

# PROS & CONS IN THE THATCHING INDUSTRY



**THATCHERS ASSOCIATION  
OF SOUTH AFRICA**

# **DISCLAIMER**

All thatched roofs are required to comply with the SANS 10407 specification pertaining to thatch roof construction. **It must be built according to building plans designed and approved by a competent and registered professional engineer.** The formal approval must be clearly visible on the design drawings and the latter must be duly signed by a competent person.

**After completion of the construction of the thatched roof, a competent and qualified person must certify that the construction complies with the SANS 10407 specification, that it has been done according to the design drawings and that the quality of workmanship was of professional standard.**

TASA cannot be held responsible for any structural defects, design failures, inferior workmanship or consequential damage that may directly or indirectly result from the above.

These guidelines are based on the **deem to satisfy rule** as described in the SANS 10407 specification as well as the Thatchers Association of South Africa's "A Guide to Thatch Construction in South Africa"

TASA commits itself to improving the standard of the Thatching Industry and reducing insurance premiums of thatched roofs.

These guidelines and **advice** aim to enable insurers to determine realistic insurance premiums regarding thatched roofs when the relevant building complies with it.

It also serves to advise contractors on how to avoid unnecessary pitfalls.

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## **RECOMMENDED PROCEDURE TO FOLLOW WHEN BUILDING A THATCH ROOF**

The first step in the process is to employ a competent experienced qualified architect. A successful project is totally dependent on the architect in that he/she is the only person involved on the project that understands the building holistically and the implications with regard to changes, so do not whimsically make changes as it will invariably impact elsewhere on the project, also do not dictate design criteria, the architect is the person qualified in the field.

Architects charge according to a fee structure which ranges from sketch plans through to site supervision. If you do not have an adequate knowledge of the building industry it would be advisable to appoint the architect to oversee the project through to completion. Part of the architect's job is to ensure that no money is paid to contractors until the material supplied and the work is completed to his satisfaction. This adjudication is based on the detailed drawings generated by the architect and approved by you, the client prior to tendering.

Most architects through experience use preferred specialist contractors with proven track records, ensuring that both quality and time constraints are met. Quality issues are generally covered by reference and detail on drawings to accepted and or approved building standards. More often than not the client's decisions are based on budget constraints rather than the advice of the architect resulting in dire consequences. Competent experienced professionals such as engineers eventually save money by designing correctly and efficiently the first time around.

Numerous thatching companies enter the market annually due to the low capital outlay required only to disappear again after a short period of time leaving behind a trail of sub-standard roofs and bad debt. Only in recent years have certain municipalities made it a requirement that a structural engineer sign responsibility for the construction of thatch roofs, which is a misnomer in that all other structural elements of a building have always been subject to this requirement. Many roofs including thatch roofs are still constructed today without the approval of a specialist engineer which can result in major expenses to the consumer, sometimes many years after construction due to age destruction (tearing of fibres in the timber from overloading). Age destruction of the pole structure, if under-designed, can cause building walls to crack or collapse and in the worst case scenario the entire collapse of the roof. The rate of age destruction is dependent on the percentage overload to the structural element.

### **A specific path should be followed, which is outlined as follows:**

Firstly make use of an architect that has knowledge of thatch roofs or an architect that will consult with a specialist Thatcher, beginning at sketch plan stage. It is of no use that the Thatcher be presented with a design for tender purposes that contravene all the basic rules for thatch roof design. This will result in expense to somebody and possible that the end result is not what is required aesthetically.

Appoint an engineer who is competent in the design of pole structures. This same engineer will be able to handle all the other design aspects of the building as well. Two engineers on the same project will increase the cost to you, the client.

Appoint a structural designer to generate detailed structural drawings for the thatch roof. These drawings are then analysed by the appointed engineer and the necessary criteria in terms of pole diameters and bolted connections determined and specified on the drawing. From these structural drawings an exact pole list and bill of materials may be determined.

Lastly request thatching companies of your choice to tender, this choice should preferably be made from members of the Thatchers Association who in terms of their status as members will comply with the SANS 10407 specification requirements. Determine at this stage who will take responsibility for the insurance during construction. Some contractors do have contract insurance in place when appointed by the client directly.

Together with the structural drawings, bill of quantities and SANS 10407 you will be assured that all tenders received are on par with one another in terms of materials and design. The appointed engineer will then inspect and approve the structure on completion by the appointed contractor. When appointing the Thatcher it is preferable to use a suitable standard JBCC contract. JBCC contracts are generally the accepted document to use as both the client and contractors interest is catered for.

## **TAKING CARE OF YOUR THATCHED ROOF**

### **General**

SATAS (South African Technical Auditing Services) certify members at their own request. It is not compulsory.

TASA members can also apply for SAQA registration when the Thatchers Association's registration as a professional body is in place.

Most thatchers have a 'team leader' or senior thatcher who has been working in the Industry for around 20 years and mentors and trains junior thatchers. It takes at least 5 years to train a thatcher up to a level that he would be considered a master thatcher.

Costing a thatched roof depends on many variables such as the design, construction and size of a home, as well as the materials used and the local climate. High costs for thatch roofs compared to tiled roofs have also been a myth busted in recent projects. Thatch is proving to be the most cost effective roof covering with many costing items taken into consideration. Thatch needs no thermal insulation, guttering systems, fascias, soffits, ceilings, painting etc and thatch provides extra ceiling space due to the 45 deg pitch giving a home a strong sense of volume. With all these items taken into consideration a thatch roof is cheaper than any other roof on the market.

Another myth about thatch which is being busted on a regular basis is the cost of insurance. With various ways to incorporate fire protection systems into the roof, insurance is brought down drastically by insurance companies.

