Title: OPTICAL FIBER CABLE WITH INTERMITTENTLY BONDED RIBBON (IBR) SUPERBUNDLES

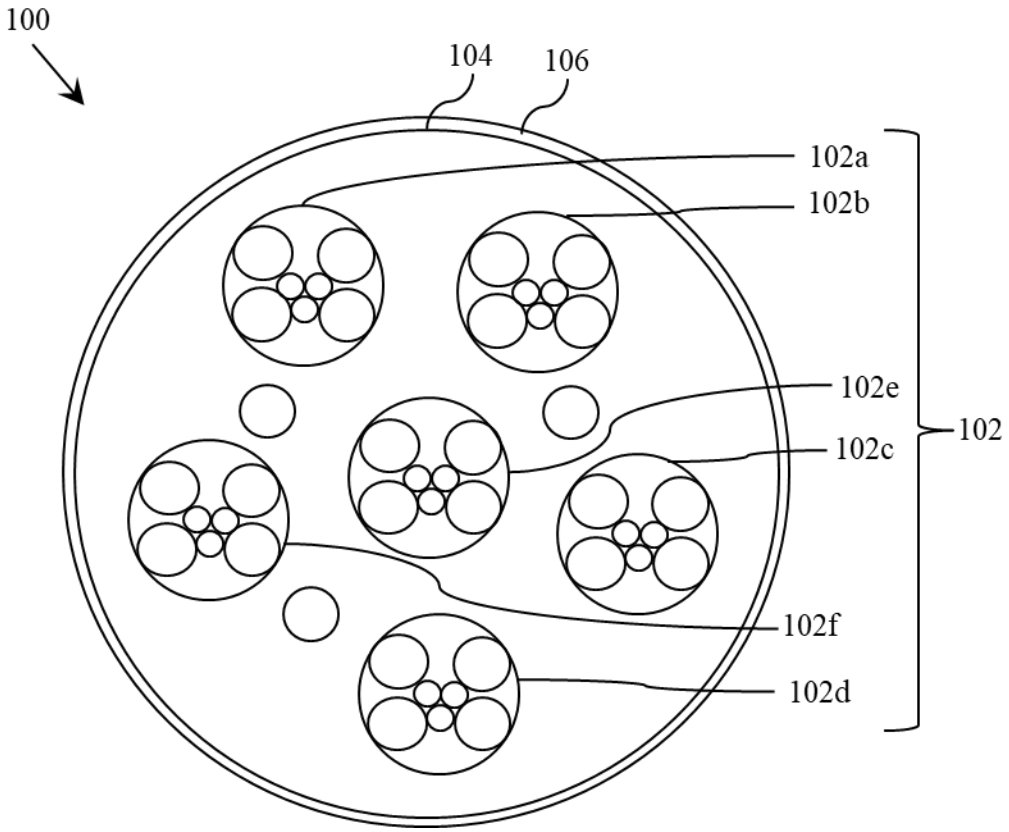


FIG.1

Signature:

Name of the Signatory: Tanishka Jain
Patent Agent (IN/PA-5199)

