House construction terminology

by
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ABSTRACT

This paper is an introduction to house construction terminology. Specifically it describes the parts of a simple stilt house such as may be found throughout Indonesia, built with a traditional king-post roof truss.

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VERSION HISTORY

Version 1 [18 April 2018] A draft version of this paper was circulated for feedback in May 2013.

House construction terminology

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This paper describes the parts of a simple stilt house, built with a traditional king-post roof truss. Anyone who has lived for any length of time in rural Indonesia has doubtless been inside one of these houses. In fact they are even easy to take for granted—that is, until one day you start looking closely at the floor, or peer into the attic and ask, exactly how is this house constructed? It was on one of these occasions that I discovered that my Indonesian friends—subsistence farmers and dirt poor—had a natural understanding of architecture and building materials that far outstripped my own meager knowledge base. They gave me term after term after term, and despite my Western university training I had little to no idea how to render them in English. I had to resort to line drawings in order to take notes.

I am indebted to these friends for pushing me into a new area of learning. I would also like to thank René van den Berg whose well-researched house construction terminology in dictionaries of Muna (Van den Berg 1996; Van den Berg and Sidu 2000) was an inspiration to pull this paper together.[1] By bringing together English and Indonesian terms in one place, I hope this paper will be of use to other dictionary makers who find themselves in the same boat … er, rather, house.

My principal aim then in writing this paper is to help lexicographers working with indigenous languages of Indonesia to create clear and accurate dictionary entries concerning the basic parts of a house. At the same time, I am aware—almost painfully so—of how little is actually covered below. There is so much that could be written concerning traditional house construction in Indonesia from both an architectural and ethnographic perspective that it could fill volumes—and has![2] This paper merely scratches at that surface.

House posts and foundation

1. main house post = *tiang seri, tiang raja, saka guru, sokoguru, tiang pokok rumah*. In particular, we mean a house post which extends from the ground floor all the way to the ridge of the roof, or in some other way is regarded as more significant or more sacred than the other posts. In a traditional-style Malay house, there is only one post which is considered to be the *tiang seri* or *tiang ibu*; typically it is also the first post to be erected when constructing the house.[3] In other cases there may be two central posts (Cedercreutz 2003:188). In a traditional Muna house there are three *katisalalo* ‘tiang raja’ supporting

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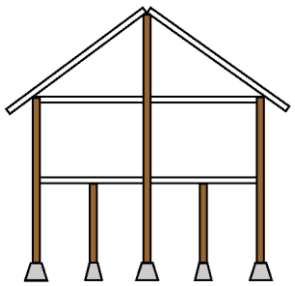
[1] I would also like to thank Berton Turnip for his assistance with Indonesian definitions. Errors remaining in this paper are solely my responsibility.

[2] See among others Kaudern (1925), Gibbs (1987), Fox (1993), Hashimah Wan Ismail (2005), Waterson (2009), and Domenig (2014).

[3] *Wikipedia*, s.v.“Tajul muluk,” http://en.wikipedia.org/wiki/Tajul_muluk (accessed September 21, 2012).

the ridge; the one at the front of the house is considered to be male, the ones in middle and back female (Van den Berg and Sidu 2000:178). By contrast, a traditional Riau house has four *tiang seri*, namely the four posts located at the corners of the house (ART-chitecture 2009).



2. ridge post, a post that supports the ridge beam = *tiang bubungan, tiang yg menopang balok bubungan*.

3. house post = *tiang rumah*.

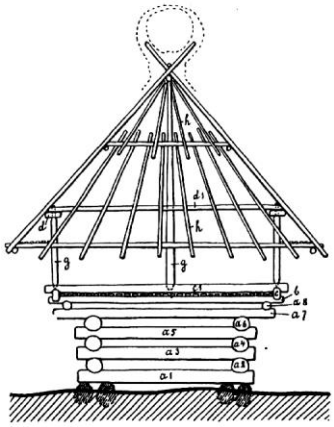
4. floor support post, short posts which support only the floor beams or the foundation beams = *tongkat, tiang lantai bawah, tiang rumah yg pendek untuk menopang rasuk lantai.*

5, space between two (rows of) house posts, space within a house defined by having a house post at each corner = *ruang, ruangan*.

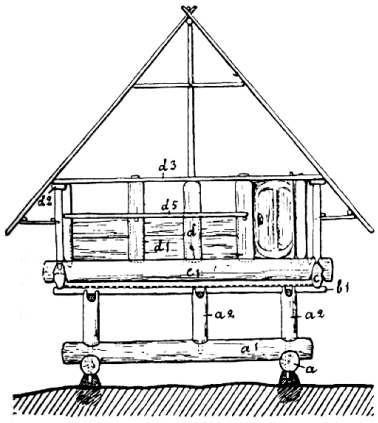
6. footer(s), the stones, cement blocks, etc. on which the house posts or foundation beams rest = *pondasi rumah, pondasi tiang rumah, terbuat dr batu alam, cor semen, dsb*.

7. pile, a post erected by burying one end in the ground = *tiang rumah yg pangkalnya tertanam dl tanah*. Traditionally piles were made of hardwoods such as ironwood and teak. The portion of a pile which rests in the ground is its *umbi*.

8. foundation beams = *balok dasar rumah*. Foundation beams are heavy beams laid horizontally. They may consist of a single layer, or they may be built up in successive layers with each layer set perpendicular to the one below it. Alternatively, some foundation styles use both beams and posts. When a house is constructed with foundation beams, then the foundation supports the floor frame, which in turn supports the vertical posts of the house.



traditional Kulawi house (Central Sulawesi) with a six-layered crossed-log foundation (illustration from Kaudern 1925:57)



traditional Kulawi house incorporating beams and posts in its foundation (illustration from Kaudern 1925:64)

Describing the different kinds of house foundations which were previously in use—and which in many places have given way to cheaper but relatively weak stilts—lies beyond the scope of this paper. Among outside references, see Sørum (2003:86–89) (includes illustrations of three types of foundations used in the Uma area of Sulawesi) and Kaudern (1925) (traditional house and temple construction across middle Central Celebes).

When investigating house foundations, you should also inquire as to what kinds of locations or orientations are (or were) preferred in traditional house construction. Is there a preference for the house ridge to run east-west or north-south? Parallel or perpendicular to the main road? Is the main entrance to a house preferentially placed on the gable end, or on the long side of the house?

Roof

9. roof truss, the 'skeleton' which supports the actual roof = *kuda-kuda atap*.[4]

10. roof, the covering material that keeps the rain out = *atap*. Traditional roofing materials range from thatch from palm fronds, to ijuk fiber from the trunks of sugar palms (*serat ijuk*), grasses such as cogon grass (*alang-alang*), bamboo shingles (*sirap bambu*), wood shingles (*sirap kayu*), and several different kinds of tile (*genténg*, *genting*). In the modern day a commonly encountered substitute for these traditional materials is corrugated galvanized iron sheeting, technically *pelat séng gelombang*, but colloquially referred to throughout Indonesia simply as *séng*.

11. ridge or peak of the roof, the highest point running the length of the roof = *bubungan atap, punggungan atap*.

12. ridge beam, main ridge pole, running the length of the ridge, which supports the upper ends of the rafters = *balok bubungan, alang bubungan, tulang bubung, nok.* The main ridge beam is not necessarily the uppermost beam, because there may be a smaller beam above it which is used to construct the ridge cap (see below).

13. common rafters, boards which slope from the ridge of the roof to the eaves, and to which the roof is attached = *kasau, kayu atau bambu yg dipasang melintang pd atap rumah.* In Indonesian, the common rafters are colloquially called the *rusuk* or *usuk* 'ribs' of the roof.

14. principal rafters, at front, middle and back of a house = *kaki kuda-kuda, kasau jantan.* Principal rafters are larger than common rafters, because their purpose is to give structure and rigidity to the entire roof structure, whereas common rafters support only the roofing material. Note also that principal rafters lie below the top plate, purlin and ridge beam, and support them, whereas common rafters lie above the top plate, purlin and ridge beam and are supported by them.