The insulating properties are very good, keeping the home warm in winter and cool in summer. Thatch is one of the oldest building materials and modern, innovative laying techniques ensure that the interior finish is clean. Thatch has a natural ability to free-curved shapes to create a warm, informal finish that blends in well because of its natural appearance. Thatch, being a natural material, will mellow in colour from its original fresh straw to a dark mink sheen that tones in wonderfully with the South African outdoors. At the same time the rustic roughness of textured thatch inside the building, lends itself to co-ordination with other natural materials such as stone and wood.

### **SANS 10407 (Thatched Roof Construction) Specification**

A thatched roof can give residents a lot of pleasure and comfort, provided that it is installed correctly. The SANS 10407 specification stipulates the minimum requirements for thatched roofs. The TASA's "A Guide to Thatch Construction in South Africa" explains these specification requirements using photos and sketches.

### **Materials**

Thatching makes use of materials that are naturally available. There are coarse varieties of grass, with stalk thicknesses greater than 4mm that are not considered suitable for thatching. Natal thatching grass has a finer texture than the Transvaal grass when laid and is often preferred for this reason. The stalks of thatching grass are normally hollow and about 3 mm thick. Dekriet (reed) stalks, however, are solid and

about 3-4 mm thick and considered the best quality and therefore the most expensive. Cape reed is often used as the interior layer, while common thatching grass is used for the outer layer.

All grasses must be mature when harvested, meaning they have lost all their seed.

Harvesting is done in winter when the grass is dry.

## **Design**

Keep your design simple. The more complicated it is, the more maintenance it will require at a later stage. Make sure that the contractor or engineer supplies the Thatchers with structural drawings. This prevents unnecessary guesswork and specifies exactly how much material will be required.

A thatched roof should have a minimum pitch of 45 degree and minimum of 35 degree over dormer windows.

The smoother a thatched roof, the more velvety its finish, the better the thatching and the better water will run from it – and the longer it will last.

Flashed areas, features that penetrate or interrupt the roof should be voided as far as possible. Chimney shafts should be designed to penetrate the roof plane at the ridge, thus avoiding the necessity of back flashing. Soil vent pipes are best located on external walls so that they penetrate the thatch near the eaves line. Rain water must not be allowed to discharge from a high level roof onto a thatched roof at a lower level. See SANS 10407table. The roof framing normally consists of eucalyptus poles that have been chemically treated.

Thatched roofs are constructed with dripping eaves, meaning rainwater gutters and down pipes are not provided. Eaves overhangs should be at least 650 mm and provision should be made at ground level, around the building, to prevent erosion due to water dripping from the eaves overhang.

## **What to look for**

To extend the lifespan of your thatched roof:

- Remember that even small repairs are best carried out by a professional Thatcher
- Take time to stand and look at your roof – unlike a conventional roof, it is very obvious if a thatched roof is in a poor condition
- If sways (horizontal lines) are exposed all over the roof, it indicates that the thatch is either nearing, or has reached the end of its life
- If gullies are appearing (vertical deep patches of rot), these will require the attention of an experienced Thatcher
- Dark wet patches on the eaves close to the wall indicate the thatch is leaking
- If the roof is covered in heavy moss, it could mean that the thatch is unable to breath and is therefore unable to dry out properly
- If you spot any problems contact a professional Thatcher for advice – prompt action can often prevent a bigger (and more expensive problem) from developing
- If contractors have to work on your roof (to repair a chimney or fix an aerial) make sure they speak with your Thatcher first to ensure any roof ladders or equipment they use, do not damage your thatch
- If pieces of your thatch are sticking out in loose clumps, with holes above, this could indicate that you and your family are not the only inhabitants of your property. Contact your thatcher or pest control officer for immediate advice.
- Wire netting applied all over the roof will prevent birds, vermin, baboons, etc from gaining entry but trapped leaves etc. on the roof.
- Trees can be problematic (if they overhang a thatch roof) as the shade will slow down or prevent the damp from drying out. Leaves falling onto the roof and left to lie there also interfere with the drying process and can cause rot.

- The southern side of roofs in South Africa always tend to decay quicker, due to the greater shade on that side.

### **What is the best climate for a home with a thatched roof?**

High humidity with low temperatures or low humidity with high temperatures is the best climate for a thatched roof.

### **Durability**

A thatched roof will normally last for about 20 years if properly laid. Dekriet will typically last a little longer, up to 30 years. A thatch ridge requires renewal every 4-6 years.

Some reed roofs are still looking good after 30 years – water reed can last over 60 years. It depends on the type and quality of the reed, the treatments and, of course, the skills of the contractor. A thatched house in Sutherland in the Cape which was constructed in 1952 needed the first ever maintenance in 2001. The reason they can last so long, is due to the very cold winters: the sub-zero temperatures actually freeze the roof which sterilizes it and curbs any fungal or bacterial charge. Sea-spray is beneficial too, as the salt sterilizes the thatch/reed and its contents.

*Managing the lifespan of a thatched roof is about controlling moisture content and temperature. Humid areas, the least highly indicated for thatching, may entail more maintenance.*

### **Care of Thatch**

- Good thatch will not require frequent maintenance
- Establish early on what condition the thatch is in - then appropriate work (if necessary) can be programmed
- Do not assume that because materials are slipping or that the roof looks a mess that it needs re-thatching
- Do not assume that because the roof looks neat (with a well executed ridge pattern) that it is in prime condition
- A thatch which looks thick is not necessarily a good thatch
- A thatch which looks thin is not necessarily a bad thatch
- The life of a thatch can be extended significantly by a timely and appropriate repair
- Do not move around on your thatch unnecessarily. Do not allow others to do so
- Do not let non-thatchers fit netting, flashings, etc. without advice from an experienced thatcher
- TV aerial erectors etc. should be required to keep off the thatch as much as possible
- Do not allow standing on the ridges or the use of ridges as working platforms
- All roofs, whether or not they are made of grass, are home to insects. Have your home professionally fumigated once a year to get rid of bugs, etc.

