A multi-function air bubble plastic clothes includes a sleeve 10, collar 20, and body 30. It is made of air locked top material 1, which consists of plastic air bubbles 2 which are stuck to top material 1, using the same material. The top material 1 and air bubble 2 can be normal plastic material or with fire retardant plastic material such as PE, LDPE, or PVC. This invention can prevent wind blow, rain, snow, ice drop penetration and prevent hurt from falling down or body impact. It also prevent getting drown in water. It is very suitable for children as winter clothes, raincoat, swim jacket, life saving jacket, or ski jacket purposes. If metal foil is added to the body side of the clothes, it will increase the body heat preservation. The cutting method is using double side adhesive tape to stick the plastic material onto the cutting table surface first, and then using double side adhesive tape to stick onto the second layer of plastic material onto the first layer of material, repeat the same process until the desired layers are formed, and then stick the paper pattern onto the top layer of the material.
图1
図3B
图14
MULTI FUNCTION AIR-BUBBLE PLASTIC CLOTHES AND ITS MANUFACTURING METHOD

TECHNICAL FIELD

[0001] This invention involves a kind of multi-function plastic clothes and its manufacturing method. These air-bubble plastic clothes can be used for protection against wind, rain, snow or impact protection such as falling down. It is suitable for children as winter clothing, rainwear, swimwear, life-saving jackets or ski wear.

BACKGROUND

[0002] Winter clothing, especially for children in rural areas, are typically made of cotton or synthetic fibre inside a shell forming the jacket and trousers. Some better-off families will give their children woolen sweaters. Although these can provide warmth but can get wet in rain. They get wet from morning dew while walking to school and end up wearing wet and cold clothing in classes. Some children wear a plastic raincoat but kids still get wet at the neck and legs areas. And when rain stops, many children will take off their raincoat and lose it. Since kids constantly changes clothing sizes some parents may not be able to afford cotton or synthetic padded jackets and trousers for their children in winter.

SUMMARY

[0003] The purpose of this invention is to solve the above mentioned problems by providing inexpensive but multi-function air-bubble plastic clothes that maintain warmth and resist rain or water. Another purpose of the multi-function air-bubble plastic clothes is to prevent drowning, as floating clothes which become life saving jackets.

[0004] A further purpose of these multi-function air-bubble plastic clothes is that it can be made by plastic welding machines in mass production. An additional purpose is to provide the manufacturing method for these air-bubble plastic clothes which are low cost and efficient.

[0005] The design includes multi-function air bubble plastic clothes which consist of air-light face plastic sheet and inside plastic sheet. On one side of the face plastic sheet there are plastic air bubbles, and the inside plastic sheet can be plastic coated metal foil. The face material and the inside material can be plastic with fire retardant chemicals or property such as PVC or PU.

[0006] The metal foil and the plastic sheet may be welded at the edge of the cut pieces so that it can be pulled out when the plastic clothes are return for recycling. The metal foil may be printed on and/or pressed into a wave like shape or inward and outward curving. The air bubble plastic clothes can also be welded with a water proof zipper in which the tooth of the zipper is plastic and the zipper supporting fabric is made from PVC or PE fabrics.

[0007] When making swimming training jackets or suits, two or more layers of air bubble plastic can be used for safety purposes. When making life saving jackets or suits, two or more layers of air bubble plastic with a layer of printed metal foil on the outside can be used so that it is detectable by radar, or human eyes when the distance is close, the printed metal foil is not shining to avoid attack by predatory fish such as sharks and even tuna which may attack shining metal foil by mistake.

[0008] There may be a detachable, foldable head cover on the multi function air bubble plastic clothes.

[0009] The manufacturing method of the multi function air bubble plastic clothes can include the follow:

[0010] 1. Paper Pattern Making: use the human body parts such as arm, leg, body, head etc. as circular core, add space allowance to form the circumference of the inner fabric, add the thickness of the first layer of air bubble plastic to find the circumference of the first layer of air bubble plastic and/or outside fabric, and repeat the process to calculate the second layer of air bubble plastic and/or outside layer of plastic fabric or plastic coated metal foil, to make up layers of paper pattern.

[0011] 2. Cutting Process:

[0012] 2.1 use pieces of double sided adhesive tape to stick on the cutting table to fix the first layer of the air bubble plastic or plastic sheet or plastic coated metal foil on the cutting table.

[0013] 2.2 And then use pieces of double side adhesive tape to stick onto the first layer of material, and repeating the process until the desired layers of material is formed.

[0014] 2.3 Finally stick the paper pattern onto the top of the layers of material.