Title: OPTICAL FIBER CABLE WITH INTERMITTENTLY BONDED RIBBON (IBR) SUPERBUNDLES

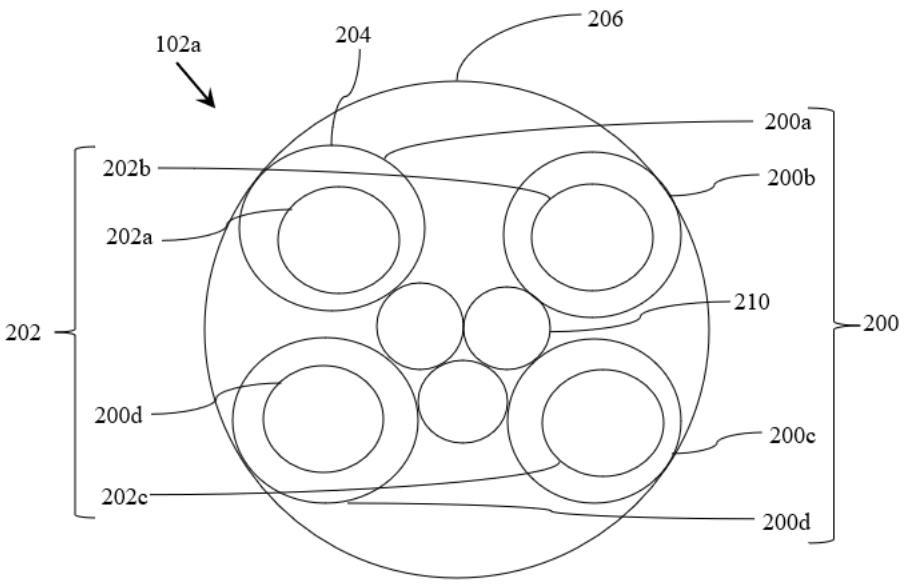


FIG.2

Signature:

Name of the Signatory: Tanishka Jain
Patent Agent (IN/PA-5199)

Title: OPTICAL FIBER CABLE WITH INTERMITTENTLY BONDED RIBBON (IBR) SUPERBUNDLES

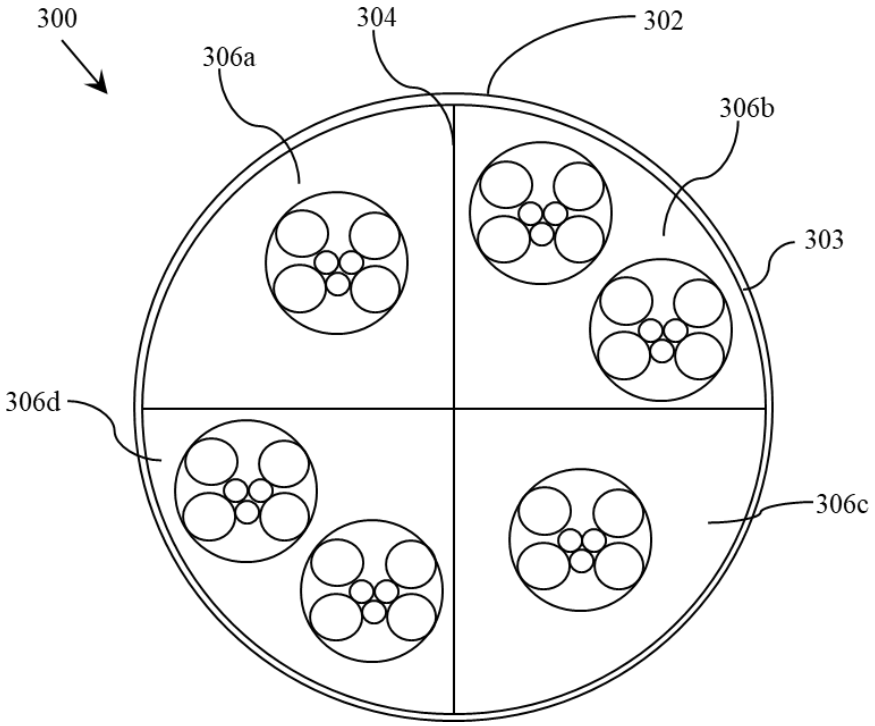


FIG.3

Signature:

Name of the Signatory: Tanishka Jain
Patent Agent (IN/PA-5199)

FORM 2

The Patents Act 1970

(39 of 1970)

&

The Patent Rules 2003

COMPLETE SPECIFICATION

(See Section 10 and rule 13)

TITLE OF THE DISCLOSURE

"OPTICAL FIBER CABLE WITH INTERMITTENTLY BONDED RIBBON (IBR) SUPERBUNDLES"

APPLICANTS:

Name:	Sterlite Technologies Limited
Nationality:	Indian
Address:	3rd Floor, Plot No. 3, IFFCO Tower, Sector – 29, Gurugram, Haryana 122002

The following specification particularly describes the disclosure and the manner in which it is performed.