### **Ridges**

The thatch grass/reed ridge of a thatched roof bears the brunt of the weather and, as the fixings are external, it requires attention. The material used is usually the same as that used for the main coat work; however water reed is too stiff and brittle. As a result, the ridge of a water reed roof is often made with sedge.

The grass that is used to form the ridge capping is thinner, softer and more pliable than that used for the main roof. The lower edges of the ridge capping may be trimmed to a decorative profile with chevrons or scallops. Alternatives to grass ridges are often used, the most common being preformed fibreglass, sheet metal and cement. The ridge is the most vulnerable part of a thatched roof and particular care must be taken to ensure that this feature is absolutely watertight.

## **Alterations**

Consult with the Thatcher who is to undertake the thatching work, or with some person who has the appropriate thatching experience, knowledge and roofing forms.

Life of thatch can be extended significantly by appropriate repair

- Water penetration into thatch is limited
- Thatch does not (when working properly) absorb large amounts of water, (hence there should be no large increase to roof weight due to water
- Any water striking the apex of the roof is transferred down the roof surface from stem to stem until it drops from the eave.
- Thatch is by its nature prone to wind damage.

## **Preventative Measures**

- Lightning conductors should be installed to protect the thatched buildings in accordance with the SABS Code of Practice
- To avoid excessive high mast, two masts or a spike on a chimney can be installed if the roof is not covered by the protection zone.
- Chimney stacks should be constructed in such a way that the outer faces in contact with the thatch do not become hot. A full brick thickness (220 mm) is normally sufficient
- All mortar joints in the stack must be properly filled
- The top of the stack must extend for a radius of at least one metre (measured from the top of the stack, closest to the roof covering) above the thatch covering of the roof
- Install a spark arrestor, consisting of a piece of stainless steel wire mesh, fitted 700 mm from the top, covering the full width of the flue. Be careful to install in such a way that birds can't nest there.
- Do get an architect or structural engineer to discuss any plans for extending your thatched property with your Thatcher to ensure any roofing alterations which you intend to have thatched are suitable for thatching.
- Do obtain an independent survey of the condition of the thatch on the property you intend to purchase from an individual who does not have a vested interest in any potential financial outlay as a result of the survey.
- Do always get more than one quotation for any thatching work which is required and bear in mind that the best Thatchers can sometimes be booked months in advance. The quality of the thatcher, their experience in using the material, the quality of the material as well as the pitch of the roof and geographical or meteorological factors e.g. wind, all play a major role. The key is to choose the right Thatcher, who in turn will ensure the correct thatch materials, are used to meet the demands of the location and design of the property within the constraints of National Building Regulations and local municipality's requirements.
- Thatched homes are not disproportionately expensive to insure – it is simply a matter of shopping around and finding an insurer who is experienced in thatched properties.

## **GUARANTEE**

A twenty four (24) months guarantee on defective workmanship and materials should be given.



# THE NECESSITY OF APPROVED PLANS

## Wind damage



The lack of windbreakers (wind bracers) are among other things, the reason for the failure of this roof. The weight of a thatch roof with poles is about 80 kg per sq.m and with wind load approximately 121 kg per sq.m

*Wind braces*



If the pole structure of a building is erected before the walls are built and it is not erected correctly, the structure tends to move.

If the walls are built afterwards, it creates a problem with regards to the sealing between the poles and the walls.



## ENVIRONMENTAL FACTORS



Clearance of bush, jungle, grass and weeds up to 25 meter from premises (excluding garden cultivation).

A rational design will determine the fire safety precautions such as the installation of a fire wall, safety distances etc.



# POLE STRUCTURE

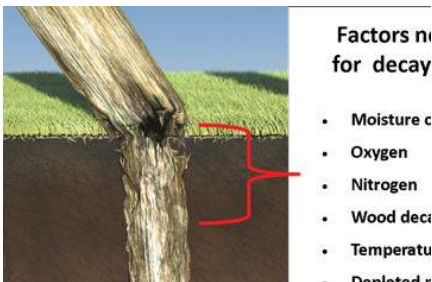
## GUM POLES

Gum poles shall be from trees of the Genus Eucalyptus grown in South Africa and treated with a preservative solution of copper-chromium-arsenate (CCA) compounds which complies with SABS 457 and applied in accordance with the SABS to Hazard Class H4.

The contractor shall obtain the written approval from the Engineer once all gum pole structures to buildings 6m and wider have been erected and before any thatching may commence. This will form part of the fee paid by client to Engineer.

All free standing structures i.e. Lapas requires Engineers approval and certificates.  
The diameters specified shall be the size at the thin end of the gum pole.  
Poles ends to be nailed with anti-split plates.

## GROUND POLES



Rotting of ground poles is a big problem. Ground poles must be at least 175 mm thick and preferably a H pole or protected by a sleeve.







The purpose of the products is to supplement the durability of the treated pole and not replace it. The assumption is that if the correct H class is used with sufficient penetration and associated retention, that poles will perform as required.



When an eucalyptus (gum) pole is cut off, an anti split plate covers atleast 80% of the surface must be applied to prevent cracking.

# DIFFERENT CLASSIFICATIONS OF POLES

Any pole planted in the ground should be a minimum classification of H4.

HAZARD CLASS SYMBOL	<b>H2</b>	<b>H3</b>	<b>H4</b>	<b>H5</b>
END USE APPLICATION	Internal	External Above Ground	In Ground Contact	In Fresh Water / Wet Soils
				



Protection at ground level.  
The water can run away from the pole.  
This provision for the drainage of water from the pole also applies when the floor area is covered with concrete, tiles etc.