[0015] 2.4 Use electric cutter to cut the layers of material according to the paper pattern into pieces.

[0016] 2.5 Alternatively, use clock wood to stick onto the surface of the cutting table, and use long needles to pierce layers of materials, and deep into the clock wood, to fix the material onto the cutting table and form holes in the material. Then, cut into desired pieces according to paper pattern.

[0017] 3. Sewing Process (by welding machines)

[0018] 3.1 weld the inside and outside, or middle layer of garments separately while leaving the cuff, chest, neck, bottom etc. unwelded.

[0019] 3.2 Putting the semi-finished garments together, and weld the cuff, chest, neck and bottoms to form the complete garment.

[0020] 4. Holes punching process for some garments (if required for air flow)

[0021] 4.1 Use needle machine to punch holes at the seams at the hidden parts of the garment such as: armpit, under arm, upper part of the side seam of the body, upper part of the inseam of the trousers etc. Because the welded seams are thicker and not easy to be tear off, and thus making the garments with air flow but not rain drops.

[0022] 4.2 Or, use welding machine to press down and weld the air bubble plastic, plastic film, or plastic coated metal film together to form a seam at the front chest or at the back. Use needle machine to punch holes at the seam, and then weld a cover to cover the holes. Thus, allowing air flow but not raindrops.

[0023] Use gear to weld the seams can make the seams wave like and reduce its stiffness. At easily broken part of the clothes such as knee, elbow, head, use thick air bubble plastic or rubber with air bubble formation. The air bubble plastic clothes can use anti-rain zipper which can be welded onto the garment.

[0024] This invention offer protection against, wind, rain, snow, ice drop, shock from falling down, getting drawn etc. and is very suitable for children as winter clothes, rainwear, swimming learning wear, life saving jackets, and ski wear.
[0025] If metal foil is welded onto the inside part of the clothes, close to the body, it will increase the body heat preservation effect. If shining metal foil is welded or adhered on the outside part of the clothes, it has anti sunlight or ultra violet light effect.

[0026] This invention’s cutting method use double side adhesive tape to fix the materials onto the cutting table and between layers of materials and on top of the material, paper pattern is aheved for cutting. Use welding machines to weld into clothes.

[0027] This method is simple and low cost, suitable for industrial mass production. The welding method is against leaking of water or air.

[0028] To use air bubble plastic like rubber on the easy to hit or broken part of the clothes such as knee, elbow, head can offer protection against shock and durable because of rubber’s elasticity.

[0029] To use printed metal foil on the outer part of the life saving jacket which are made of two or more layers of air bubble plastic, can be located by radar at far distance and by human eyes at shorter distance. And can avoid attack by meat eating fish such as shark or tuna who would mistake shining objects as fish and attack.

DESCRIPTION OF THE DRAWINGS

[0030] Drawing 1 is the construction of the garments for this invention;

[0031] Drawing 2 is another construction example of garments for this invention;

[0032] Drawing 3 is another construction example of garments for this invention;

[0033] Drawing 3A is the construction example of this invention of jackets with foldable hat;

[0034] Drawing 3B is the side view of the example garments with foldable hat in use.

[0035] Drawing 3C is the side view of the example garments with foldable hat folded at the back.

[0036] Drawing 3D is the view of the supporter of the foldable hat.

[0037] Drawing 4 is the section view A-A of Drawing 1

[0038] Drawing 5 is the section view B-B of Drawing 5

[0039] Drawing 6 is the section view C-C of Drawing 3

[0040] Drawing 7-13 are sectional view of various combination of air bubble plastic with plastic sheet or plastic coated metal foil as face or inside parts.

DETAILED DESCRIPTION

[0041] As seen in Drawing 1 and drawing 4, Drawing 1 is example jackets of this invention of air bubble plastic clothes which include sleeves 10, collar 20 and body 30. To view the inside construction of the clothes, open views are made on the left sleeve at the cuff. Drawing 4 is the A-A section view of drawing 1. Illustrated by drawing 4, this multi-function air bubble plastic clothes include air-tight face material 1, and underneath face material 1, there are air bubble 2 which are stuck to face material 1, using the same material which can be common plastic or plastic with fire retardant or plastic with fire retardant properties such as PVC. The face material can be added with color or prints or color with prints for beauty purpose. For air bubble 2, its best in diameter from 3 mm to 20 mm. Because of the construction of air bubble plastic 2 which inside is air, it can keep warm and as life saving jacket when children falling into lake or river or sudden flooding. The small diameter of the air bubble plastic advantage is that when some air bubbles are broken but still large part of it are unbroken, it can still float or keeping warm with air flow. Using PVC or PU, it prevent fire, snow or water. So it prevent children from rain, cold weather and getting drawn. When air-bubble plastic is using air bubble rubber in the angle of the arm 102, it will not broken easily because of the elasticity of the rubber. Air bubble rubber can also be used at the hat of the jacket to protect the head.