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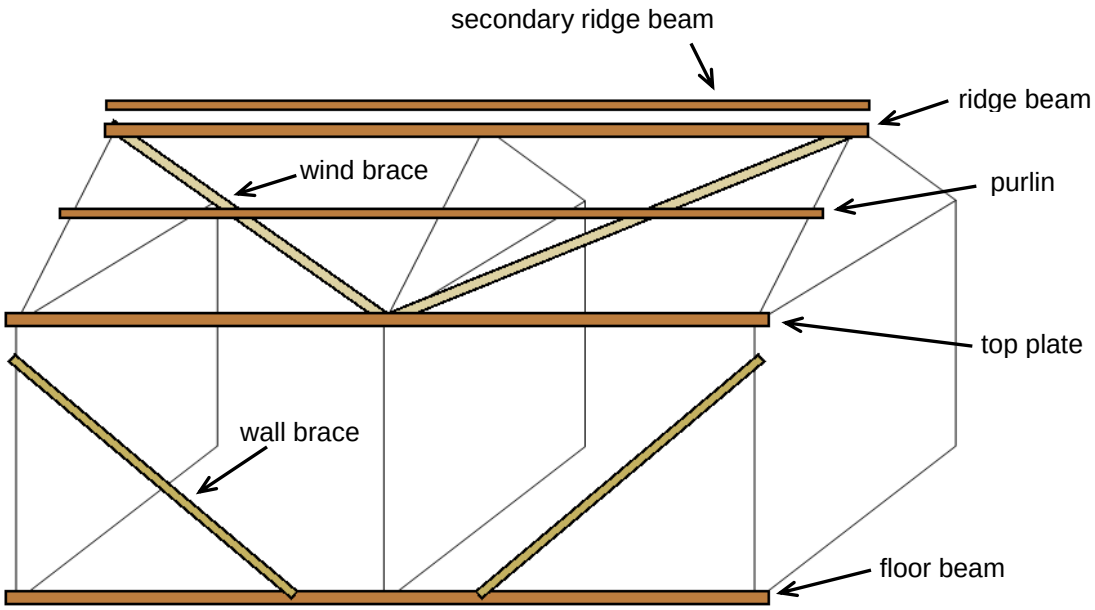
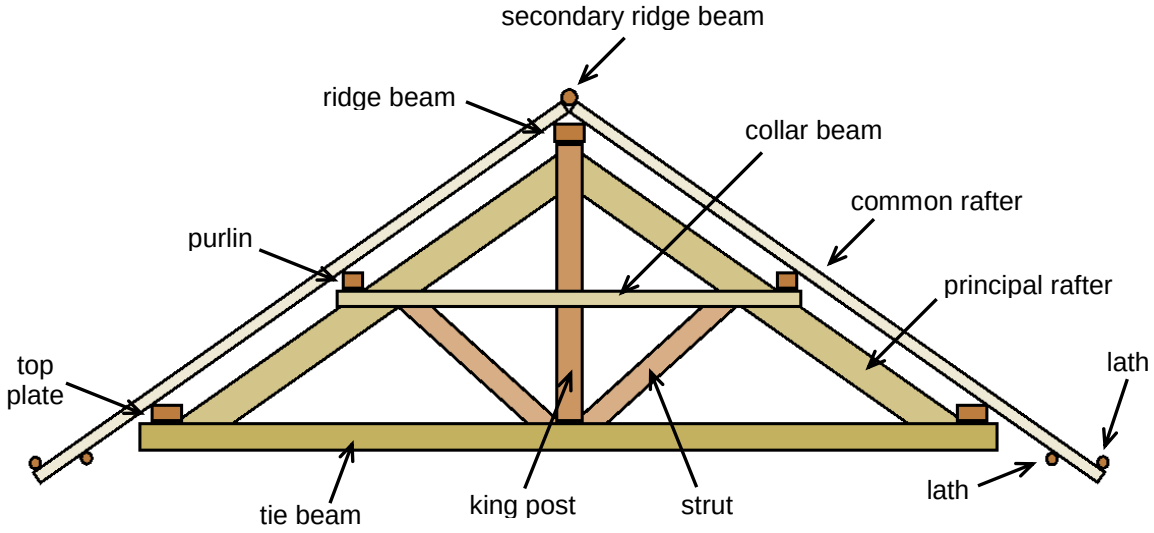
[4] The Indonesian term *kuda-kuda* can also refer to an easel such as an artist uses, and to sawhorses.



schematic of some longitudinal and diagonal beams in house construction

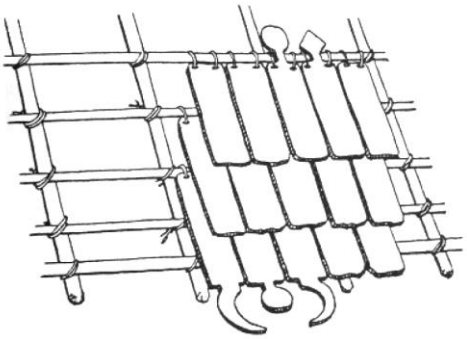


roof truss, viewed from the gable end

There are at least two ways that principal and common rafters are lexically distinguished in Indonesian. In your own dictionary work you should choose one way and be consistent.

principal rafter	*kaki kuda-kuda*	*kasau jantan*
common rafter	*kasau*	*kasau betina*

15. lath (also batten), a strip of bamboo or wood attached across the rafters as a support for shingles, tiles or other roofing material = *jeriau, réng, bilah bambu atau kayu yg dipasang melintang pd kasau untuk sangkutan sirap atau genténg*. The drawing below illustrates the (sloping) rafters and the (horizontal) laths attached to them. Note how the shingles in turn are attached to the laths.



roof with wooden shingles in the Lindu area of Central Sulawesi; the exposed view shows the underlying rafters and laths (illustration from Kaudern 1925:92)

When the roof is made from panels of thatch, laths are not needed, since each panel will have, in essence, its own internal lath (viz. the 'spine' over which the palm leaflets are folded and sewn in place) (see below).

16. tie beam, transverse beam connecting the feet of opposing principal rafters at the level of the upper wall plate = *balok tarik, (balok) peran, dipasang pd ujung kaki kuda-kuda*.

17. king post, vertical piece running from the center of the tie beam to the ridge beam = *tiang kuda-kuda, tiang gantung, makelar, ander, tiang yg diletakkan di antara balok bubungan sampai ke tengah balok tarik.* Some houses are constructed without a separate king post. Rather, the piece which plays this structural role is simply an extension of the central house post.

18. collar beam, collar tie, rafter tie, horizontal transverse roof beams connecting a pair of rafters at purlin level = *balok apit, balok gapit, batang penjepit, balok yg diletakkan secara horisontal kira-kira di tengah tiang kuda-kuda untuk memperkuat atap*.

19. strut, diagonal piece for reinforcing the roof truss = *balok sokong, batang sokong, skoor, dipasang untuk mencegah pelenturan pd kaki kuda-kuda*.

20. top plate, ceiling plate, upper wall plate, horizontal beam situated along the top of a wall at the level of the tie beam for bearing the ends of the rafters = *balok témbok, murplat, diletakkan di sepanjang témbok (atau di atas tumpuan beberapa tiang penyangga), berfungsi untuk menumpu kasau bagian bawah.*

21. purlin, longitudinal beam attached midway up the principal rafters, which in turn supports the common rafters = *balok gording, gulung-gulung, diletakkan di atas kaki kuda-kuda untuk menumpu kasau bagian tengah*. The purpose of the purlin is to keep the rafters above it from sagging.

22. wind brace, a brace attached diagonally in the roof to provide structural rigidity = *balok angin, balok yg dipasang menyilang untuk menjaga kestabilan kerangka atap akibat pengaruh tiupan angin*. Instead of a fixed beam, the brace can also be of some flexible material pulled taut (in this case called 'strap bracing,' Indonesian *ikatan silang*).

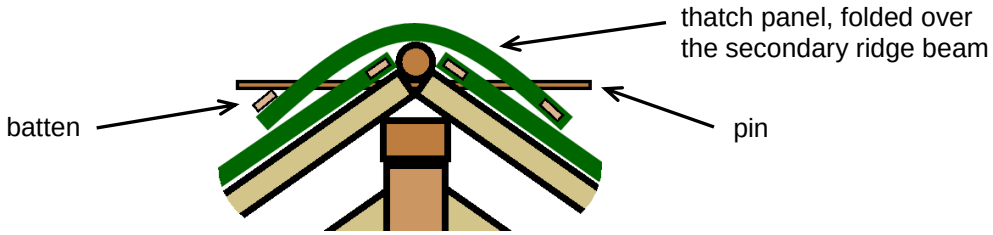
23. ridge cap = *penutup bubungan, penutup pertemuan puncak atap*. Every house with a peaked roof needs the angle of the ridge finished off to prevent rainwater from leaking in at this crucial juncture. The ridge cap may consist of a row of tiles or shingles which are specially shaped for this purpose, or it can be as simple as an arc or 'saddle' made of metal sheeting (which can be called ridge flashing). I have also seen the ridge cap referred to in Indonesian as the *punggungan topi*, apparently a straightforward calque (loan translation) from the English.

constructing a thatch ridge cap on a house in Tanete, West Sulawesi

When the ridge cap itself is constructed of thatch, it requires certain other pieces to hold the thatch in place. These pieces are:

(a) secondary (upper) ridge beam, second ridge pole, the beam over which the last (topmost) course of roofing thatch is folded/rolled = *balok penutup bubungan, balok tutup rabung*. This lightweight, rounded member runs the length of the ridge, and—unlike the main ridge beam which supports the rafters—it rests on top of the upper ends of the rafters.