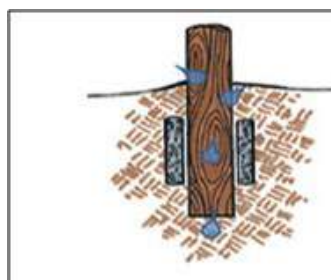


No protection at ground level after 5 years.  
Concrete must surround the pole but the bottom of the pole must stay open.

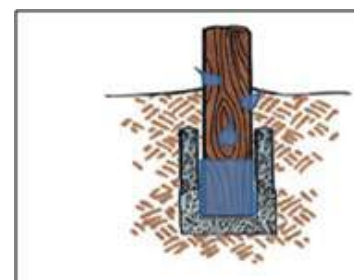
There should soon be a SANS specification available for barrier protection system of those roofs which are supported by columns.

The footings of these columns affect the overall stability of the roof and adequate footings, preferable specified by an engineer, be installed. Many columns are planted in the ground too shallow and without the necessary concrete footing the size of which is determined by the roof load and soil conditions. Concrete *footings should not encase the bottom of the pole* as this will accelerate rotting by not allowing drainage.

**RIGHT**



**WRONG**



# CONNECTORS, BOLTS, THREADED ROD & WASHER SIZE

Incorrect washer size



Correct washer size.



Incorrect positioning of threaded bar



## Bolt or threaded rod

M10 to M12  
M16 to M20

## Washer size mm

**Round**  
36 x 3  
50 x 3

**Square**  
36 x 36 x 3,6  
50 x 50 x 3

## BOLT-END SPACING

Good practice is to measure the diameter of the pole **A** and not to drill closer than this measurement from the end of the pole **B**.

Bolt	Min distance to pole end measured on centre-line of pole mm	Min spacing between bolts mm
M10	75	100
M12	90	120
M16	120	150
M20	160	200

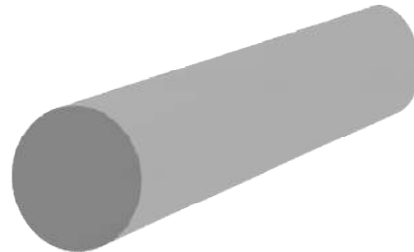


Diagram showing correct calculation of bolt-end position.

### **WRONG**

Incorrect bolt-end spacing.  
Distances not equal



### **CORRECT**

Correct bolt-end spacing.  
Distances equal



### **WRONG**

Incorrect bolt-end spacing  
Distances not equal



### **CORRECT**

Correct bolt-end spacing  
Distances equal.



# **BOLTED STRUCTURAL CONNECTIONS**

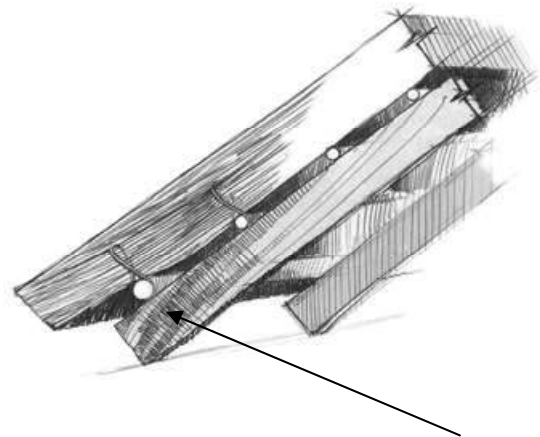
## **Wrong**



Structures are built and on inspection it seems that the main connections are bolted, however on closer inspection it is found the connection is actually a 150 mm **wire nail** fitted washer and nut. The fraud connection is very often not seen ground level but seen only on closer inspection.

## **BOTTOM LATH**

To prevent the thatch sliding down at eaves level and to increase the tension of the stitching, it is recommended that a larger diameter bottom lath (tilting lath) be used to lift the thatch. It is not compulsory.



Section through eave showing the tilting lath

# **FREE STANDING STRUCTURES**

## **SIZES OF POLES**

### **Uprights**

1. Buildings less than 3.0 meters wide 125/150 diameter posts fixed with 16mm thread bar.
  2. Buildings between 3.1 and 4.0 meters wide 150/175 diameter posts fixed with 16mm thread bar.
  3. Buildings between 4.1 and 5.0 meters wide 175/200 diameter posts fixed with 16mm thread bar.
  4. Buildings between 5.1 and 6.0 meters wide 200/225 diameter posts fixed with 16mm thread bar.
  5. Buildings between 6.1 and 7.0 meters wide 225/250 diameter posts fixed with 20mm thread bar.
  6. Buildings over 7.1 meters wide 250/275 diameter posts fixed with 20mm thread bar.
- All uprights to be spaced at no more than 3.5 meters apart.

### **Ring beams**

1. Buildings less than 3.0 meters wide 125/150 diameter ring beam.
2. Buildings between 3.1 and 4.0 meters wide 150/175 diameter ring beam.
3. Buildings between 4.1 and 5.0 meters wide 150/175 diameter ring beam.
4. Buildings between 5.1 and 6.0 meters wide 150/175 diameter ring beam.
5. Buildings between 6.1 and 7.0 meters wide 175/200 diameter ring beam.
6. Buildings over 7.1 meters wide 200/225 diameter ring beam.

## Rafters

Double ridge pole to be used.

Buildings less than 5.0 meters wide 100/125 rafters to be used at 900 centers.

Buildings 5.1 to 8.0 wide 100/125 rafters to be used at 900 centers.

Buildings 8.1 to 12.0 wide 125/150 rafters to be used at 900 centers.

All rafters are to be secured at walls with a double strand of no. 8 wire.

No hoop irons are to be used.

## Tie Beams

Spaced at no more than 2.7 meters apart.

Building 5.0 meter wide or less - straight tie beam.

Building 5.1 - 8.0 meters wide - straight tie beam.

Building 8.1 - 12.0 meters wide -straight tie beam and scissor tie.