[0042] As illustrated by drawing 2 and 5, drawing 2 is a vest 60 of the multi-function air bubble plastic clothes example. At the left corner of the vest 60, there is an open view to show the internal construction of the vest 60. Drawing 5 is the the B-B section view of drawing 2 construction. Drawing 5 shows vest 60 construction, besides construction as drawing 1, there are lining 3 which plastic or fire retardant plastics such as PVC, and stick to the air bubble 2 to form a double faces construction, which although its harder then construction of drawing 1, it is stronger then construction as drawing 1, and with better efficiency in keeping warm and preventing water.

[0043] The lining 3 can be plastic or metal foil such as aluminum or tin and designed as drawing 7 which is not stick onto the air bubble plastic 2, in this construction the lining 3 is welded or stick with the face material 1, and the metal foil can be tier off from the face material 1 when recycle.

[0044] For drawing 3 and drawing 6, drawing 3 is a trouser example made of air bubble plastic. The trouser included two legs 40 and waist band 50. For the purpose of durability, air bubble plastic made of rubber can be used on knee 401. Drawing 6 is the c-c section view of drawing 6. Drawing 6 demonstrate that on the face material 1, there are anti-sun light layer 4, which can be metal foil that reflects sunlight including ultra-violet light. This device can be used on all air bubble plastic clothes.

[0045] Drawing 3A is the is the forth construction of this invention in practice. In the drawing, 61 is plastic film or fabric. The fabric can be water proof but allow air flow. 62 is the plastic film at the front, which can be transparent plastic film or metal coated plastic film to prevent sun light or slow reflection. 63 is semi soft plastic frame such as LDPE, PVC, etc. which can be inserted into the holder near the neck and shoulder. 64 means air-holes with cover, used in all plastic cover for the head, which can be welded together. 65 is the holder for plastic frame 63. The holder 65 can be plastic, thick plastic film or fabric. 66 is fixing stripe at the back or front.

[0046] Drawing 3A is the demonstration of this invention with Anti-snow-wind hood 60. the anti-snow-wind hood 60 can be fixed on the garment and also can be fixed onto the garment with string 66. The anti-snow-wind hood 60 can be semi-closed or fully closed. When it is fully closed, there is air holes on the hood 60.

[0047] Drawing 3B is the demonstration of the using of the anti-snow wind hood when fully closed.

[0048] Drawing 3C is the demonstration of the hood, folded at the back when not used. Drawing 3D is the construction of the plastic frame used in the hood 60, as shown in drawing 3A.

[0049] Drawing 8 to drawing 13 are the different composition/construction of the face material and the air bubble plastic material. Which means when it is made into any kind of garments such as jacket, vest, or trousers, the face material 1, and the inner material 3, besides the above mentioned compositions, there are other combinations.
This invention included, but not limited to the following composition. Drawing 8 construction is based on Drawing 5 but add an inner layer on the air bubble plastic. The inner layer can be plastic film such as PVC or PU or metal film.

Drawing 9 construction is based on Drawing 5 where the inner layer is air tight and on the side of the air bubble, there is air bubble plastic which is joint to inner layer as a whole piece.

Drawing 10 construction is based on Drawing 9 but improvement is made where the inside of the inner layer, there is insulated layer 6, and on the face material, there is anti-sunlight layer 4.

Drawing 11 construction is based on Drawing 5 with improvement. It is added air bubble plastic drawing 1 on both sides as Drawing 5 demonstrated, which are using two inward construction on the outside and with construction as Drawing 5 in the middle.

Drawing 12 construction is based on Drawing 9 with improvement. The construction as drawing 1 is added on the outside of construction as drawing 9, and inner material is added on the inside.

Drawing 13 construction is based on Drawing 12 with improvement where anti-sunlight layer 4 in added on the outside and insulation layer 6 is added on the inside.

The above mentioned construction are only for example, different construction can be made according to market demand.

