A pallet structure having a deck having an upper surface that can hold or bear a load, a first runner core below the deck, and a shell of sheet material that can cover a portion of a surface of the first runner core or deck, wherein the shell comprises a material that provides a higher impact resistance than the material comprising the first runner core or deck covered by the shell.
PALLET STRUCTURE WITH PROTECTIVE SHELL

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application relates to and claims priority from U.S. Patent Application Ser. No. 61/267,771 filed Dec. 8, 2009, the entire disclosure of which is hereby incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present disclosure relates to a pallet structure having a protective shell that can be used for the load-carrying support of goods.

BACKGROUND

[0003] A pallet is a portable, horizontal, rigid platform used as a base for assembling, storing, stacking, handling and transporting goods as a unit load, often equipped with a superstructure. Conventional pallets are generally constructed of wood made by joining together a set of top and bottom deckboards fastened by nails or staples to a continuous, solid board often called a stringer or stringerboard. The pallet may have openings in the design to accompany fork truck or hand jack equipment to insert their forks between the top deck and bottom deck to lift the pallet and load its load off the floor. Pallets are generally square or rectangle with two-way or four-way entry into the pallet. A typical pallet size can be 48 inches by 40 inches, i.e., a 48 inch stringer or stringerboard and a 40 inch deckboard.

[0004] Labor and material costs involved in producing wooden pallets are relatively high; and, as a result of these high costs, wooden pallets are often required to be reused either by the receiver or returned to the supplier which results in higher shipping costs (normally they are returned to the supplier empty). Wood pallets also weigh on the average forty (40) pounds, which adds to the cost of shipping the load. Likewise due to the weight of the wooden pallet the operator may have difficulty manually moving the pallets. The repair or disposal of damaged wood pallets adds to their cost. In some industries the typical wooden pallet is used on an average of no more than twice before it must be replaced or repaired.

[0005] Materials other than wood may be used in the design and manufacture of pallets such as metal, plastic, and paper. The use of paper materials can be cost competitive to materials such as wood, metal, and plastic, while at the same time offering benefits that are not available through the use of traditional wood materials. The benefits of using paper materials are several fold. Paper products are lighter than wood, plastic, or metal products, and when formed into a honeycomb structure may have remarkable strength. Paper pallets have been made, for example, of glued paper honeycomb and of paper corrugate and held together with glue.

[0006] Paper products can be made biodegradable to allow for disposal without penalty charges or prohibitions from land fills or they can be baled and recycled to paper companies. Because of the ease of working with paper materials and the availability of various honeycomb structures, products can be manufactured in a variety of shapes and sizes to meet any particular requirements.

[0007] Pallets that are made of a lightweight, paper material, however, are more likely to crush when, e.g., picked up at the wrong spot by a fork truck or hand jack equipment, or when hit or pushed at side surfaces of the paper pallet.

SUMMARY

[0008] In one embodiment, a pallet structure is provided with a deck that has an upper surface configured to hold a load bearing. A first runner core is preferably provided below the deck, with a shell, such as of sheet material, covering a portion of a surface of the first runner core or deck. The preferred shell is made of a material that provides a higher impact resistance than the material comprising the first runner core or deck covered by the shell.

[0009] The shell can comprise a multi-layered sheet material, such as a multi-ply material, and at least one of the first runner core or deck can comprise a sheet material. The deck can comprise an edge portion, and the shell can cover a lateral edge surface of the edge portion of the deck. In some embodiments, the shell extends from the lateral edge surface of the edge portion of the deck around the first runner core to a bottom surface portion of the deck on an opposite lateral side of the first runner core to protect the deck and first runner core to improve attachment of the first runner core to the deck.

[0010] The deck can have an edge portion displaced laterally outward from the first runner core and that includes the lateral edge surface of the edge portion of the deck, and the shell can extend between the lateral edge surface of the edge portion of the deck and first runner core to cover a bottom surface of the edge portion of the deck. The shell can further cover an upper surface of the edge portion of the deck.