Thickness at thin ends to range between 25mm and 38mm nailed with 4" nails to rafters at 270mm centres. Only the first row at eaves and last row at ridge will be at  $\pm 150$ mm centres.

## Lathes

Thickness at thin ends to range between 25mm and 38mm nailed with 4" nails to rafters at 270mm centres. Only the first row at eaves and last row at ridge will be at  $\pm 150$ mm centres.

## ROOF PITCH



Roof pitch must be at least 45 degrees and dormer windows at least 35 degrees. The reason for this is that any valley or hip is always approximately 10 degrees flatter than the general roof slope giving the minimum roof slope of 35 degrees allowed. The general roof slope impacts dramatically on the slope area of the roof. A major saving can be made by an unqualified Thatcher by building the roof a few degrees flatter than specified.

## VALLEYS



Valleys should be wide and open so that the water can run freely and quick. The ideal is that the roof dry as quickly as possible.

If the valley is very narrow, a valley liner can be installed.

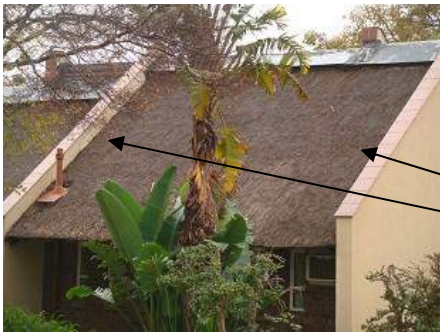


Additional material must be laid in the valley to provide extra thickness to prevent water penetration into the thatch layer and to provide a gradual sweep, rather than a sharp bend.



Valleys may be fitted with valley liners (Galvanized or Aluminium in coastal areas) stitched with double strand sisal tar twine maximum stitch width to be 10 cm.

## FLASHINGS



Flashings must be installed against the wall to prevent waterproofing problems



**Wrong**



## RAFTER SPACING



Correct rafter spacing, max is 900mm centre to centre

800 mm

## DEFLECTION AND THICKNESS OF POLES



A typical pole size is given as 100-125m. 100 designate the **minimum** diameter on the **thin** end of the pole. The thick end diameter of the pole varies, but an accepted norm is that the pole tapers by 5% per meter. Many roofs are built with undersized poles and the responsible person is unaware as they are led to believe a pole is measured on the thick end. Keep in mind the pole diameter that may be used for thatch structures is 100-125mm.

## WRONG



With deflection

Caused by thin poles and loading before tie beams are in place.

## CORRECT



Without deflection

During construction load spans need to be supported to alleviate deflection

There are many ring beam failures and there are 3 main reasons:

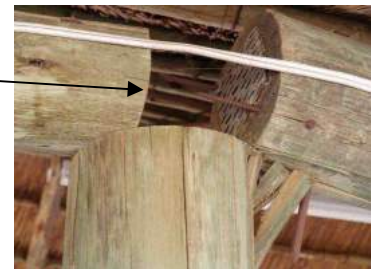
1. The size of ring beam is too small.
2. The uprights are placed too far apart. (Where possible plan trusses above uprights).
3. No proper tie beams in place causing extra stress on the ring beam

## PROPER CONNECTIONS



Improper ring beam connection to upright. Note only nails!

Laths must be connected to the pole



Major connections 16mm galvanized thread bar.  
Rafters connections 12mm galvanized thread bar.

All joints to be drilled and fixed with galvanized threaded bar and no nails are to be used for this purpose. Cross-tonguing joints shall be used on all gum poles, which are unobtainable in lengths required.

## POLES TIED TO WALLS



Poles are tied to the wall with wire.

The wire is placed underneath the fourth **and** fifth layers of bricks, to not keep the tension on the same layer of bricks.



## RAIN WATER



Preferably rain water must not fall from one roof unto another thatched roof because it causes unnecessary water damage of the roof below.

**Bad design.** Never allow overlapping thatch surfaces. The drainage water falling from the higher roof onto a lower thatch roof accelerates rotting on the lower surface as the penetration of water into the layer is deeper and washes out the layer. It also takes longer to dry.

In general the drainage of water from thatch roofs is an important factor in the design of thatch roofs as all drainage areas such as valleys will degrade faster than the general roof slopes.

## THATCHING

Guaranteed frost cured thatch grass shall be fully grown Hyperrhenia Hirta species cleared of all leaf and sheath residue and thatch must be free of mould.

The thatching grass shall be beige/yellow in colour and shall have maximum body moisture of 10% to 15% by mass. Only straight pieces shall be used, cut above the first notch. The grass shall be 1000mm to 1500mm in length, with the ends ranging from 2mm to 3.5mm diameter.

Back thatch (sprei laag) to be uniform in colour ensuring that all seed ends are covered. Stems to be concealed by lathes.

A sample of the thatch grass is to be supplied to the Architect for his approval prior to commencement of thatching and will be used as a representative sample for the entire roof.

The Contractor shall take special care in storing and stacking of thatch grass on site, by stacking the bundles off the ground and under cover.

Thatched to a thickness of 200 mm thickness measured at right angles to the roof.

### **Good quality Cape reed**



### **Spray layer (back thatch \ ceiling)**

Cape reed or clean comb spreij grass is used as spreij layer.

This is the colour of the reed harvested according to the specification requirements thereof.

### **Quality spreij layer**

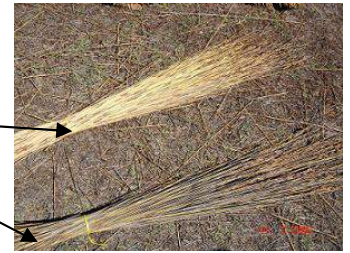


Cape reed harvested in the growing season full of seeds and leaves which tends to rot and attracts insects. The green reed turns grey when dry.