This invention included the manufacturing method as follow:

1. Cutting Process:
   1.1 Use double side adhesive tape to stick on the cutting table and stick and fix the first layer of air bubble plastic or plastic sheet, or metal foil onto the cutting table.
   1.2 Use double side adhesive tape to stick onto the first layer of air bubble plastic, or plastic sheet or metal foil, and stick on the second layer of the above mentioned materials until the desired layers are formed.
   1.3 On the last step, stick the paper pattern onto the above mentioned materials

2. Sewing(by welding machines) Process:
   2.1 Joint the inner shell and outer shell of the garments separately by welding machines, leaving the cuff, chest, collar, and leg bottom open.
   2.2 Put the semi-finished inner and outer shell together and joint the garments together by welding at the cuff, chest, collar, or leg bottom.

3. Hole punching Process (if required)
   3.1 At the hiding place of the garment such as: armpit, under arm, body side, inner legs etc. use needle machines or tools to punch hole at the seam where materials are thicker and not easy to be broken.
   3.2 OR, use welding machine to press flat bar at the chest or back, and use needle to punch holes, and weld covers to covers the holes at avoid rain drops or snow.

The above manufacturing method can also be used in the making of sleeping bag, tent, cushion and bed cover etc.

EXAMPLE OF MANUFACTURING METHOD 1

First use small pieces of double side adhesive tape to stick onto the cutting table, and then stick one layer of material onto the cutting table. (the materials can be face material 1 or air bubble plastic 2) and then stick small pieces of double side adhesive tape on the material on the first layer of material, and then stick another layer of material onto layer 1, and then stick small pieces of double side adhesive tape onto layer 2, and then stick another layer of material on layer 2. Repeat this process until the desired layers are formed, and then stick the paper pattern onto the last layer of materials. Cut the pieces according to the paper pattern, and then separate into single layers of cut materials. And then, use welding machines to joint the cut pieces as desired. When necessary, use gear to weld the seams to form wave like seams. Also when necessary, stick air bubble rubber onto easy broken parts of the garment, such as knee, elbow, or head.

EXAMPLE OF MANUFACTURING METHOD 2

Using drawing 11 as example, which is made up of three layers: with layer of drawing 2 in the middle, and layer of drawing 1 on both side of layer as drawing 2. When goes into the cutting process, first use double side adhesive tape to stick on the cutting table. Stick layer of air bubble plastic as drawing 1 with air bubble side upward and the face material 1 downward and stick onto the cutting table. And then stick double side adhesive tapes onto the air bubble 2, and then stick a layer of material as drawing 2 to form the second layer, and then use double side adhesive tape to another layers of drawing 1. Repeat the process until desired layers is formed. And then stick the paper pattern onto the top layer of material. And then cut the layers of material according to paper pattern. And then separate the each 3 layers of material as drawing 11. And then, and then weld the cut pieces into the desired products. If necessary, use gear to weld the cut pieces to give softness.

Example 1 shows the manufacturing method of single layer of materials and example 2 shows the manufacturing method of multi-layers products such as live saving vest.

Sleeping bag, bed cushion and bed covers etc.

This invention can also use two pieces of single layer but with two flat face air bubble plastic and welded at the edge and all the cut pieces are weld together to form a garment. It is cheap, comfortable, convenient.

The metal foil used in the life saving jacket or floating clothes are coated with thin plastic and printed with color (for example: red stripe). It is not easy to be corrosion by sea water or wet weather. It is easy to be found by radar, or by seamen with telescope.

This invention use double side adhesive tape to stick layers of air bubble plastic together to avoid slippage and can also applied to the plastic coated metal foil when cutting.

The gear welding method makes the seam soft and reduce contact with the human body.

The zipper used in this invention can be water proof with plastic teeth and the zipper fabric can be PVC or PE woven and can be welded onto the garments. Or it can be existing water proof zipper sewn on the garment with glue or
melted glue to seal the needle hole and make the garment stronger, to avoid water leakage or keeping air.

1. Multi function air bubble plastic clothes which include surface material (1) and inside material (3). On the surface material there are many air bubble (2) which are of the same material as the surface material and stick onto the surface material (1) forming the air bubble plastic material. The inside material (3) can be plastic sheet or plastic coated metal foil.

2. According to claim 1 the multi function air bubble plastic clothes, the surface material (1) and the inside material (3) can be normal plastic sheet or added with fire retardant chemicals and the plastic can be PE, LDPE etc. or plastics with fire retardant properties such as PVC or PU.

3. According to claim 1 or claim 2, the multi function air bubble plastic clothes, The plastic coated metal foil is welded on the edge of the cut pieces, which can tier out and recycle.

4. According to claim 3, the plastic coated metal foil can be printed and/or pressed with inward and outward carving or wave like shape.