[0011] The pallet structure can include additional runners, for example having a second runner core located at approximately a first end of the deck portion, with the deck including a second edge portion opposite the first edge portion, and the shell covering a lateral edge surface of the second edge portion of the deck. The shell can extend from the lateral edge surface of the second edge portion of the deck around the second runner core to a bottom surface portion of the deck on an opposite lateral side of the second runner core to protect the deck and second runner core to improve attachment of the second runner core to the deck.

[0012] In some embodiments, the shell can comprise a sheet material of a significantly greater density than the first runner core. The deck or first runner core covered by the shell can comprise a honeycomb paper material, and the shell can comprise a laminate paper material. The first runner core can comprise, for example, a material having more than 70% airspace, and the shell comprises a material having less than 10% airspace.

[0013] In certain embodiments, the deck has an upper surface configured to hold a load and an edge portion that extends past the first lateral surface of the first runner core, and the shell covers a portion of an upper surface of the edge portion of the deck, a portion of a first lateral surface of the edge portion of the deck, a portion of a bottom surface of the edge portion of the deck, and a portion of the first lateral surface of the runner core. The shell can further cover a portion of a lower surface and a second lateral surface disposed opposite the first lateral surface of the first runner core. As indicated above, the shell can comprise a sheet material of a sufficiently greater density and toughness than the first runner core to improve an impact resistance of the covered portions. The runner core may have a cutout portion there-through on a lateral surface.
The shell material covering the portion of the upper surface of the edge portion of the deck can be thinner than the shell material covering at least one of the other covered portions the shell. The shell can have a first shell portion 67 covering at least a portion of the upper surface of the edge portion of the deck, and a second shell portion 68 covering a portion of the first lateral surface of the edge portion of the deck, with the second shell portion having a greater thickness than at least part of the first portion for minimizing a height of the shell on the upper surface of the deck.

The shell can be made of a multi-ply sheet material, and, for instance, part or all of the first shell portion can have fewer plies than the second shell portion. The shell can comprise a ply that extends along the first and second shell portions, and another ply that does not extend onto the at least part of the first shell portion. The at least part of the first shell portion can comprise the entire portion of the shell disposed on the upper surface of the deck. Part of the second shell portion adjacent and extending to the first shell portion can comprise fewer plies than another part of the second shell portion that is spaced from the upper surface of the deck.

BRIEF DESCRIPTION OF FIGURES

FIG. 1a shows a perspective view of a pallet structure according to an embodiment;

FIG. 1b shows a side perspective view of the pallet structure of the embodiment of FIG. 1a;

FIG. 1c shows a cut-away side view of the pallet structure of FIG. 1c;

FIG. 2 shows a perspective view of a deck and a runner according to certain embodiments;

FIG. 3 shows a perspective view of a middle runner of a pallet structure according to certain embodiments;

FIG. 4 shows a perspective view of a deck and a runner according to the embodiment of FIG. 1a;

FIG. 5 shows a top cross-sectional view of a runner core taken along plane V-V of FIG. 4; and

FIG. 6 shows a perspective view of a corner of a pallet structure constructed according to another embodiment.

DETAILED DESCRIPTION

Referring to FIG. 1a, a pallet structure 100 is shown having a deck 10 and runners 200, 300, and 400. Two or more runners may be provided, and in preferred embodiments 3 runners may be provided. Two runners 200, 400 may be provided on opposite ends of the pallet structure 100, and a middle runner 300 along a middle portion of the pallet structure 100. Each runner 200, 300, 400 can comprise a shell 50 enclosing a runner support member or interior structure, such as a core 20, 30, 40, respectively. Each runner core 20, 30 and 40 can comprise a relatively low-density material, which in some embodiments may be a honeycomb structure. The deck 10 can comprise a top facing 11 and a bottom facing 12, which may be made of a relatively high-density material, with a honeycomb core 13 between the top facing 11 and bottom facing 12. The majority of the top facing 11 of the deck can be free of the shell (i.e., not covered by the shell 50) and preferably disposed as an outer surface, as shown in FIG. 1a. The top facing 11, bottom facing 12, and honeycomb structure 13 can comprise a relatively high-density paper sheet material, such as solid sheet material with essentially no airspaces. Although the pallet structure 100 shown in FIG. 1a has a deck 10 and runners 200, 300, and 400 with lateral side surfaces that are substantially vertical, and the top and bottom sides thereof are substantially horizontal, other embodiments can provide for these surfaces to have an angular orientation depending on the needs of the pallet structure.