(b) batten, ligger, slat usually of split bamboo used to batten down the ends of the last (topmost) course of roofing thatch = *réng, belahan bambu yg menjepit atap di jajaran paling atas.* Because these slats lie on top of the last course of roofing thatch, they can be viewed from outside the house. Their purpose is to keep the thatch ridge cap properly folded over the secondary ridge beam.



detail of thatch ridge cap attachment

(c) in the construction of a thatch ridge cap, short, horizontal, wooden pins placed every few feet along the ridge and perpendicular to it, that assist in holding the last (topmost) layer of roofing thatch in place (Indonesian unknown). These pieces pass *under* the secondary ridge beam, and *over* both the spine of the thatch panel plus the added batten, holding the ridge cap in place (see illustration). I have seen these pins on only some houses.

24. wooden or bamboo lath attached to the tail ends of the rafters and running the length of the eave = *penahan ujung atap, réng yg diletakkan pd ujung bawah kasau*. In traditional house construction, this piece is needed to keep the ends of the lowest course of roofing thatch from drooping (*fungisnya supaya ujung atap di jajaran terbawah jangan menggelayut*).

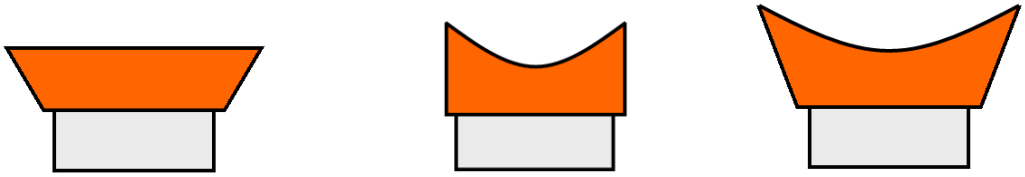
Sometimes there is a parallel piece of wood or bamboo placed on the *underside* of the rafter tails in the overhang area, but not present in all houses; see illustration at bottom of page 6. The function and name of this structural piece is unknown to me.

25. battens, liggers, lengths usually of split bamboo attached on the outside of a roof to hold the upper surface of the thatch in place, so that the ends aren't lifted and damaged by wind = *belahan bambu penahan atap (fungsinya supaya atap jangan kerusakan tiupan angin).*

26. gable, triangular section at the end of a building below the roof and above the main portion of the house = *tébar layar, tubing layar, gabél, bagian di paras dan belakang rumah yg berbentuk segitiga antara dua kasau jantan yg bersilang*. If separately named, the part which covers the gable can be called a 'gable end panel' (*penutup tébar layar*).

27. gable peak, apex of the roof = *ujung perabung, ujung bubungan*. A structure that projects outward creating an overhang area at the gable end can be called a 'prow gable' (*ujung bubungan yg menonjol berbentuk haluan kapal*), while a ridge that rises at the

gable peak can be called an ‘upswept gable’ (*atap lontik, atap minangkabau, ujung bubungan yg melengkung ke atas*). Upswept prow gables are traditional in some locales of Indonesia, for example among the Batak of Sumatra and the Sa'dan Toraja of Sulawesi.



prow gables (side view) upswept gables (side view) upswept prow gables

28. rake(s) of a roof, the edge(s) of a roof at the gable end = *peméléh, pinggir atap di bagian tébar layar rumah*. The rakes are the roof edges which angle downward from the gable peak toward the bottom corners of the roof. If you think of a gable as a triangular area, then the rakes are located along two of the edges of that triangle. The Indonesian term *peméléh* refers to the inverted-V of the gable end, as well as to the (sometimes decorated) barge boards used to trim the gable ends (technically *papan peméléh*). By extension the term *peméléh* can also refer to a decorative element above a door, gate, or archway (*peméléh pintu*)—or even to a decoratons worn about the forehead and temples e.g. by dancers.

29. bottom corner of the roof, the corner of a roof where the rake meets the eave = *sudut di bagian bawah atap, ke-empat sudut cucuran atap*.

30. eave(s), the bottom (horizontal) edge of a sloping roof = *cucuran atap, kaki atap, pekakian atap*. The eaves necessarily extend beyond the exterior walls, since one of their main functions is to channel runoff away from the main structure of the house.

31. eavesdrip, dripline, the line formed on the ground by rainwater dripping off the eaves of a roof = *jejak titik-titik air hujan di bawah cucuran atap*.

32. rafter tail, the part of a rafter which protrudes beyond an outside wall, creating an overhang = *ujung bawah kasau yg menonjol pd dinding rumah ke luar*.

33. roof overhang, area between the end of the eaves and the wall of a house = *teritis, teritisan, tempat di bawah ujung atap di sekeliling rumah, tanah atau lantai di sekeliling rumah yang masih beratap di atasnya*. In my idiolect, I tend to think of this overhang area as the ‘eaves,’ e.g. in a rainstorm one could stay dry by waiting it out ‘under the eaves,’ but technically this would be hanging out under the overhang.

34. gutter = *talang air, saluran air (dr bambu, séng, dsb) pd cucuran atap*.

35. downspout = *talang tegak*.

36. fascia, facing boards used to trim the rafter ends along the eaves of a roof = *lisplang, lésplang, tumpu kasau, papan cucuran*. Fascia boards are horizontal. They are located

where a gutter would be placed, if a house had one. Ornately carved or decorated boards placed in this location are called *ande-ande* in Indonesian.

37. barge boards, facing boards used to trim the rakes (gable end) of a roof = *papan peméléh, kayu peméléh, papan layang yg dipasang di kedua ujung bagian atas tébar layar*.

38. roof ornament, finial = *tunjuk langit, tajuk rumah, buah buton*.[5] Finials are of various sizes and shapes, and may be variously located at the top, ends, or corners of a roof, although often placed to emphasize the apex of the gable.

A popular type of finial in Sulawesi is the 'scissors cross' gable ornament, formed by extensions of the barge boards in a crossing pattern at the tip of a gable (*tunjuk langit jenis silang, sj hiasan bangunan yg terletak bersilangan pd ujung perabung*). For other types of roof and house ornaments, see especially Utaberta et al. (2010), Rashid and Dawa (2005) and Rashid and Amat (2011). All three guides are available online and are nicely illustrated.

Roof measurements and basic roof types

39. the length of a roof = *panjangnya atap*. This distance can be measured either along the ridge or along the eaves. In traditional architecture, the length of the roof may be given in terms of panels of roofing thatch, i.e. how many panels would it take to make one row?

40. span or width of a roof = *lebarnya atap*. This distance is sometimes calculated based on the length of the tie beam, that is, measured from side wall to side wall (this is an important measurement from an engineering standpoint). If overhang areas are included (according to some, the 'true width of the roof'), then it is measured from eave to eave. If one's intention is to measure the distance from eave to ridge following the slope of the roof, this measurement can be referred to as the width of the plane of the roof (*lebarnya bidang atap*).

41. height of a roof = *tingginya atap*. In English, the height of a roof is regarded as the distance from ground level to the highest part of the roof. If one's intention is to measure vertical distance from the bottom of the eaves to the top of the ridge, this measurement can be referred to as the (total) rise of the roof.

42. pitch of a roof = *kecuraman atap*, *kemiringan atap*. Pitch refers to the degree to which a roof is sloped, whether gradual (*atap mendatar*, *atap landai*), steep (*atap curam*), or somewhere in between. No roof is completely flat since there must be some degree of pitch to promote drainage of rainwater. A roof ridge with steeply sloping sides can be called an *atap lipat pandan*; when the sides are gently pitched it can be called an *atap lipat kijang* (Wahyuningsih and Abu 1986/1987:14–15).