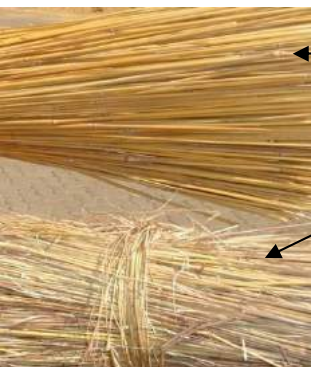
Imature Cape reed



Difference in colour of quality reed and those cut during the growing season when dry

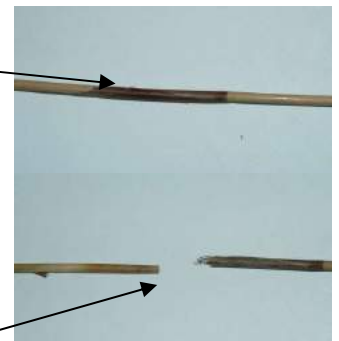


Bad quality Cape reed



Thatch grass must be harvested after the first frost has fallen when it is without leaves and seed. Nodes are tight.

Poor quality thatch grass. Both Cape reed and thatch grass can be tested to determine if it was harvested in the growing season.



**Test:** Try to pull the nodes apart. Green thatch or reed's nodes will pull apart when not mature – harvested in growing season. The resin layer of thatch has not formed yet which protects the thatch against water penetration.

**COMPACTION**

**Wrong**



Compaction is of the utmost importance. A fire retardant chemical should not be applied if the compaction is not correct otherwise it will have no or very little effect.



**Test with a normal pull scale.**

The treated sisal twine may only moves away from the lath at 5 kilograms.

When the **compaction** is correct a thatched roof tends only to smoulder in case of a fire.

Loose twine not tight around lath which will allow the layer of thatch to slide down.

## **STITCHING**



Only tar treated twine or galvanised wire are allowed.

**Polypropylene (plastic) is not allowed** because the correct compaction cannot be achieved and melts in the case of a fire long before the tar treated twine and cannot hold the thatch together anymore.

Stitching must be no more than 10 cm apart

## **WIND DAMAGE**

In the Southern hemisphere we have the problem that thatch roofs take longer to dry on the South side than on the other sides.

As a result, the treated sisal twine is longer exposed to moisture, resulting in a more rapid weathering than on the other sides of a roof.

When servicing a roof, special attention should be paid to this because this is where wind damage occurs because the weathered twine does not hold the thatch tight enough or break.

These pole structures in the photos were strong enough to withstand the onslaught of a tornado. Only wind damage occurred.



## ROOFS FITTED WITH CEILINGS



Many Thatchers will not install "sprei" layer when roofs are fitted with ceilings. This results in an under surface with the seed ends of the thatch bundles exposed which in advent of a fire, will accelerate burning. Ceiling thatch should be installed irrespective of normal ceilings being fitted.

## THATCH LAYER THICKNESS



Many Thatchers will lay an eaves layer that is 175 mm thick, *and then taper the layer to the ridge where the thickness ends up as little as 75mm.* As a result, the roof starts to leak within a short period of time. It is not obvious once the roof is complete as all that changes is a slight change of angle on the thatch surface. Gable ended roofs are more difficult to cheat as the taper then becomes obvious. On completion of the thatching the thatch layer thickness should be checked randomly over the entire roof surface. The piece of thatch that is exposed to the elements should not exceed 3 cm.

**SANS 10400-XA: 2018** Edition 2 stipulates the following:

In a roof assembly that consists of thatch the thickness of the thatch shall be as follows:

1. Fine thatching grass or reed in all zones except 5H: 210 mm or R value of 3.7
2. Fine thatching grass or reed in zone 5H: 175 mm or R value of 2.7
3. Coarse thatching grass or reed and water reed: 300 mm

## ROLLED THATCH GABLE ENDS



Beautifully finished gable ends.

*Please note that this finishing of gable ends is not compulsory, but is an example of what can be done.*





*Gable ends* are the most difficult to thatch and the thatch must run up at 45 degrees on the gable and the thatch must be turned so that you only see the ends of the thatch and not the sides.

## **SERVICING OF THATCHED ROOFS**

**Wrong**



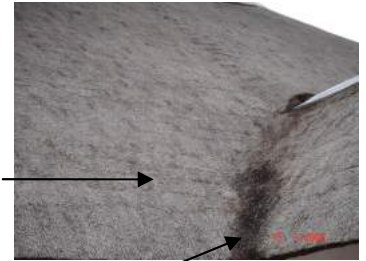
The practice of inserting short pieces of grass (which usually does not meet specification requirements) between the existing thatch, disturbs the laying of the thatch by lifting the front of the thatch. This tucked grass also eroded much faster. The wrong practice to "comb" the roof shorten the lifespan of the roof and causes leaks.

*How to **service** a thatch roof : "A Guide to Thatch Construction in South Africa" page 71*



The correct method to service a thatched roof.

Wrong methods cause the wire to be exposed very quickly that makes an additional thatch layer necessary.



*The pole structure must be able to carry the extra weight of an additional layer.*

A valley liner could have prevented the decay of the valley

## **WRONG OVERLAP OF THATCH**

**Wrong**



**Wrong**



Only approximately 3 cm of thatch may be exposed to the elements

The smoother a thatched roof, the more velvety its finish, the better the thatching and the better water will run from it – and the longer it will last.

## **FIRE PROTECTION**

### **SISALATION AND CONDENSATION**



Some Thatchers use Sisalation instead of a fire blanket. The problem with Sisalation is condensation. When poor quality thatch is used that does not meet specification requirements (not mature and full of leaves and seed), are laid on top of the sisalation and on top of that is sprayed with a chemical agent, the moisture is sealed in.

### **FIRE RETARDANT BLANKET**



The blanket acts as protection for the roof pole structure, internal/ external layer of thatch and internal contents of the building by stopping flames from getting through to all the layers of thatch and spreading throughout the entire roof and building.