With reference to the material of the faceins and the core, the facings may be made of a paper matenal. The paper material may be a multilayered sheet material. The paper material may have a density between approximately 26 lb./1000 sq. ft. - 90 lb./sq. ft. The core may be a honeycomb material. The honeycomb core may be made of a material having more than 60% airspase, and the first facing may comprise a material having less than 25% airspace. For example, the panels can comprise a material having over 60%, 70%, or 90% airspace, although any amount of airspace may be acceptable. In other embodiments, a corrugated or other low-density structure may be used in place of the honeycomb structure. The facings may generally have a significantly greater density than the low-density core. In some embodiments, the facings can be made with a material having less than 25% airspace, and preferably less than 10% airspace. Examples of the density of the facings are between 26 lb./1000 sq. ft. and 90 lb./sq. ft., and preferably about 56 lb./1000 sq. ft. The facings are preferably made of a single sheet of material, but may be made of multiple plies, for instance.

The runners 200, 300, and 400 can be interrupted along the length of the runners, providing cutouts, spaces, or holes between sections of the runners, as depicted in FIG. 1b (reference numeral 91), to receive a forklift from another angle, such as from the lateral sides of the pallet structure 100, so that the pallet structure can be lifted from the front, back or sides. The pallet structure 100 can have spaces 90 along the bottom portion of the deck 10 between runners 200 and 300, and runners 300 and 400, as seen in FIG. 1a. Accordingly, a shell 50 is not required in this area in some embodiments, and savings can be attained by not using a shell 50 in this area. In alternative embodiments, a shell 50 may be provided along the entire bottom surface of the deck 10, along with the runner cores 20, 30 and 40. In these embodiments, the shell 50 is continuous along the entire bottom surface of the deck, as shown in FIG. 1c. In particular, reference numeral 92 depicts the portion of the shell above which the runner interior has been removed to allow for a forklift to enter. In some embodiments, the spaces 91 of the runners may be of a height which is less than the height of the runner, for example, the spaces may only be the height of one layer of the core of the runner. As depicted in FIG. 1c, the runner has one continuous core layer 94, and one discontinuous core structure layer 93, wherein the spaces 91 are located. The edges 97 define the ends of the discontinuous core layer 93. The width of spaces 91, defined by opposite ends 97, may be approximately 1-15 inches, more preferably 2-10 inches, and most preferably 6-9 inches.

Referring now to FIG. 2, a runner 200 along an end portion of the deck 10 is shown having a runner core 20 and a protective shell 50. The runner core 20 can comprise one or more layers of sheet material. In the embodiment shown in FIG. 2, three layers 22, 25 and 28 are provided. A top layer 22 has a top facing 21 and a bottom facing 23, a middle layer 25 has a top facing 24 and a bottom facing 26, and a bottom layer 28 has a top facing 27 and a bottom facing 29. The layers 22, 25 and 28 can comprise a honeycomb structure. The top facing 27 of the bottom layer 28 can be associated with or
adhered to the bottom facing 26 of the middle layer 25, and the top facing 24 of the middle layer 25 can be associated with or adhered to the bottom facing 23 of the top layer 22. The top facing 21 of the top layer 22 can be associated with or adhered to the bottom sheet 12 of the deck 10. The top and bottom facings can be made of a paper sheathing material. Of course, more or less layers can be provided in the runners, depending on the needs of the pallet structure 100, such as size of the pallet structure, the weight of the load placed upon the pallet structure, etc.