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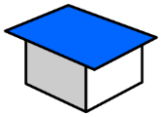
[5] The name *buah buton* is based on analogy with the shape of the fruit of the fish poison tree, *Barringtonia asiatica* (L.) Kurz, and particularly refers to ornaments with a rounded or bulbous shape.

43. width of the plane of a roof, the distance from ridge to eave = *lebarnya bidang atap*. You could also think of this measurement as the length of a common rafter. Traditionally this measurement may also be given in terms of thatch panels, i.e. how many rows of thatch paneling would it take to cover the roof from eave to ridge?

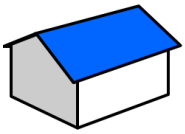
44. plane of a roof = *bidang atap*. The simple gable roof that we have been assuming up to this point has two planes, but some roof types have only one plane, and others four or more. The following are some basic roof types.

(a) flat roof, consisting of a single plane that is nearly level, in Indonesian called an *atap datar* or *atap rata*.

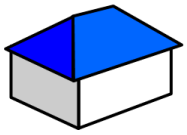


(b) shed roof, a roof consisting of a single, sloped plane, in Indonesian called an *atap miring*, *atap sandar* or *atap sengkuap*.

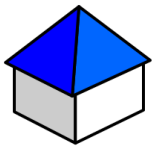
(c) gable roof, consisting of two rectangular planes that share a common edge along the ridge. In Indonesian this type of roof is called an *atap pelana*, *atap tébar layar*, or colloquially an *atap kampung*.



(d) hip roof, consisting of four planes, all of which are sloped. Usually two of the planes are triangular, and two are trapezoid in shape. In Indonesian this roof type is called an *atap perisai*, *atap lima*, *atap limas*, or *atap limasan*. This basic roof type has four 'hips,' one at each corner, called *bubungan miring*, *jurai* or *jurai luar* in Indonesian.[6] The underlying beam which forms the hip is called a 'hip rafter' (less commonly 'angle rafter') in English, in Indonesian *balok jurai* or *balok bubungan miring*. The Indonesian term *limas* is blended from *lima* 'five' and *emas* 'gold' in reference to the five 'ridges' (one horizontal, four sloped) of a hip roof.[7] However the terms *limas* and *limasan* are now used more broadly than this to refer to various other kinds of roof structures that are constructed with hips such as pyramidal, gablet and bonnet roofs (see below).



(e) pyramid hip roof, consisting of four (or more) triangular planes that meet in a point. In Indonesian this type of roof is called an *atap lancip* or *atap piramida*. A



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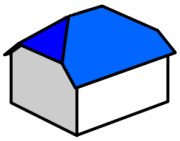
[6] In distinction to a 'valley,' called a *jurai dalam*, *jurai talang* or *lembahan atap* A roof valley (not illustrated) is a V-shaped trough created where two sloping roofs meet. The valley rafter at this juncture is called a *balok lembahan*, *balok jurai dalam*, or *balok jurai talang*.

[7] *The Glossary*, s.v. "Rumah limas," http://malaycivilization.ukm.my/MalayPortal/Highlights/test/UKM_Glossary_Term/index.htm (accessed 31 December 2012).

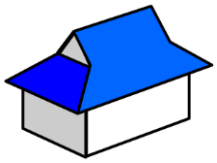
pyramid roof with very steep sides can be called a 'tent roof' in English, or an *atap menara* in Indonesian.[8]

(f) half-hip roof. This style can be likened to a hip roof with the ends 'lopped off.' In Indonesian this roof type is called an *atap perisai buntung*.



half-hip roof

(g) gablet roof, also called a Dutch hip roof or Dutch gable roof, consisting of a hip roof topped with small gables (the 'gablets'). According to some, this roof type was original to the Malay archipelago (the gablets aid in ventilation), and was adopted by the Dutch. In Indonesian this type of roof can be referred to as an *atap limas belanda* or *atap potong belanda (sebuah atap pelana kecil yg proyek dari permukaan atap perisai, peméléhnya tidak sampai ke kaki atap)*.

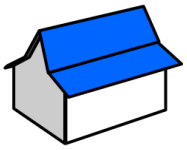


gablet roof

(h) domed roof (not pictured), in Indonesian called an *atap kubah*.

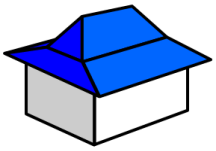
The following roof types all have a double pitch or 'angle' in the side of the roof, but differ according to whether the upper or lower slope is steeper.

(i) double-pitched gable roof, the upper slope having the steeper pitch. In Indonesian can be described as an *atap pelana yg bagian sisi bawah melébar ke samping kiri kanan*. In Sundanese this roof type is called a *suhunan julang ngapak* (in reference to a bird spreading its wings).



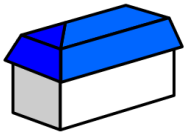
double-pitched gable roof

(j) bonnet roof, a kind of roof having a double pitch on all four sides, the upper slope having the steeper pitch. You could also think of a bonnet roof as a hip roof with the addition of a lower-pitched eave along the outer perimeter. In Indonesian this type of roof can be called an *atap joglo*.



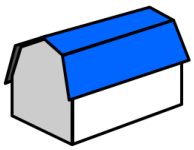
bonnet roof

(k) mansard roof, a roof with a double pitch on all four sides, the lower slope having the steeper pitch. In Indonesian this type of roof can be called an *atap mansard*.



mansard roof

(l) gambrel roof, a two-sided roof with a double pitch on both sides, the lower slope having the steeper pitch. In my idiolect, this is a 'barn roof.' In Indonesian this type of roof can be called an *atap gambrel* or *atap gudang*.



gambrel roof

[8] Not to be confused with a canopy roof, *atap ténda*. The Indonesian term *atap menara* can be used of other roof types as well, apparently having in common that the roof is steeply pitched.

It is also possible for a house to have two or more roof levels (for example a simple split roof, or a two-tiered hip roof). In Indonesian, such a house is said to have an *atap berjenjang* (also *atap berlapis*, *atap bertingkat*). For certain named combinations, see Effendi (1986) and Heinz and Moediartianto (2004:81–82).

Palm-thatch roofs

There is much that could be said about thatch roofs and the materials and methods for making them. In this section I consider only thatch made from palm fronds, and ignore the methods of constructing thatch roofs from grass, reed, sedge, ijuk, and similar plant fibers (which require bundling techniques). Even with our attention restricted to palms, there are at least four different methods for making a roof from palm thatch.

(a) Fan-shaped palm fronds are layered on each another in an overlapping pattern.

(b) The stem of a long palm frond is split down the middle, and leaflets are left attached to the stem. When placed on a roof, right-side halves are used in one row, and left-side halves in the next row, so that in successive rows leaflets alternately angle down and left, down and right, etc. in a crossing pattern.

(c) The stem is split down the middle. Leaflets are left attached to the stem and are plaited together.

(d) Palm frond leaflets are removed from the stem, folded over a separate, long slat, and then sewn, lashed or pinned into place.

45. palm frond = *daun palem*, sometimes also *pelepah palem*. Technically the Indonesian term *pelepah* refers to the central stalk of a palm frond, but by extension it is often used to refer to a frond in its entirety.[9]

46. palm leaflets = *anak daun, bagian rangkaian daun palem*.

47. thatching spine = *bengkawan, sebilah bambu untuk penguat atap daun palem (daun nipah, rumbia, dsb dilipatkan pd bilah itu*). In the manufacture of roofing thatch, this is a long slat over which palm frond leaflets are folded. Usually this slat is made of split bamboo. Although the Indonesian term *bengkawan* is precise, it is now somewhat archaic.

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[9] Five palms commonly used as a source of thatch are the mangrove palm (also known as the nipa or attap palm, *pohon nipah*, NIPAH FRUTICANS Wurmb), the sago palm (*pohon rumbia*, METROXYLON SAGU Rottb.), the sugar palm (*pohon enau, pohon aren*, ARENGA PINNATA (Wurmb) Merr.), the coconut palm (*pohon kelapa*, COCOS NUCIFERA L.), and (in Borneo and Malaysia) the bertam palm (*pohon bertam*, EUGEISSONA spp.). In cases where an entire, fan-shape palm frond is used, in my experience two trees commonly used for this purpose are the footstool palm, also called the round-leaf fan palm (*pohon serdang daun bulat*, SARIBUS ROTUNDIFOLIUS (Lam.) Blume), and the gebang palm (*pohon gebang*, CORYPHA UTAN Lamk), but you should confirm which palms are used in your region.