TECHNICAL FIELD

[1] The present disclosure relates to the field of optical fiber ribbons and cables. More specifically, the present disclosure relates to an optical fiber cable with Intermittently Bonded Ribbon (IBR) superbundles.

PRIORITY DETAILS

[2] The present application claims the benefit of the Ordinary Application No. 202111002365, filed on 19/01/2021.

BACKGROUND

[3] An optical fibre cable plays a pivotal role in today's networking infrastructure. The optical fiber cable carries data faster than conventional copper cables and has complex designs and intensive underground laying procedures. The demand for uninterrupted and high-speed internet is consistently paving a way for new design of the optical fiber cable. Over decades, the consistent development in the optical fiber cable industry leads to innovative cable designs that can accommodate more optical fibers within the current limited duct space.

[4] The optical fiber cable is designed to have maximum number of optical fibers, to be easy to access and to be easy to tear and cut whenever required. In one of the configurations, the optical fibers are placed longitudinally in groups (12 fibers, 24 fibers or the like) and bonded with a bonding material to form optical fiber ribbons. The optical fiber ribbons are grouped together to form optical fiber ribbon bundles.

[5] The prior art reference US2011110635A1 discloses bundles of IBR. The prior art reference DE60030375T2 discloses about grouping of fibers with colored water-swellable binders and binding of all the groups with a water-swellable material. The reference DE60030375T2 focuses on using water swellable material to bundle a plurality of fibers to avoid use of water-blocking gel. Further, the prior art reference DE10111274A1 discloses bundling of loose fibers and assembling of

these bundles to form sub-cables. The reference DE10111274A1 discloses about bundling of loose fibers and not IBR.

[6] However, in a high fiber count optical fiber cable like 6912F cable, a total of 24 bundles has 288 fibres each. Sheathing of the 24 bundles simultaneously becomes difficult since the optical fiber cable has ripcords, water swellable yarns, water blocking tape and strength members apart from the 24 bundles. Such sheathing process with a large number of moving parts becomes difficult to monitor and may cause damage. In addition, the bundling of the 24 bundles together in a core like structure to avoid using the 24 bundles individually causes fibre breaks due to the sheer weight of 6912 fibers.

[7] In the light of the above stated discussion, there is a need to ameliorate one or more of the aforementioned disadvantages by providing an optical fiber cable with one or more superbundles.

OBJECTIVE OF THE DISCLOSURE

[8] A primary object of the present disclosure is to provide an optical fiber cable having one or more superbundles that further has a plurality of Intermittently Bonded Ribbons (IBRs) bundles that has unstranded IBRs. Another object of the present disclosure is to provide an optical fiber cable having one or more superbundles that further has a plurality of stranded IBR bundles with a lay length of 350 mm to 700mm. yet another object of the present disclosure is to provide an optical fiber cable having stranded one or more superbundles with a lay length of 900 mm to 2000 mm.

SUMMARY

[9] In an aspect of the present disclosure an optical fiber cable is disclosed. The optical fiber cable has a core. The core has one or more superbundles. Specifically, each superbundle of the one or more superbundles has a plurality of Intermittently Bonded Ribbon (IBR) bundles such that each IBR bundle of the plurality of IBR bundles has a plurality of unstranded IBRs. Specifically, each IBR bundle of the plurality of IBR bundles is stranded at a first lay-length that is

in a range of 350 millimetres (mm) to 700 mm. Further, the optical fiber cable has a sheath that surrounds the core.

BRIEF DESCRIPTION OF DRAWINGS

[10] Having thus described the disclosure in general terms, reference will now be made to the accompanying figures, wherein:

[11] FIG. 1 illustrates a cross-sectional view of an optical fiber cable with one or more superbundles.

[12] FIG. 2 illustrates a superbundle of the one or more superbundles of FIG. 1.