[0028] The walls 60 of the layers 22, 25 and 28 can have a vertical orientation as shown in FIG. 2. Alternatively, the walls 60 can have a non-vertical or horizontal orientation, or have an angular orientation. Each layer can have a similar or substantially similar height, or have different heights. For example, the height h2 of layer 25 can be greater than the height h1 of layer 22 and height h3 of layer 28. In some embodiments, the height of all 3 or more layers can be the same, or can vary as required. The heights h1, h2 and h3 preferably can vary from ½ to 5 inches, and more preferably between 1.5 and 4 inches, and most preferably between 2 and 3.5 inches, although it will be appreciated that any heights, h1, h2, h3 may be used. Various adhesives can be used between the layers to adhere the sheets between the layers to each other, as well as to adhere the various parts of the pallet to each other, such as, but not limited to PVA glue, EVA glue, water-based adhesives, starch-based adhesives, HotMelt®, and solventless adhesives. Preferred embodiments may utilize PVA glue, especially as between honeycomb walls 60. The thickness of the disclosed facings may vary, for example, between 0.00788 inches in the case of a 31 lb./1000 sq. ft. density layer, and 0.02728 inches in the case of a 90 lb./1000 sq. ft. density layer. In preferred embodiments, the thickness may vary linearly between 0.00788 inches and 0.02728 inches for layer densities between 31 and 90 lb./sq. ft., as the thickness may vary generally linearly in proportion to density.

[0029] The panel or pallet structure of the preferred embodiment is capable of handling loads up to about 2000, 2250, or 2500 lbs. All portions of the panel or pallet structure, including the facings and core, can be made of sheet material, such as paper material, which can provide savings on shipping costs and can be recyclable and biodegradable, and can provide a lightweight, low-cost structure. Furthermore, the use of paper materials can be cost competitive to materials such as wood, metal, and plastic, while at the same time offering benefits that are not available through the use of traditional wood materials. Paper products can be made lighter than wood, plastic, or metal products, and when formed into a honeycomb structure may have remarkable strength. Because of the ease of working with paper materials and the availability of various honeycomb structures, products can be manufactured in a variety of shapes and sizes to meet any particular requirements. Exemplary honeycomb panels which may be used with the present disclosure include those which are produced under the Hexacomb® brand by Pregis Corporation. Other embodiments of the panel structure described above are also possible.

[0030] The runner cores 20, 30, 40 and honeycomb structure 13 of the deck 10 can be configured to vertically support the weight of the load that is supported on the deck. In the embodiment shown, the honeycomb structure 13 of the deck 10 and runner 200, 300, 400 is sufficiently strong to withstand typical vertical forces applied. This is assisted by the vertical orientation of the honeycomb walls 60, and their association with each other at non-parallel angles in the horizontal direction. For example, vertical forces of at least 60 psi may be withstood in the case of a 195 lb./1000 ft. honeycomb structure of the deck 10 and cores 20, 30, and 40, although other embodiments may range from 30-80 psi. The honeycomb of the deck 10 and runner cores 20, 30, 40, however, are typically more prone to crushing or puncturing due to impacts, especially in a horizontal direction, or perpendicular to the honeycomb walls 60, than the shell 50. For instance, exposed portions of the honeycomb 13 or runner cores 20, 30, 40 may crumble when exposed to a force or impact along the horizontal sides.

[0031] Accordingly, in exemplary embodiments, a shell 50 can be provided along and to protect one or more surfaces of the deck 10 and/or runner core 20, which are preferably surfaces most prone to impact, scraping, or other contact during handling, moving, loading, and unloading, such as by a forklift, shelving, or the product loaded thereon. For example, the shell 50 can be placed at one or more peripheral, side edges of the runner core 20 and/or of the deck 10. The shell 50 can be provided as a continuous sheet extending along one or more of the bottom surface 52 of the runner core 20, a first lateral surface 51 of the runner core 20 and a second lateral surface 53 opposite the first lateral surface 51. In the embodiment shown in FIG. 2, the shell 50 is provided on the bottom surface 52, first lateral surface 51 and second lateral surface 53. The shell 50 can extend from the first lateral surface 51 of the edge portion 14 of the deck 10 around the first runner core 20 to a bottom surface portion 54 of the deck on an opposite lateral side of the runner core 20 to protect the deck 10 and runner core 20 to improve attachment of the runner core 20 to the deck 10.