48. thatching batten = *réng, sebilah bambu kecil untuk menahan bilah-bilah atap*. In the manufacture of roofing thatch, a second, lighter piece the same length as the thatching spine and set parallel to it, used to hold the thatch in place. While the spine is placed inside the fold of the leaflets, the batten is placed outside the leaflets. It is also possible to stitch leaflets directly to the spine, and not use a batten; see pictures below.[10]

layered fan-palm leaves used as roofing material

panel of plaited palm-thatch roofing (leaflets still attached to the rachis)

Moronene man sewing a panel of palm-thatch roofing (spine and batten)

Sangir woman sewing a panel of palm-thatch roofing (spine only)

[10] The difference between using and not using a batten can also be observed in various YouTube videos. See among others "Atap Nipah," http://www.youtube.com/watch?v=3wXpkGOhNh4 (using only a spine) and "Technique to Make Rumbia Roof," http://www.youtube.com/watch?v=SD8UMrwk9ME&NR (using both a spine and a batten) (accessed January 7, 2013).

49. in the manufacture of roofing thatch, narrow, flat, flexible, fibrous strips used for stitching or lashing palm leaflets to the spine or batten = *serat bahan menjahit atap*. Natural sources for these strips include bamboo, rattan, whip vine,[11] donax,[12] and patidoi.[13] These fibrous strips may have other uses, for example in basket weaving or tying bundles of harvested rice.

50. to sew roofing thatch = *menjahit atap*. In Sulawesi languages the verb for this activity is almost always a distinct lexical item; avoid prematurely accepting a direct translation of the Indonesian phrase.

51. panel, mat, sheet (of roofing thatch) = *selembar, sekeping, sebengkawan (atap daun palem)*. Classifier word for counting sections of roofing thatch, e.g. panels that have already been manufactured, but not yet attached to a roof.

52. length of a mat of roofing thatch = *panjangnya selembar atap*. This distance, usually around five or six feet long, can also be used as a measure for the length of a roof, i.e. end to end, how many panels of roofing thatch would be required for one row?

53. row (of roofing thatch) = *sejéjéran, sejajaran* (*msl atap daun palem*). Classifier word for counting rows of roofing thatch attached to a roof; also used in measuring the width of the plane of a roof, i.e. from eave to ridge, how many rows of thatch panels are needed?

Each row of roofing thatch overlaps the row below it. In some locales there may be a particular term for a roof with a double layer of roofing thatch (*atap yg terbuat dr dua lapis daun nipah, rumbia, dsb*) versus a roof with the usual single layer (*atap biasa yg terbuat dr hanya selapis daun*).

Floor

The floor of a typical stilt house is constructed in layers, in which each layer is set perpendicular to the one below it. Including the floor itself, from top to bottom these layers can be referred to respectively as:

floor	*lantai*
floor joists	*gelégar, jeriau*
floor beams	*rasuk*

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[11] FLAGELLARIA INDICA L., also known as supplejack, false rattan, and bush cane, and in Indonesian as *rotan tikus*. Although technically not a rattan (CALAMUS spp.), it may be regarded locally as such. In at least three languages of Sulawesi, the name for this plant translates literally as 'woman's rattan.'

[12] In Indonesian called *bemban* or *bamban*. At least two species are encountered: (a) common donax, DONAX CANNIFORMIS (G. Forster) K. Schumann (some online sources refer to this species as *bemban batu*); and (b) mohtra reed or sitalpati plant, DONAX ARUNDASTRUM Lour. (in older Dutch sources often identified under the synonym MARANTA DICHOTOMA).

[13] SCHUMANNIANTHUS DICHOTOMUS (Roxb.) Gagnep., also known as the patidoi plant, murta, and murta tree, and in Indonesian as *bemban air*. This plant is closely related to donax; see the preceding footnote.

54. floor = *lantai*. The surface on which people walk or sit. The floor can be of various materials, including: a stick floor made of straight but rough sticks or limbs (such as in a garden hut); a slat floor (*lantai bilah, lantai pelupuh*) made from rattan, split bamboo, or the split trunks of various palms;[14] and a plank floor made from boards of flattened bamboo (*galar*) or sawn timber (*lantai papan kayu*). Of course, cement and tile floors are common in the modern day.

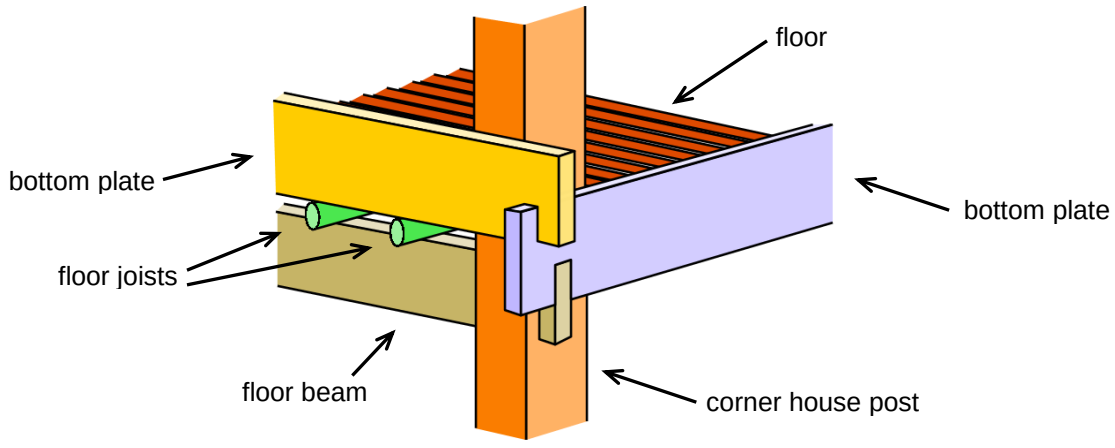
55. space between floor slats or floorboards = *celah lantai*. Sticks and slats are usually not nailed but rather are lashed (*diikat*) to the floor joists, with a narrow or wider space in between.

56. space under a stilt house = *kolong rumah*.

57. floor joists, beams that support the actual floor = *gelégar lantai, jeriau lantai, balok yg menopang lantai, sedang besarnya, melintang di atas rasuk lantai*.

58. floor beams, horizontal beams that are perpendicular to and support the floor joists = *rasuk lantai, balok besar yg menopang gelégar lantai*. Floor beams are always stouter and fewer in number than the floor joists. If there are two layers of floor beams, set perpendicular to each other, the ones on top can be called *rasuk anak* and the heavier ones on the bottom can be called the *rasuk induk*. A heavy beam that connects a pair of house posts at floor level (also ceiling level) can be called a stringer (*rimbat, kayu palang*).

59. bottom plate, floor plate, lower wall plate, horizontal beams placed at floor level forming a frame around the floor, also placed on top of the flooring wherever one wants to place an interior wall = *bendul, balok kayu di dasar dinding*. Although bottom plates are located at floor level, they do not support the floor (as do the floor joists and beams).



exposed view showing one method of attaching the bottom plates

[14] The term *lantai pelupuh* refers to a floor made from split bamboo. Palms used for flooring include the footstool palm (*pohon serdang daun bulat*, SARIBUS ROTUNDIFOLIUS (Lam.) Blume, although the synonym LIVISTONA ROTUNDIFOLIA remains widely encountered), the areca palm (*pohon pinang*, ARECA spp.) and the thorn palm (*pohon nibung*, ONCOSPERMA TIGILLARIUM (Jack) Ridl.) among others.

There are four bottom plates around the exterior of a rectangular house. Some languages of Sulawesi have different words for the two longitudinal bottom plates (placed along the long side of a house) versus the two transverse bottom plates (placed along the short side), or for bottom plates that run parallel to the floor joists versus ones that run perpendicular to the joists. Although bottom plates are usually associated with wall construction, even sitting platforms (which have no walls) may nonetheless be supplied with these framing pieces.

Ceiling

60. attic = *loténg*. The attic is the room or space between the rafters and the ceiling beams, whether or not this space is supplied with a floor.

61. floor of the attic = *lantai loténg*. In some houses the attic has no floor; in others the attic floor may cover only a portion of the house, the rest being left open.