If a fire begins on the inside of the roof (through an electrical spark for example), the flame will be stifled when it hits the fire blanket and unable to burn through to the outer layer of thatch and access oxygen from the outside. If the fire begins on the outside of the roof the blanket will stifle the flames and prevent the flames from penetrating the inner layer of thatch and sucking oxygen from the inside of the house to grow.



The fire blanket also prevents dust from falling into the house as the thatch ages - a common problem with older thatch roofs and is perforated allowing adequate aeration.

*The fire blanket does not prevent a flame from catching but dramatically reduces the spread of fire and rate of growth allowing time for the fire to be extinguished.*

#### **Application**

A thatch fire retardant blanket can only be applied to newly thatched roofs. The blanket is woven in between the layers of thatch as they are added to the roof creating a membrane which covers the entire roof. Thatch roof preferably stitched with stainless steel wire stays

# **DRENCHER AND SPRINKLER SYSTEMS**

While a sprinkler system protect a building from internal fire, drenchers are placed on roofs and over windows and external openings to protect the building from damage by exposure to fire in adjacent premise.

## **Drencher System**

A drencher system is comprised of water heads somewhat similar to these of sprinklers; these may be sealed or unsealed (open drenchers), may be controlled by quick-opening valves operated by less of air pressure in a detector line system in a similar manner to high velocity water spray systems.

## **Roof Drenchers**

Roof drenchers have a deflector rather similar to that of a sprinkler head. From the roof ridge they throw a curtain must be protected.

## **Wall or Curtain Drenchers.**

Wall or curtain drencher throw water to one side only of the outlet in the form of a flat curtain over those openings or portions of building most likely to admit fire in order to cover all combustible portions of a wall, it is the usual practice to put a line of drenchers just below the caves of this contain flammable material, and to fit every window or opening the top two storey with a drencher. Those below this level except the ground floor and basement are fitted on every alternative storey



**Link to a video:** [https://www.youtube.com/watch?v=vdEf\\_5Hv4R4&feature=share](https://www.youtube.com/watch?v=vdEf_5Hv4R4&feature=share)

# **NOTICE REGARDING THE APPLICATION OF CHEMICAL**

## **SUBSTANCES TO THATCHED ROOFS**

The Thatchers Association of South Africa has noted an increase in inquiries and complaints regarding certain chemical products applied to thatch roofs.

We request that members of the Association and the general public research and investigate any chemical substances properly before application and to follow guidelines provided by manufacturers as certain products may have an adverse effect on the life span of the roof. Please also note that application of chemical substances to thatched roofs must be repeated every five to seven years, and that a thatched roof must first be served beforehand as explained on page 71 of the "A Guide to Thatch Construction in South Africa" to make sure amongst other things that the compaction, which is an important factor, is tight.

### **Phrases which to note with caution are:**

- Waterproofing properties

*It is almost impossible to waterproof a thatched layer with a chemical or coating without hindering the thatched layers ability to "breathe". Proper thatching techniques ensure that any water ingress into the layer does not penetrate far enough to cause water to go through the thatched layer. Any product which claims to waterproof the thatched layer will obstruct the moisture trapped in the grass from drying out. This stagnant moisture can cause the premature decay of the thatched roof.*

- Extends the life of the thatched roof

*There are no known and environmentally safe spray-on chemical substances which are able to drastically extend the life of a thatched roof. Certain products may assist initially but will soon wear off with the thatched layer it was applied to.*

- Prevents dust

*Again, blocking of the natural air flow through the thatched layer can trap in moisture which can negatively impact the life the thatched roof.*

- Prevents bird and monkey damage

*There is a known case, with a judgment handed down from the Advertising Standards Authority, against a company which claimed that bird and monkey damage could be prevented by applying a certain product. These types of applications are not effective.*

- SABS approved or SABS tested

*In relation to chemical or coating products for thatched roofs - the SABS Standards Act of 2008 strictly prohibits the unauthorised use of the SABS mark in respect to a commodity which is likely to create an impression that the commodity has been approved by the SABS. The use of the terms SABS TESTED, SABS APPROVED, and or SABS COMPLIANT are to be considered unlawful trademark infringements. Any product purporting to be SABS APPROVED or SABS TESTED or SABS COMPLIANT should be reported to the SABS legal department for investigation.*

*Chemical agents sprayed on thatched roofs weather with the thatch. Therefore, treatment should be repeated every five to seven years.*



# RIDGES

## FIBER GLASS RIDGES

### Wrong



Thatch that has been cut at the ridge and not bent over is easily pulled out by birds and dropped out of the ridge.

*Refers to page 60 of A Guide to Thatch Construction in South Africa*



### Correct



**When a fibreglass ridge is installed, the opening between the thatch and the fibreglass must be filled with grass.**

***This prevents fire from running along the ridge during a fire.***

Thatch at apex to bend over ridge of roof and fixed to opposite side of the existing gum pole lathes.

The bundles of ridging grass should be bent over the ridge and securely anchored by means of stitching onto the opposite two top most battens.

## CEMENT CAPPINGS



Cement mixture of 4:1 i.e. 2 wheelbarrows to 50kg bag.

250 Micron plastic as concrete underlay cut to cover the last stitch of twine only.

Allow minimum 100mm space between ends of capping to ensure that the cement mix binds with the thatch.

25mm x 0.9mm netting wire to extend over entire width of capping.

50mm thick cement capping to extend over the last layer of thatch ensuring that the butt ends are secured by the capping (this ensures that birds are unable to pull the thatch from under the ridge).

Capping to be floated to a smooth even finish.

Expansion joints at no more than 3 meters apart.