[0032] However, one of ordinary skill in the art would understand that different surfaces can be protected. For example, it may be important to protect the first lateral surface 51 of the runner core 20 as any side impact will likely hit from that particular side of the first lateral surface 51. The shell 50 may be provided on the bottom surface 52 if the load is being lifted by a forklift or other mechanical means, which can apply a force in that area.

[0033] The shell 50 can also be provided along a portion of a bottom surface 55 of an edge portion 14 of the deck 10 adjacent the first lateral surface 51 of the runner core 20. The shell 50 can also be provided along a portion of a bottom surface 54 of the deck 10 adjacent the second lateral surface 53 of the runner core 20.

[0034] The shell 50 can preferably be made of a material that is sufficiently tough and dense to protect the honeycomb or other such structure of the runner and deck, which can be of a material such as a paper material that can be less dense than the material of the shell. Preferably, the shell material has an elevated density compared to the structure of the deck and/or runner, as detailed above. In one embodiment, the shell 50 can be made from a multilayered sheet material. The sheet material can include multiple layers or plies of paper. For example, double or triple ply paper material can be used for the shell 50, that can have a density greater than the interior of the runner 20 and/or deck 10. This material is more dense that that of, e.g., the sheets that comprise the interior of the layers 22, 25 and 28, and/or the top and bottom facings of the layers, as outlined above. The shell 50 can provide much improved resistance to damage to the runners, and especially the bottom surface 52 and first and second lateral surfaces 51, 53 of the
runner core 20. Such shell 50 is preferably configured to provide resistance to, e.g., punctures, denting, ripping, breaking the runner from the deck completely or partially, crushing, impacts, etc., for the deck and/or runner of the pallet structure 100. A similar shell can also be provided on the runner core 40 on the opposite end of the deck 10, where the shell 50 can cover the edge portion of the deck 10 on the opposite end of the deck 10 as well, and one or more of the bottom, first and second lateral surfaces of the runner core 40.

[0035] Referring now to FIG. 3, a middle runner 300 can be provided comprising a runner core 30 can be provided along a bottom of approximately a middle portion beneath a deck 10. The shell 50 can be made of similar materials as described above with reference to FIG. 2. Further, the shell 50 can have supportive portions 34 and 35 that cover a portion of the bottom facing 12 of the deck 10. These can typically be areas where a fork lift may be provided, and thus, a shell 50 can protect these areas of the bottom of the deck 10. A top facing 36 of the top layer 37 of the runner core 30 can be associated with or adhered to the bottom facing 12 of the deck 10. The shell 50 can also protect a first lateral surface 31 and second lateral surface 33 of the runner core 30, and a bottom surface 32 of the runner core 30.

[0036] Referring now to FIG. 4, which shows an edge portion 14 of the deck 10 and runner 200 as shown in FIG. 1a, the shell 50 can further be provided along an edge portion 14 of the deck 10. The shell 50 can cover the runner core 20 similarly as described above with reference to FIG. 2. The shell 50 can further provide a protective covering over a bottom surface 55 of the edge portion 14 (shell portion 65), an outer surface 56 of the edge portion 14 (shell portion 66), and a top surface 57 of the edge portion 14 (shell portion 67). A similar shell 50 can be provided along an edge portion of the runner core 40 at the opposite end of the deck 10. This protective covering 50 can provide impact resistance for the pallet structure 100 along the sides of the pallet structure 100. The portion of the shell 50 along the bottom surface 55, the outer surface 56 and the top surface 57 of the edge portion 14 can have single or multiple plies, such as single-ply, double-ply, triple-ply, etc.