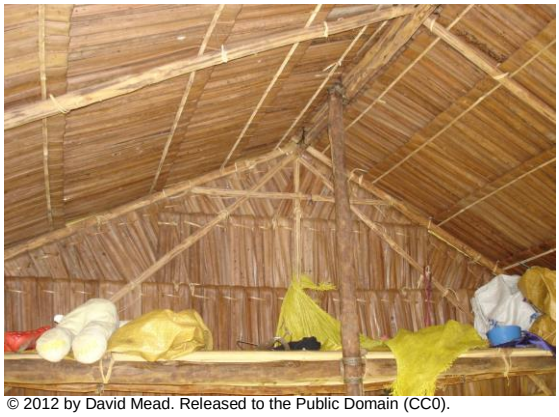
62. ceiling joists, joists that support the floor of the attic = *alang, gelégar loténg, jeriau siling*. Ceiling joists may be absent in houses with unfloored attics.

63. ceiling beams, horizontal beams at ceiling level, usually perpendicular to the tie beams and supporting the ceiling joists = *balok loténg, balok di tengah rumah yg melintang balok tarik, untuk menopang gelégar loténg*. A heavy beam that connects a pair of house posts at ceiling (or floor) level can be called a stringer (*rimbat, kayu palang*).

64. entrance to the attic = *tempat masuk loténg*.

65. steps or ladder to the attic = *tangga loténg*.

66. storage shelf built at ceiling level at the gable end of a house = *peran, sebuah rak yg dipasang di bagian tébar layar rumah sbg tempat menyimpang barang*. The floor of this shelf is typically covered with thatch or other light material, and is for storage only, not for walking on. According to some sources, Indonesian *peran* refers not to this shelf but rather to the tie beam, that is, the beam in the ceiling where this shelf is typically located.



storage shelf constructed at the gable end of a small hut

67. ceiling, a partition or lining constructed below the ceiling beams to close off the upper part of the house = *plafon, siling, langit-langit, papan dsb yg dipasang sbg penutup bagian atas ruangan*.

68. cloth canopy hung across the top of a room at ceiling level = *langit-langit, kain ténda yg dipasang di atas ruangan dsb*.

Wall

69. wall, the sheathing used to cover the wall framework of a house = *dinding*. Also investigate the different kinds of material that can be used for walls, such as thatch, wattle, stalks from sago palm fronds,[15] panels of flattened and plaited bamboo (*bilik, anyaman bambu*), planks (*papan kayu*), bricks (*batu bata*) and cinder blocks (*batako*).

70. partition or section of wall = *bidang dinding, petak dinding*.

71. wall studs, upright posts in the frame of a wall to which the wall sheathing is attached = *jenang dinding, turus dinding, sako, tiang tempat melekatkan dinding*.

72. spacer, a short horizontal piece in the frame of a wall that joins neighboring studs at mid level = *sento, sentur, pekayuan pd dinding rumah yg menghubungkan jenang dng jenang*. Alternatively, a long horizontal member of the wall frame at mid level (which may run the length of the wall joining several studs) is better termed a girt, girt strip or ribbon strip.

73. diagonal braces located in the plane of a wall, in order to strengthen the frame of a house and prevent it from leaning = *sokong yg dipasang menyilang di dinding rumah untuk menguatkan kerangka rumah*. See illustration at top of page 6.

74. doorway, the entrance to a house or room = *pintu*. An interior doorway (*pintu yg menghubungkan kamar dng kamar*) may be named differently from an outside doorway (*pintu keluar dan masuk rumah*).

75. door, the panel used to cover a doorway = *daun pintu*.

76. doorframe, doorcase = *kusén pintu*. The parts of a doorframe, which may be separately named, are:

(a) doorposts, door jambs, the side pieces of a doorframe = *jenang pintu, tiang pd kiri kanan pintu*.

(b) lintel, header, head, the top piece of a doorframe = *alang pintu, ambang pintu, balok keliling di bagian atas pintu*.

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[15] Formerly the usual material in Ternate house construction, called there *gaba-gaba* (de Clercq 1890:19, 86).

(c) doorsill, threshold, the bottom piece of a doorframe = *bendul pintu, ambang pintu, balok di bagian bawah pintu.* In stilt houses, the threshold may be supplied with a railing or solid panel in order to prevent young children from falling out (*kisi-kisi atau papan pd bagian bawah pintu, maksudnya supaya anak kecil jangan terjatuh*).

In Malay, the term *ambang* originally referred to the entire doorframe, but now is usually restricted to the horizontal members only (threshold and lintel). The term *kusén* (also *kusin*, borrowed from Dutch *kozijn*) includes in its reference modern, prefabricated doorframes.

77. hinge (of door, window) = *éngsél, sendi*. Less commonly a door may have pins at top and bottom on which it pivots. The pins are called pintles and fit into corresponding holes in the doorsill and the lintel.

78. door latch, latch for keeping a door closed = *kancing pintu*. The simpliest kind of door latch is a rectangular block of wood nailed to the door jamb; positioned vertically it allows the door to pass, but turned horizontally it stops the door. In another type a wedge is inserted into a holder on the jamb; the narrow end of the wedge protrudes through the holder and stops the door. A metal door bolt, e.g. commercially purchased and attatched at the edge of the door, is called a *gréndel* (or *geréndel*) *pintu*. A door bar, e.g. a plank placed across a door into holders on the jambs, is called a *sengkang pintu* or *palang pintu*.

79. window opening = *jendéla*.

80. the window itself, the piece which covers the window opening, made of framed glass, a louvered wooden panel, etc. = *daun jendéla, terbuat dari gelas, jalusi, dsb*. In Indonesian, a distinction is usually not made between window panes and shutters. Three common types of windows are:

(a) casement window, a window hinged on the side that swings open like a door.

(b) awning window, a window hinged on the top, the bottom opening outward.

(c) sliding window = *jendéla gésér*. *jendéla sorong*.

81. window frame = *kusén jendéla*. A window frame consists *mutatis mutandis* of all the same pieces as a doorframe (see above). In addition, a mullion is a vertical member (of wood, etc.) which partitions a window opening into two or more sections (*bagian kerangka jendéla yg vértikal*). A transom is a horizontal divider (*bagian kerangka jendéla yg horisontal*). The frame that holds a pane of glass (*bingkai daun jendéla*) is called a sash. A glass window may have one or more moveable sashes.

82. railing, grill, or latticework that provides partial covering or decoration for a window or door = *kisi-kisi pd jendéla atau pintu*.

83. curtains hung on a window or doorframe = *gordén, kain penutup jendéla, pintu, dsb*.

84. bamboo matchstick or rollup blind, e.g. hung outside to shade a window or patio area from the sun's rays = *tirai buluh, tirai matahari*.

Miscellaneous house construction terms

85. inside corner = *sudut sebelah dalam*.

86. outside corner = *sudut sebelah luar*. A quion is an external angle or corner of a building where two walls meet.

87. porch, veranda = *serambi, beranda, ruang beratap yg terbuka (tidak berdinding) di bagian samping atau depan rumah*. A porch having a floor lower than that of the main house can be called a *serambi gantung* in Indonesian.

88. ladder, staircase (in this context, particularly one leading up to a house) = *tangga*. Without modification, the Indonesian term *tangga* is ambiguous, and can refer to any of the following.

(a) a staircase, a flight of steps, e.g. with stringers and treads = *tangga pipih*.

(b) a ladder with rungs and rails = *tangga tusuk dua*.[16]

(c) a single-rail ladder = *tangga tusuk tunggal*. Instead of the usual two rails with rungs in between, this type of ladder has only a single rail with rungs or cleats that project on the sides. A portable version of this kind of ladder is also used for climbing trees (e.g. tapping toddy and harvesting cloves).

(d) a log or heavy plank with steps hewn out, a notched log ladder = *tangga sokong, tiang atau balok kayu yg menyandar dan bertakik-takik untuk memanjat*.

(e) cement or concrete stairs (sometimes covered with tiles) = *tangga batu*.

In addition to the basic term for 'ladder, staircase,' you may also want to elicit the following terms for its parts:

(f) step, tread (of a staircase), rung, cleat (of a ladder) = *anak tangga*.

(g) stringer (of a staircase) = *papan tangga*.

(h) rail(s) of a ladder = *tusuk tangga*.

(i) handrail (of ladder, stairs) = *pegangan tangga*.

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[16] It can also be referred to as a *tangga bulat*, assuming the rungs and rails are made of round pieces of wood.

89. timbers used to prop the frame of a house while it is under construction = *balok untuk menyangga kerangka rumah sambil rumah itu sedang dibangun*.

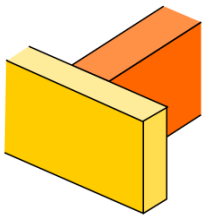
90. braces added to the outside of an aging house, to help delay the day when it must be torn down = *penyangga rumah*.