## OVERVIEW OF A THATCHED ROOF HOME



1. Classification of pole planted in ground is a H4 pole. Some thatchers even use thicker poles and put ant poison in the hole to combat termites.
2. A stone chimney was built around the steel flue as protection for the thatch against the heat of the flue. The top of the stack must extend for a radius of at least one metre (measured from the top of the stack, closest to the roof covering) above the thatch covering of the roof.

Securely build into the flue around the edges, or support on mild steel dowels, a spark-arrester consisting of a piece of 10 x 10 x 1 mm (minimum) stainless steel wire mesh, flue. Fire extinguishers at the fire place and at hand at other places where necessary.

3. Roof pitch at least 45 degrees and compaction according to specification. (The treated sisal twine may only moves away from the lath at 5 kilograms).
4. Valley liner in narrow valley.
- 5a. A **fire blanket** can be installed above the spreil layer.
- 5b. Natural thatch for the top layer harvested according to specification requirements. A thatch roof thatched with quality thatch needs only to be serviced twice in its lifespan of 20 to 25 years.
- 5c. A **Drencher System** is preferred above a Sprinkler System because the water runs down the thatch while the wind blows the moist away of a Sprinkler System.
6. Water for the Drencher System can be obtained from a swimming pool or water tank.
7. **Smoke Detectors** which activate the Drencher System.
8. **No shadow and rotting leaves** on the roof so that it can stay clean and dry quickly.
9. **Clean and open** around the building.
10. **Electricity supply** from the floor up against the walls and then in conduit on the poles. Never through the thatch.

## INSTALLATION OF APPLIANCES



Electrical devices, telephone lines, etc. should not be installed near the thatch.

Electrical wiring must be installed from the floor upwards and fasten to the beams in a conduit which is also a safety precaution regarding rodents. No electric cable may run through the grass.



### Electricity supply:

Electrical cables must run **from the floor** against a wall or pole inside a conduit to prevent it from damage caused by rodents, etc. Cables must never run through or near the thatch itself.

The **heat** of a geyser or airconditioner may cause the thatch to burn.

## WRONG POSITION OF A CHIMNEY



A chimney *built in a valley* is always problematic and secondly, the side of the dormer window ends very close to the chimney which also restricts the flow of water even more.

Attempts to fix these types of problems are seldom successful.

## INSTALLATION OF A STEEL FLUE

The installation of a steel flue through thatch is not recommended unless it is properly done under supervision of an experienced thatcher.



Thatch and poles should never come in contact with the heat of a steel flue.

The heat of the steel flue leaves the pole and thatch charred.

A stone chimney was built around the steel flue as protection for the thatch against the heat of the flue.



## SPARK ARRESTOR

On page 87 of our "*Guide to Thatch Construction in South Africa*" it is described what a spark arrestor is and how it should be installed. It is found that the public is totally uninformed about this and *believes that the Cowl on the chimney is the spark arrestor.*



The public is very negative about it because birds nests in it. Due to ignorance or indifference, many people do not install spark arrestors in chimneys.

This is a **Cowl** and NOT A SPARKARRESTOR



Spark arrestors should be cleansed at least once a year

# PROBLEM SOLVING

## BOX GUTTER

This is completely wrong. A Box gutter is the answer.

The best way is to cut back the tiled roof, fix a box gutter onto your house wall and then both roofs discharge rain water into the box gutter.

**Wrong**



## A solution



## STRUCTURAL PROBLEM THAT WAS RECOVERABLE



Structurally the roof has two bolted tie-beams, one next to the gable of the building and one in the front. Facing the building it is noticeable that the wooden columns on the left are leaning over outwards, which in return puts additional stress on the two rafters in front. This is held together by the tie-beam and king post. They both have bent considerably.

The solution to the problem is to remove all the thatch up to the gable wall. Support the existing structure, remove and replace the left column, as well as the two bent rafters in the front, together with new structural members.

# **ACKNOWLEDGMENTS & REFERENCES**

## **SABS**

Thatched roof construction: SANS 10407 - 2015 Edition 2

This standard covers the design of the supporting roofing structure and installation of thatch on roofing structures.

NOTE SANS 10400-L:2011 Edition 3 covers the design of roof structures, SANS 10400-T covers fire protection requirements, and SANS 10400-V covers chimney requirements. SANS 2001-CT2 covers the construction of the structural timberwork in the roof.

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

SANS 457-2, Wooden poles, droppers, guardrail posts and spacer blocks – Part 2: Softwood species.  
SANS 457-3, Wooden poles, droppers, guardrail posts and spacer blocks – Part 3: Hardwood species.  
SANS 820, Mild steel nails.  
SANS 1083, Aggregates from natural sources – Aggregates for concrete.  
SANS 1288, Preservative-treated timber.  
SANS 1707-2, Sawn eucalyptus timber – Part 2: Brandering and battens.  
SANS 1783-4, Sawn softwood timber – Part 4: Brandering and battens.  
SANS 2001-CT2, Construction works – Part CT2: Structural timberwork (roofing).  
SANS 10005, The preservative treatment of timber.  
SANS 10155, Accuracy in buildings.  
SANS 10183-1, Adhesives for wood – Part 1: Terminology.  
SANS 10183-2, Adhesives for wood – Part 2: Requirements for structural applications.  
SANS 10400-B, The application of the National Building Regulations – Part B: Structural design.  
SANS 10400-K, The application of the National Building Regulations – Part K: Walls.  
SANS 10400-L, The application of the National Building Regulations – Part L: Roofs.  
SANS 10400-XA Energy usage in Buildings  
SANS 10400-T, The application of the National Building Regulations – Part T: Fire protection.  
SANS 10400-V, The application of the National Building Regulations – Part V: Space heating.  
SANS 50197-1/EN 197-1, Cement – Part 1: Composition, specifications and conformity criteria for common cements.

## **SAWPA**

How to plant a pole

## **A GUIDE TO THATCH CONSTRUCTION IN SOUTH AFRICA**

A publication of the Thatchers Association of South Africa

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