[0037] In one embodiment, the shell 50 along the bottom surface 55 and the outer surface 56 can have a greater thickness than the part of the shell 50 disposed along the top surface 57 of the edge portion 14. For example, the shell 50 along the bottom surface 55 and the outer surface 56 can be double-ply or triple-ply, and the top surface 57 of the edge portion 14 can be single-ply. The thickness x of the top surface 57 of the edge portion 14 can vary from 0.001 inches to 0.5 inches, and may preferably be about 0.05, 0.1, 0.2, 0.3, or 0.4 inches. The thickness y of the shell 50 along the bottom surface 55 and the outer surface 56 of the edge portion, and the bottom surface 54 of the deck 10 can vary from 0.001 inches to 0.5 inches, and may preferably be about 0.05, 0.1, 0.2, 0.3, or 0.4 inches. The thickness z of the shell 50 along the first lateral surface 51, bottom surface 52 and second lateral surface 53 of the runner core 20 can vary from 0.001 inches to 0.5 inches, and may preferably be about 0.05, 0.1, 0.2, 0.3, or 0.4 inches. Of course, a thickness z along the bottom surface can be thicker than a thickness x along the lateral surfaces, if a weight on the deck 10 required such thickness. The thickness of the shell layer 50 all around the runner cores and edge portions of the deck can be adjusted according to different requirements. The shell 50 can be adhered to an extensive surface of the sheet material at a top and or bottom of the deck 10, while protecting the lateral surface 56 of the edge portion 14. The distance between the outer surface 56 of the edge portion 14 of the deck 10 and the first lateral surface 51 of the runner core 20 can be approximately between ¼" to 3", and can preferably be approximately between ½" to 2". The length of shell portions 65, 66, and 67 may be between 0.01 and 5 inches, preferably between ½ inch and 3 inches, and most preferably between ¾ inches and 2 inches.

[0038] The portion of the shell 50 along the upper surface 57 of the edge portion 14 can be single-ply or of a lesser thickness than the portion of the shell along the outer surface 56 of the edge portion 14, so that any object or weight that is placed on the top surface 11 of the deck 20, if placed over the upper surface 57 of the edge portion 14, is not top-sided, and yet will still provide a protective covering. The shell, or any of the facings, in any of the embodiments described herein may be scored at to improve folding about any of the edges over which the shell bends/folds—for example on the deck 10 or the runners 200, 300, and 400.

[0039] FIG. 5 shows a broken up top cross-sectional view of the runner core 20 along line V-V as shown in FIG. 4. The honeycomb structure 80 of the runner core 20 is shown with the protective shell 50 around it. The honeycomb structure 80 can have walls 60. The honeycomb structure can have cells of six walls 60 as shown in FIG. 5, having a hexagonal shape, or can have an octagonal shape as well. Of course, the structure can also have 3-4 sides as well. The honeycomb structure 80 can provide for plenty of air spaces 82 within or in between the walls 60 to provide for a low-density honeycomb material, such that the honeycomb structure of the runner core 20 is more crushable in comparison to the shell, while the shell 50 is more dense. For example, the runner cores can comprise a material having between 60%-90% airspace, and preferably more than 70% airspace, and the shell 50 can comprise a material having less than 25% airspace, and preferably less than 10% airspace.

[0040] The pallet structure of the preferred embodiment provides a pallet capable of handling loads up to about 2000, 2250, or 2500 lbs. The pallet structure can be a lightweight material, such as paper material, which can provide savings on shipping costs, and is recyclable as it can be made of paper material. It is safe and easy to handle compared to wooden pallets, which generally have nails and splinters. The paper pallet structure also can eliminate import restrictions on wood.

[0041] FIG. 6 shows a perspective view of another embodiment according to the present disclosure. A pallet structure 600 can be provided, having a deck 610 and a runner 612. The runner 612 can be one or more internal support member, such as in the above embodiments. The runner 612 is provided along an edge of a pallet structure, but the construction can also be used for other runners of the pallet, whether near an edge or along a middle portion of the deck 610.