91. plumb line (in carpentry) = *tali sipat*. The weight on the end of a plumb line is called a 'plumb bob' in English, or *anting* in Indonesian.

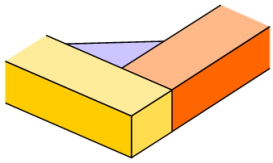
Wood joinery

The following is an incomplete list of some ways to join two pieces of wood. A full listing of wood joinery terms is beyond the scope of this paper.

92. butt joint = *sambungan bokong*, *tanggam temu*, *tanggam sudut tepi*. A butt joint is a very simple kind of joint formed by two pieces that meet squarely without overlap. Butt joints are simple but weak, and usually require some kind of reinforcement (nails, screws, dowels, brace, etc.).

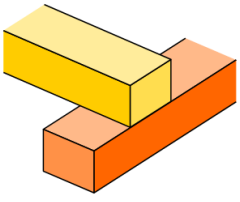


butt joint

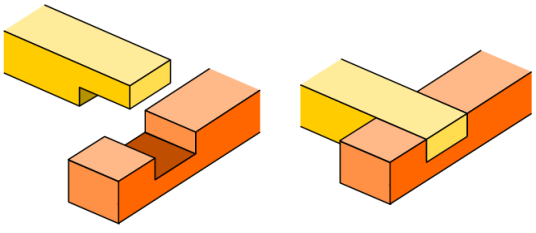


butt joint with corner brace

93. lap joint = *sambungan berhimpit*, *tanggam lekap*. An overlap joint is made by placing one board over another, usually at right angles, and fastening them together. A lap joint is similar, except that material is removed from one or both members so that they fit flush and snug.

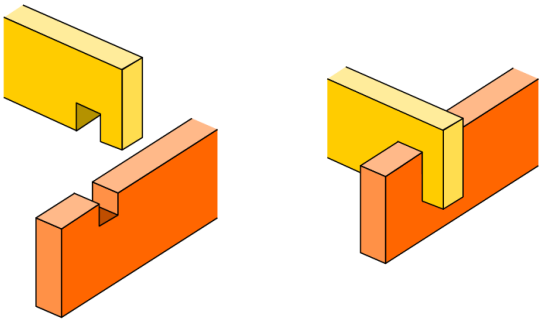


overlap joint



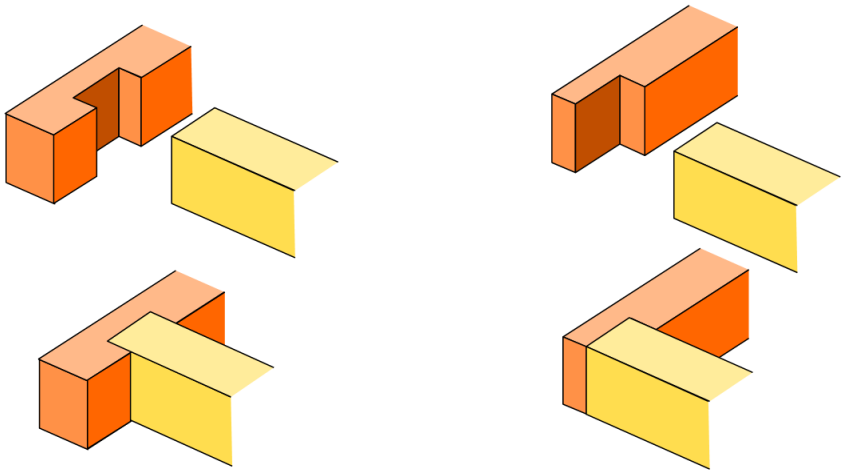
lap joint

I have also seen two boards joined edge to edge with interlocking slots, as illustrated here:



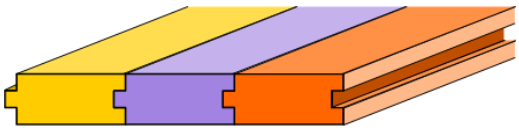
However, I have yet to come across a specific term for this type of joint. Apparently this is *not* a lap joint, since the pieces don't rest flush (if they did, it could be called an edge cross-lap joint or cross halving joint).

94. rabbet joint, dado joint. A dado (Indonesian unknown) is a U-shaped groove, square on the bottom. Dado grooves are cut perpendicular to the grain of the wood. A rabbet, also known as a rebate (*sponéng*, *sponing*), is an L-shaped groove, cut along the edge of a piece. Rabbet grooves are cut parallel to an edge, whether along or across the grain.



dado joint rabbet joint

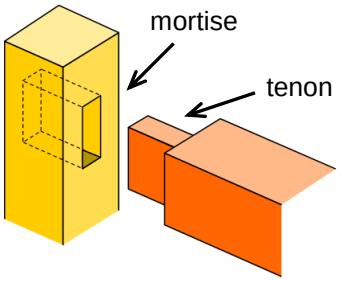
95. tongue and groove joint = *sambungan lidah dan alur*, *tanggam lidah dan lurah*. Tongue and groove is used to join pieces of wood along their length.



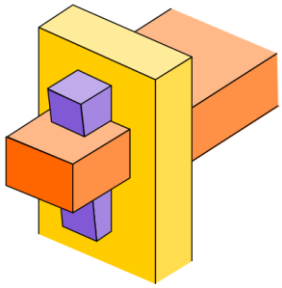
tongue and groove joint

96. mortise and tenon joint = *sambungan pen dan lubang*, *sambungan purus dan lubang*, *sambungan cowok cewek*, *tanggam lubang dan puting*. The mortise (*lubang*) is

the hole or recess cut into one part, designed to receive a corresponding projection (tenon, *pen*, *purus*, *puting*, *lidah kayu*) of another part, and so lock the two pieces together.



mortise and tenon joint

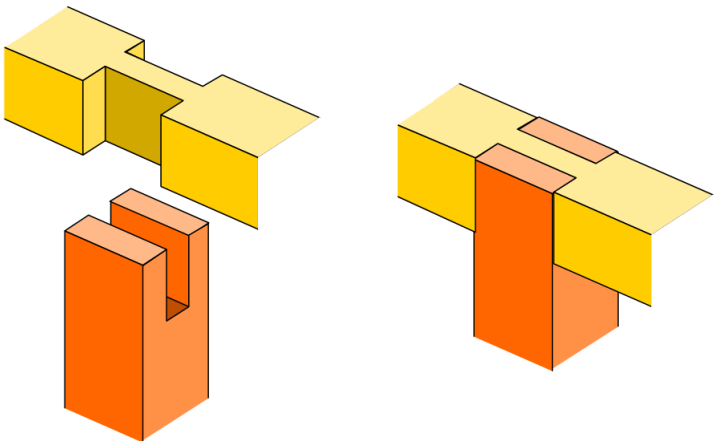


keyed mortise and tenon joint

In order to hold the tenon in place, the joint can be strengthened with pegs (*pasak*, *penetap*) (a pegged mortise and tenon joint) or wedges (*baji*) (a wedged mortise and tenon joint). If the tenon passes completely through the mortise and projects on the other side, it can be held in place with a wedge-shaped 'key' that passes through the protruding portion of the tenon (a keyed mortise and tenon joint).

In Indonesian house construction, sometimes an entire board is passed through an aperture in a post, i.e. the board's full height and width are used, without cutting it down to make a tenon. I have yet to come across a specific term for this kind of joint, but it could possibly be described as a through mortise with full-size board/tenon.

97. T-bridle joint = *sambungan T*, *tanggam kekang T*. A T-bridle joint is used to joint two pieces of wood in a T-shape. The middle of one member fits into a slot at the end of another member.

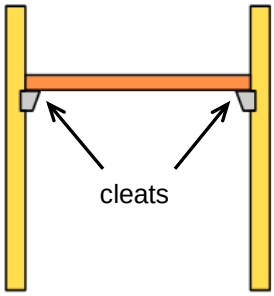


T bridle joint

98. scarf joint = *sambungan bibir*, *tanggam skaf*. A scarf joint (not illustrated), also known as a scarph joint or splice joint, is used to join two boards end to end to make one long board.

99. notch = *takik*. A notch is a V-shaped grove (if a groove has a rectangular shape, it is technically a slot, not a notch). A double-notch joint (think Lincoln Logs) can be referred to in Indonesian as a *sambungan takik rangkap* (?).