[13] FIG. 3 illustrates a cross-sectional view of a slotted optical fiber cable.

[14] It should be noted that the accompanying figures are intended to present illustrations of exemplary aspects of the present disclosure. These figures are not intended to limit the scope of the present disclosure. It should also be noted that accompanying figures are not necessarily drawn to scale.

DETAILED DESCRIPTION

[15] The detailed description of the appended drawings is intended as a description of the currently preferred aspects of the present disclosure, and is not intended to represent the only form in which the present disclosure may be practiced. It is to be understood that the same or equivalent functions may be accomplished by different aspects that are intended to be encompassed within the spirit and scope of the present disclosure.

[16] Moreover, although the following description contains many specifics for the purposes of illustration, anyone skilled in the art will appreciate that many variations and/or alterations to said details are within the scope of the present technology. Similarly, although many of the features of the present technology are described in terms of each other, or in conjunction with each other, one skilled in the art will appreciate that many of these features can be provided independently of other features. Accordingly, this description of the present technology is set forth without any loss of generality to, and without imposing limitations upon, the present technology.

[17] FIG. 1 illustrates a cross-sectional view of an optical fiber cable 100 with one or more superbundles 102. The optical fiber cable 100 may have a core 104. The core 104 may have the one or more superbundles 102 of which first through six superbundles 102a-102f are shown. Although FIG. 1 illustrates that the one or more superbundles 102 has six superbundles (*i.e.*, the first through six superbundles 102a-102f), it will be apparent to a person skilled in the art that the scope of the present disclosure is not limited to it. In various other aspects of the present disclosure, the one or more superbundles 102 may have any number of superbundles, without deviating from the scope of the present disclosure. In such a scenario, each superbundle may be adapted to perform one or more operations in a manner similar to the operations of the first through six superbundles 102a-102f as described herein. In general, an optical fiber cable has a plurality of fibers that carries information in the form of data between two places using light technology. In some aspects of the present disclosure, the core 104 may have stranded one or more superbundles 102. In some other aspects of the present disclosure, the core 104 may have stranded loose tubes each with a superbundle of the one or more superbundles 102.

[18] In some aspects of the present disclosure, each superbundle of the one or more superbundles 102 may have a predefined occupancy. Specifically, the predefined occupancy of the one or more superbundles 102 (*i.e.*, the first through six superbundles 102a-102f) may be greater than 0.5. The predefined occupancy of the one or more superbundles 104 may be defined as a filling coefficient of a plurality of optical fibers present in a superbundle of the one or more superbundles 102 with respect to an imaginary cylinder of minimum diameter that can accommodate the plurality of optical fibers of the superbundle of the one or more superbundles 102.

[19] In some aspects of the present disclosure, the optical fiber cable 100 may further have a sheath 106 that surrounds the core 104. In some aspects of the present disclosure, the sheath 106 may be a high-density polyethylene (HDPE) jacket. Aspects of the present disclosure are intended to include and otherwise cover any type of the material for the sheath 106, including known, related, and

later developed materials, without deviating from the scope of the present disclosure. In some aspects of the present disclosure, the sheath 106 may be characterized by a thickness that may be in a range of 2 mm to 3.5 mm. In some other aspects of the present disclosure, the thickness of the sheath 108 may vary. In an aspect, the sheath 106 may be black in color. In another aspect, the sheath 106 may be of any color. In an aspect, the sheath 106 may be embedded with one or more strength members. The sheath 106 may interact directly with an ambient environment. In addition, the sheath 106 is a jacketing layer. Specifically, the sheath 106 may protect the optical fiber cable 100 against crush, bend and tensile stress along a length of the optical fiber cable 100. In some aspects of the present disclosure, the optical fiber cable 100 may further have one or more intermediated layers (not shown) disposed underneath the sheath 106. Specifically, the one or more intermediated layers may be made up of, but not limited to, a water blocking tape, aramid yarns, water soluble yarns, an armor layer, and the like. Aspects of the present disclosure are intended to include and/or otherwise cover any type of the one or more intermediated layers known to a person of ordinary skill in the art, without deviating from the scope of the present disclosure.