[0042] The runner includes a protective shell 627, which is made of a plurality of sheet layers. Protective layer 630 of the shell 627 can be constructed of similar material as used in the shell 50 described above and can be provided surrounding the core 620. In the embodiment of FIG. 6, the protective layer 630 extends at or near the deck 610, and preferably does not extend parallel to the deck 60. A connecting layer 632 of the shell 627, preferably an outer layer, although alternatively the connecting layer can be an inner layer in contact with the core, or a mid layer, extends from over the shell to include support-
ive portions, such as flanges 635, that are bent to cover a portion of the deck extending away from the runner core 620, and which are preferably adhered to the lower facing 637. Connecting layer 632 connects the shell to the deck, and thus improves the robustness of the attachment between the runner and deck, and helps prevent the runner from being knocked off the deck. Preferably, the connecting layer 632 has bends between portions that extend over a portion of the bottom and/or sidewall of the deck 610, the side walls 615 of the runner 612, and the bottom side 625 of the core 620, providing a connection between these portions. The connecting layer 632 is preferably thinner than the protective layer 630, and can be made of similar sheet material as the facing on the deck 610 or sheets between the honeycomb portions of the core 620. Both the connecting layer and the protective layer can be made of multiple sheet layers, and preferably individually and collectively provide a high-density material, such as used in the embodiments above. Alternative shells can be provided with thinner flanges than portions protecting the runner core.

[0043] The shell 627 in the embodiment is constructed of two pieces, each of which is Z-shaped to extend from flanges 635 to where they form the bottom surface of the runner 621, under the core 620. To ease manufacturing tolerances, the shell can be discontinuous, such as in a lateral direction, having a gap 650 provided between the Z-shaped pieces, preferably remove from the corners of the runner bottom, and most preferably near the center of the bottom surface of the core. The gap 650 can have a width w1 of about between 1/2" to about 1", although larger and smaller gaps can be used. Typically, width w1 is between about 1/8" to 1/2 of the runner width w2. The gap can have a length as long as the length of the runner 620.

[0044] One having ordinary skill in the art should appreciate that there are numerous shapes and sizes of the runners and deck for which there can be a need or desire to load items thereon according to exemplary embodiments of the present invention. Additionally, one having ordinary skill in the art will appreciate that although the preferred embodiments illustrated herein reflect generally flat and rectangular deck, with long rectangular runners, the pallet structure can have a variety of shapes and sizes. The shell can be made of various materials, such as a corrugated sheet structure, as well as multiple layers of sheet material, or other material. The runners and deck can also comprise various materials, which can be of a less density or thickness than the shell material.

[0045] As used herein, the terms “front,” “back,” and/or other terms indicative of direction are used herein for convenience and to depict relational positions and/or directions between the parts of the embodiments. It will be appreciated that certain embodiments, or portions thereof, can also be oriented in other positions.

[0046] In addition, the term “about” should generally be understood to refer to both the corresponding number and a range of numbers. In addition, all numerical ranges herein should be understood to include each whole integer within the range. While an illustrative embodiment of the invention has been disclosed herein, it will be appreciated that numerous modifications and other embodiments may be devised by those skilled in the art. Therefore, it will be understood that the appended claims are intended to cover all such modifications and embodiments that come within the spirit and scope of the present invention.