5. According to claim 4, the multi function air bubble plastic clothes, in which the zipper can be water tight zipper with plastic tooth and the supporting fabric can be PVC or PE, or just normal water tight zipper sewn on the garment.

6. According to claim 4, the multi function plastic clothes, when use as floating jacket or trouser, 2 or more layers of air bubble plastic is used for safety purpose.

7. According to 4, the multi function air bubble plastic clothes, when used as life saving garment, 2 or more layers of air bubble plastic is used and outside with plastic coated and printed metal foil which can be detected by radar and if close distance, can be seen by human eye and avoid shining effect which may attract meat eating fish such as sharks or tuna because they misunderstood as other fish.

8. According to claim 5, the multi function air bubble plastic clothes, can attach a wind snow hat which also prevent sand storm, rain or sun ray.

9. The manufacturing method of the multi function air bubble plastic clothes is as follow:

1. Paper pattern making: use the body part (31), such as: arm, leg, waist, chest, head, neck etc. as inside circumference, add space (32), to calculate diameter x (pi) to find out the inner circumference of the inner fabric (33). Use the diameter of the circumference of the inner fabric (33) plus the thickness of the first layer of air bubble plastic x (pi) to calculate the circumference of the first layer of air bubble plastic (34), by the same method, to calculate the circumference of the second layer of air bubble plastic (35) or third layer of air bubble plastic and the circumference of the outer plastic fabric or plastic coated metal foil, to make up the paper pattern.

2. Cutting method:

2.1 stick double-side adhesive tape on the cutting table, and lay the plastic sheet or the air bubble plastic onto the table which stick the plastic sheet.

2.2 use the double side adhesive tape to stick more layers of plastic or air bubble plastic, until the desired layers in formed.

2.3 stick the paper pattern onto the top layer of the plastic sheet or air bubble plastic.

2.4 cut the layers of plastic sheet or air bubble plastic according to the paper pattern design into parts of the desired garment.

2.5 or, use soft wood to stick onto the cutting table, use long steel needle to pierce through layers of plastic sheet or air bubble plastic, into the soft wood bed to fix the layers or making holes, and then cut into desired pieces.

3. Sewing (welding) method:

3.1 Separate the outer layer or inner layer which is consist of plastic film or metal foil and air bubble plastic plate and welding into outer shell and inner shell, leaving the cuff, front chest closing, collar, bottom of jacket or bottom of trouser.

3.2 place the inner and outer semi-finished clothes together and joint the sleeve, front chest, collar, jacket bottom or trousers bottom by welding machine to make up the whole garment.

4. Hole making

4.1 Use needle machine to punch holes at the under parts of the garment jointing places such as armpit, inside of the arm, the upper part of the body near the arms, or in case of trousers the inner and upper parts of the legs. Because of the thicker part of the joints by welding, it is not easy to break and also lets air flow but not easy to allow water drops to go inside the body.

4.2 Or punch holes at front chest or near back yoke of the garment by first using welding machine to joint or press the air-bubble plastic, plastic film or metal foil, and punch holes by needle machine, and attach covers to cover the air holes, so that air can flow but water drops are not easy to enter the inside body.

10. Under claim 9, the manufacturing method of the multi-function air-bubble plastic clothes, in the steps 2.2, at the welding joints, small wave-like shapes can be make by using welding machines with gears.

11. According to claim 10, the manufacturing method of the multi-purposes air bubble plastic clothes, include placing thick air-bubble plastic or rubber sheets at easy to break places of the garments, such as knee, angle of the arms or outside of the head for protection of the body.

12. According to claim 11, the manufacturing method of the multi-function air-bubble plastic clothes, include the zipper can be welded into the plastic clothes.

13. According to claim 9, the manufacturing method of the multi-function air-bubble plastic clothes include using needles to punch holes in the air-bubble plastic, plastic film, metal foil to air holes to allow air flow but use an attachable/ detachable plastic outer shell which has no holes to allow water drops to go inside the body.

14. According to claim 9, the manufacturing method of the multi-function air-bubble plastic clothes include punching holes at different places of the outer shell, air-bubble plastic sheet, inner plastic or metal foil to allow air flow in zig-zag manner to reduce the entering of water drops.

15. According to claim 9, the manufacturing method of the multi-function air-bubble plastic clothes include welding of plastic coated metal foil onto the flat side, outside of the air-bubble plastic sheet to reflect sun light and ultra-violet light, and use the air-bubbled inside to allow air flow between the flat space of the air-bubble to make into air-bubble clothes that is again sun light and rain.