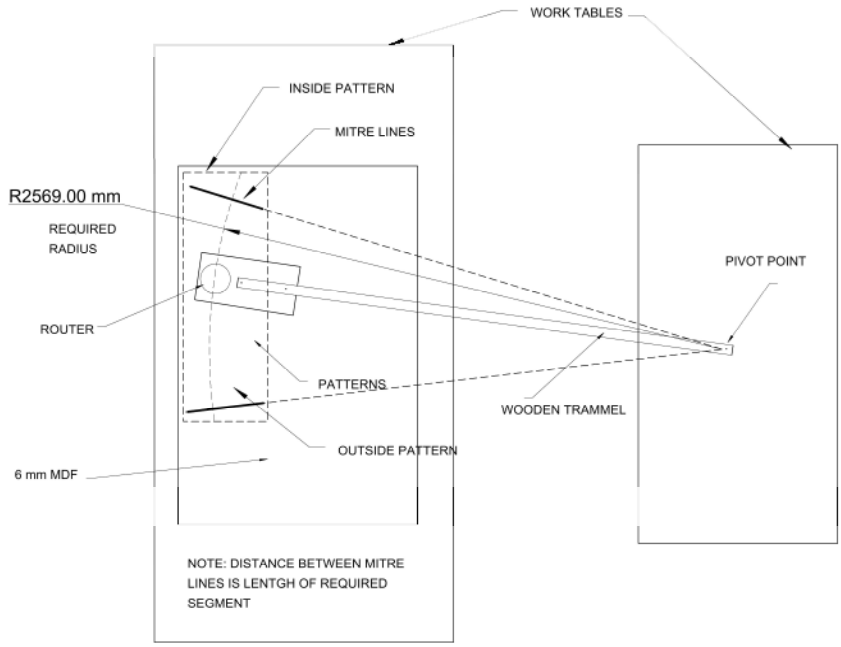


Drawing 15: Multi-curved complex solid edges

Making these tops is possibly as difficult as it can get. It is definitely only to be attempted by experienced woodworkers. I developed this technique for myself, but thereby I'm not saying that other people may not have used it as well, only that no one helped me nor did any magazine. Hence there may possibly be other ways to achieve the same result. Of course CNC machines will make it a lot easier, but then home woodworkers and even small factories

don't have these. My reason for including this technique is to put this method on record for whom ever may find a need for it now or in the future.

The shape of such a top may include straight lines as well as curves of various radii. Referring again to **Drawing 15**, it will be noticed that some of the curves have extremely large radii. In the making of these tops I employed templates made out of 6 mm thick MDF. One would be well advised to start with a scaled drawing of the top, or alternatively a full sized drawing on perhaps a sheet of raw chip board. A lot of work area will be required and also fairly large work benches. Lay the 6 mm MDF for the template down on one work bench. Make a trammel out of a long piece of timber; say 20 mm by 40 mm and sufficiently long to achieve the largest radius. In this example some 2,5 m. At one end of this nail or screw a piece of 6 mm MDF about 200 mm by 500 mm. Mount your router onto the MDF piece complete with a hole for the cutter. For this operation a ¼ inch router will do. At the other end of the trammel drill a screw hole at the desired radius from the cutter centre to the hole. Screw the trammel to another work bench of the same height in such position that the router cutter will describe the radius onto the MDF board leaving at least 150 mm from the edge of the board for strength. See **Drawing 16**. Fit a 3 mm diameter straight cutter to the router. Cut right through the board over sufficient length as required by the design. Cut the MDF such that two templates will result, one for an outside curve and one for an onside curve. The radii of the templates will differ by only 3 mm and over such a large radius it will not matter. The MDF may be lifted up slightly with suitable scrap pieces of wood to save the work bench from damage. The MDF must of course be held down firmly.



Drawing 16: Cutting of templates

Make all required templates required by the design, keeping in mind that for radii of up to say 800 mm a trammel rod as discussed in section 2.2.2 may be employed instead of templates.

a) Preparing the substrate:

The pre-veneered boards (chip board or MDF) that are going to be used for the top will next be prepared. In case of large tops it is advisable to double the top with a suitable (but cheaper) pre-veneered board. It may be easiest to cut both boards with a jig saw slightly oversize before gluing together with PVA glue and as much heavy objects as one can lay hands on, especially around the periphery. The straight lines are next cut to final sizes with as circular saw and guide rail, leaving only the curves to be cut. The little bits left uncut by the circular

saw at full plunge can be cut out carefully with a jig saw. Remember to reduce the size of the top all round by the width of the solid edge, eg. 20 mm. The "outside" template is now nailed to the bottom of the edge section to be cut. Use a ½ inch router fitted with a 12.7 mm or 16 mm dia. straight cutter with a guide bearing to cut the curved part to exactly the desired shape. Carry on with other curves until the top is completely shaped. In the case of very small radii, say from 80 to 150 mm, smaller templates can be hand made out of 6 mm MDF. One must plan and be careful where the curves join curves and straight lines.

b) Making the solid edges:
Usually it is better to do the curved edges first and fit them, since the straight edges are more plain sailing. As shown in **Drawing 15**, suitable pieces of timber must be made up out of which the curved edges will be shaped. Use the inside and outside templates to pencil draw the section of the edge to be made, and cut the piece slightly oversize on the band saw. It should be noticed that the outside curve of a section of edge can be drawn with the outside template by moving it outwards with the width of the intended edge. Over a large radius this will make little difference, but on smaller radii another template may be required for the outer radius of the edge. Do some testing to see how good the outside shape will be, i.e. how much it will differ in width over the section in question. Remember that the inside curve is more important since it must fit tightly over the curve of the board top. Before cutting the piece(s) on the band saw the connecting mitres must be cut. This is easy provided you drew lines on the templates at the connecting points using the trammel to draw the mitre cut lines. Cut the mitres now before band sawing the pieces, by setting the mitre angles on a table saw mitre gauge.

The "inside" template is then nailed to the bottom of the rough cut piece making sure that a small bit of wood is protruding all the way inside. A nail gun with so called "F" nails is very handy. Remember that the template must also provide some strength to the segment. The template can also be hot glued. It is important to have a fairly strong combination since the wood must not spring away while routing. The inside shape may be cut with the router and guided bit as before, but this time the router must be mounted underneath a router table. The ball bearing must follow the template which of course will be uppermost. The process is repeated for the outside curve with the "outside" template. Complete all other segments. The smaller radii sections, say 500 to 800 mm, can be prepared as described in section 2.2.3. Whether the edge is higher than the substrate or of equal thickness, the rest of the process will be on similar lines as per section 2.2.3.

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