What is claimed is:
1. A pallet structure, comprising:
   a deck having an upper surface configured to hold a load bearing:
   a first runner core associated with and disposed below the deck; and
   a shell of sheet material covering a portion of a surface of the first runner core or deck, wherein the shell comprises a material that provides a higher impact resistance than the material comprising the first runner core or deck covered by the shell.
2. The pallet structure of claim 1, wherein the shell comprises a multi-ply sheet material.
3. The pallet structure of claim 2, where the deck comprises a low-density core and high-density facing, and an outer layer of the shell extends onto and is bonded to the deck facing and is made of a same sheet material as the facing.
4. The pallet structure of claim 1, wherein the deck further comprises an edge portion, and the shell covers a lateral edge surface of the edge portion of the deck.
5. The pallet structure of claim 4, wherein the shell extends from the lateral edge surface of the edge portion of the deck around the first runner core to a bottom surface portion of the deck on an opposite lateral side of the first runner core to protect the deck and first runner core to improve attachment of the first runner core to the deck.
6. The pallet structure of claim 5, wherein:
   the deck has an edge portion displaced laterally outward from the first runner core and that includes the lateral edge surface of the portion of the deck, and
   the shell extends between the lateral edge surface of the edge portion of the deck and first runner core to cover a bottom surface of the edge portion of the deck.
7. The pallet structure of claim 6, wherein the shell further covers an upper surface of the edge portion of the deck.
8. The pallet structure of claim 1, further comprising a second runner core located at approximately a first end of the deck portion, wherein:
   the deck further comprises a second edge portion opposite the first edge portion, and the shell covers a lateral edge surface of the second edge portion of the deck;
   the shell extends from the lateral edge surface of the second edge portion of the deck around the second runner core to a bottom surface portion of the deck on an opposite lateral side of the second runner core to protect the deck and second runner core to improve attachment of the second runner core to the deck.
9. The pallet structure of claim 1, wherein the sheet material of the shell has a significantly greater density than the first runner core.
10. The pallet structure of claim 9, wherein deck or first runner core covered by the shell comprises a honeycomb paper material, and the shell comprises a laminate paper material.
11. The pallet structure of claim 10, wherein the first runner core comprises a material having more than 70% airspace, and the shell comprises a material having less than 10% airspace.
12. A pallet structure, comprising:
   a first runner core having a first lateral surface;
   a deck associated with and disposed above the first runner core, the deck comprising an upper surface configured to hold a load and an edge portion that extends past the first lateral surface of the first runner core; and
13. The pallet structure of claim 12, wherein the shell further covers a portion of a lower surface and a second lateral surface disposed opposite the first lateral surface of the first runner core.

14. The pallet structure of claim 12, wherein the shell material of the shell comprises has sufficiently greater density and toughness than the first runner core to improve an impact resistance of the covered portions.

15. The pallet structure of claim 12, wherein the shell material disposed covering the portion of the upper surface of the edge portion of the deck is thinner than the shell material covering at least one of the other covered portions.

16. A pallet structure, comprising:
a first runner core having a first lateral surface;
a deck associated with and disposed above the first runner core and comprising an edge portion that extends past the first lateral surface of the first runner core, the edge portion having an upper surface and a first lateral surface; and
a shell of sheet material having a first shell portion covering at least a portion of the upper surface of the edge portion of the deck, and a second shell portion covering a portion of the first lateral surface of the edge portion of the deck,

wherein the second shell portion has a greater thickness than at least part of the first portion for minimizing a height of the shell on the upper surface of the deck.

17. The pallet structure of claim 16, wherein the shell further covers at least a portion of a bottom surface of the edge portion of the deck.

18. The pallet structure of claim 17, wherein the shell comprises a sheet material of sufficiently greater density than the material of the deck edge portion to significantly improve an impact resistance of the edge portion.

19. The pallet structure of claim 16, wherein the shell is made of a multi-ply sheet material, and the at least part of the first shell portion comprises fewer plies than the second shell portion.

20. The pallet structure of claim 19, wherein the shell comprises a ply that extends along the first and second shell portions, and another ply that does not extend onto the at least part of the first shell portion.

21. The pallet structure of claim 19, wherein the at least part of the first shell portion comprises the entire portion of the shell disposed on the upper surface of the deck.

22. The pallet structure of claim 19, wherein part of the second shell portion adjacent and extending to the first shell portion comprises fewer plies than another part of the second shell portion that is spaced from the upper surface of the deck.

23. The pallet structure of claim 16, wherein the first runner core further comprises at least one cutout portion.