100. cleat, corbel = *tupai*, *korbel*. In house construction, a piece that projects or juts out from a vertical member, used to support a beam (or other structure) that rests on it. The difference between a corbel and a cleat is that a corbel is often carved or decorated, while a cleat is mundane, e.g. a rectangular or wedge-shaped block of wood (the word 'cleat' also has other meanings). The Malay term *tupai* derives from a time and place when corbels were carved in the shape of squirrels. Some Indonesian websites use instead *korbel* (a transliteration of the English).



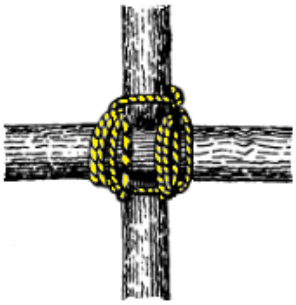
beam supported by cleats
that ride in a dado

In addition to the joints described above, there are also various ways that joints can be reinforced, including metal or wooden braces, support blocks, gussets (*pelat sambung*), fishplates (*balok pengunci*) with their clamping bolts, and even strapping.

Lashing and knots

101. to lash = *mengikat dua batang kayu, buluh, dsb*.

102. square lashing = *ikat seraya, ikat palang*. The pieces so joined need not be perpendicular to each other. Square lashing is the most common type of lashing in frame construction and is used where members will try to slide over each other (*digunakan untuk mengikat dua batang kayu, buluh, dsb*). In so-called Japanese square lashing (not illustrated) one begins lashing at the middle of a length of cord and works toward the ends.

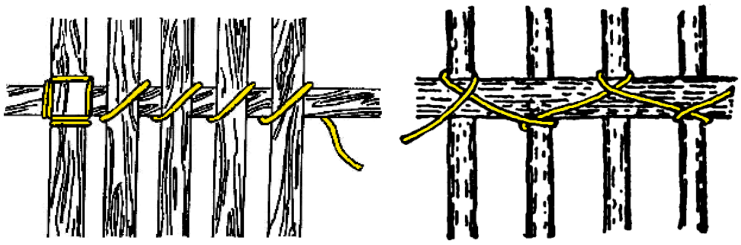


square lashing

103. diagonal lashing = *ikat sérong, ikat silang.* Diagonal lashing is used when two crossing members spring apart from each other and need to be pulled together (*digunakan untuk merapatkan dan mengikat dua batang kayu, buluh, dsb*). In so-called Filipino diagonal lashing (not illustrated) one begins with a cow hitch in the middle of the cord and works toward the ends.

diagonal lashing

104. floor lashing, also called snake lashing = *lilit kacang*. Floor lashing is used to join a row of parallel members to one long crosspiece, e.g. floor slats to a floor joist.

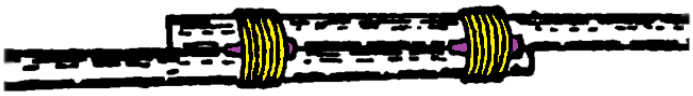


two methods of floor lashing

The pictures above illustrate two different methods of floor lashing using a single cord (*lilit kacang satu tali*).[17] It is also possible to use two cords in tandem (*lilit kacang dua tali*), working them in and out between the slats in mirror-image fashion. In Indonesian floor lashing is sometimes also called *lilit ular*, presumably a calque from English.

105. ladder lashing = *ikat tangga*. Ladder lashing (not illustrated) is similar to snake lashing, but differs in that each slat (rung, spar, etc.) is independently held in place by several loops. This allows the parallel members to be spaced further apart.

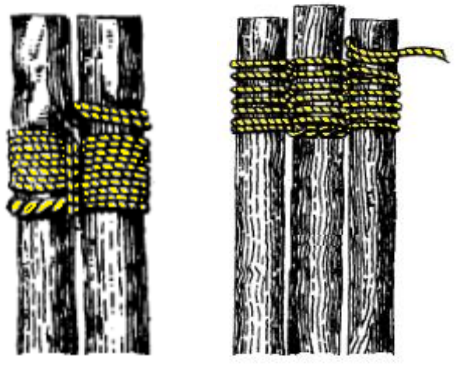
106. round lashing = *ikat canggah*. Round lashing is used to join two poles together to extend their length (*digunakan untuk menyambung dua batang kayu, buluh, dsb*). Usually two round lashings are recommended for increased strength and security. Frapping turns are not used. However a round lashing can be tightened by pounding pegs (*pasak*) between the poles, or—as illustrated above—by pounding wedges (*baji*) into the lashing.



round lashing with wedges

107. shear lashing, also spelled sheer lashing = *ikat silang gunting, ikat kaki*. Shear lashing is similar to round lashing, except that frapping turns are added between the poles. Shear lashing is used to join parallel poles; if tied with some slack, the legs can be spread apart to form an A-frame.

108. figure-of-eight lashing, also known as tripod lashing or gyn lashing = *ikat silang tungku*. The legs can be spread apart to form a tripod.



shear lashing tripod lashing

[17] Because of my sources, one picture shows the lashing from the front side, while the other shows it from the reverse. The method of lashing pictured on the right is in some sources called a 'paling hitch.'

109. to knot, to tie a knot = *menyimpul*. The following are names and illustrations of some common types of knots. Note that many types of lashing begin with a clove hitch or a timber hitch.

(a) overhand knot = *simpul mati*.

(b) figure-of-eight knot = *simpul delapan, simpul angka lapan*.

(c) square knot, reef knot = *simpul buku sila*.

(d) sheet bend, weaver's knot = *simpul bunga geti, simpul bunga keti, simpul anyam*.

(e) fisherman's knot = *simpul himpit, simpul kembar, simpul nelayan*.

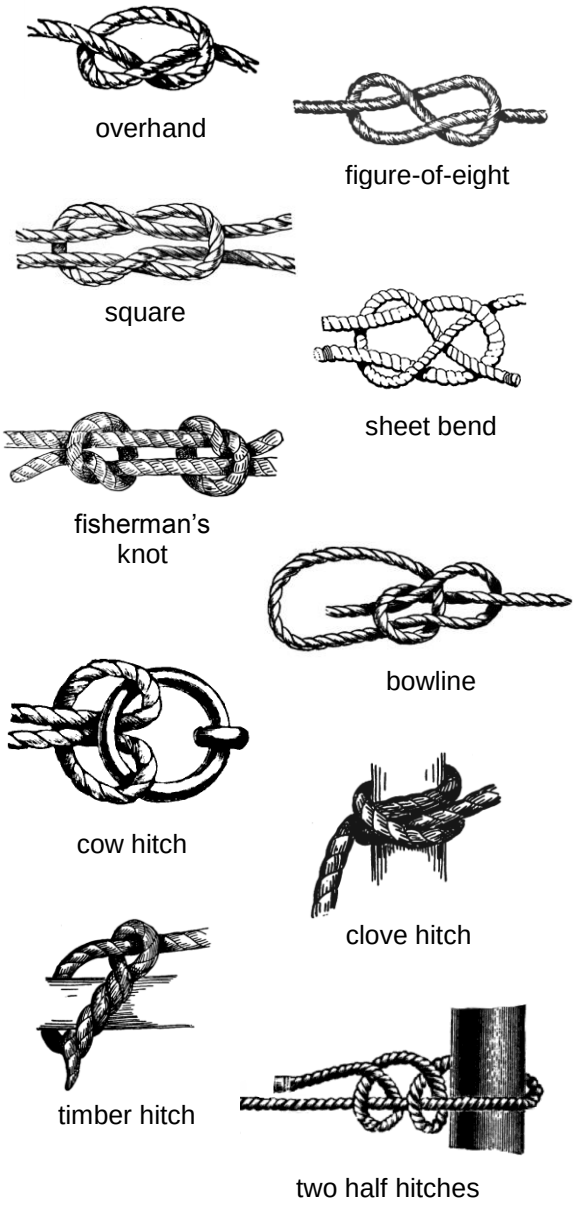
(f) bowline = *simpul tindih kasih, simpul kambing*.

(g) cow hitch = *simpul jangkar*. This knot has many other names in English, including lanyard hitch, girth hitch, lark's head and lark's foot.

(h) clove hitch, builder's hitch = *simpul manuk, simpul pangkal*.

(i) timber hitch = *simpul tambat, simpul balak, lilit balak*.

(j) two half hitches, double hitch = *lilit dua simpul*.



Other types of knots can easily be found by consulting online guides. An interesting place to begin is "Animated Knots by Grog" at http://www.animatedknots.com/, which covers both knots and lashing. For a start on Indonesian terms, see among others Mohamad (n.d.).

110. to untie or open a knot = *melepaskan simpul, membuka tali*.

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