[20] FIG. 2 illustrates a cross-sectional view of a first superbundle 102a (herein interchangeably designated as “the superbundle 102a”) of the one or more superbundles 102 of FIG. 1. As the first through sixth superbundles 102a-102f may be structurally and functionally similar to one another, therefore, FIG. 2 illustrates the first superbundle 104a (*i.e.,* the superbundle 102a) only, to make the illustrations concise and clear and should not be considered as a limitation of the present disclosure. In various other aspects, each superbundle (*i.e.,* the second through sixth superbundles 102b-102f) may be adapted to serve one or more functionalities in a manner similar to one or more functionalities of the superbundle 102a as described herein, without deviating from the scope of the present disclosure.

[21] Each superbundle of the one or more superbundles 102 may have a plurality of Intermittently Bonded Ribbon (IBR) bundles 200. As illustrated, the superbundle 102a may have the plurality of Intermittently Bonded Ribbon (IBR)

bundles 200 of which first through fourth IBR bundles 200a-200d are shown. Further, each IBR bundle (*i.e.,* the first through fourth IBR bundles 200a-200d) of the plurality of IBR bundles 200 may have a plurality of unstranded IBRs 202a-202d. Specifically, the first IBR bundle 200a may have a plurality of unstranded IBRs 202a, the second IBR bundle 200b may have a plurality of unstranded IBRs 202b, the third IBR bundle 200c may have a plurality of unstranded IBRs 202c, and the fourth IBR bundle 200d may have a plurality of unstranded IBRs 202d. Each IBR bundle (*i.e.,* the first through fourth IBR bundles 200a-200d) of the plurality of IBR bundles 200 may be stranded at a first lay length. Specifically, the first lay length may be in a range of 350 millimetres (mm) to 700 mm. Specifically, each IBR bundle (*i.e.,* the first through fourth IBR bundles 200a-200d) of the plurality of IBR bundles 200 may be stranded at a large lay length (*i.e.,* the first lay length of 350 millimetres (mm) to 700 mm) to make the core 104 (as shown in FIG. 1) of the optical fiber cable 100. In some aspects of the present disclosure, each superbundle of the one or more superbundles 102 may be made by stranding the plurality of IBR bundles 200 (*i.e.,* the first through fourth IBR bundles 200a-200d) to provide Extra Fiber Length (EFL). Stranding of the plurality of IBR bundles 200 (*i.e.,* the first through fourth IBR bundles 200a-200d) to make the one or more superbundles 102 may be easier as the number of components is less. Normally, the number of ribbons in an IBR bundle are 12-24 while number of IBR bundles in a superbundle are 2-6. Therefore, the stranding process is simpler at second stage. The first lay length may be selected to be in the range of 350 mm to 700 mm as below 350 mm EFL would be very high and production line speed would be a challenge and above 700 mm the EFL might not be sufficient for operation in various conditions, and the optical fibers may face optical losses after installation.

[22] In some aspects of the present disclosure, each superbundle of the one or more superbundles 102 (*i.e.*, the first through six superbundles 102a-102f) may be stranded at a second lay length such that the second lay length may be greater than the first lay length. As illustrated, the superbundle 102a may be stranded at the second lay length such that the second lay length may be greater than the first lay

length. In some aspects of the present disclosure, the second lay length may be in a range of 900 mm to 2000 mm. Specifically, when the second lay length is below 900 mm, mechanical stresses on the optical fibers may increase which may degrade performance of the optical fibers. Moreover, when the second length is above 2000 mm, extra length of the one or more superbundles 102 may be insufficient inside the optical fiber cable 100 which may result in attenuation issues during handling/installation. Thus, the second lay length may be kept in the range of 900 mm to 2000 mm. In some aspects of the present disclosure, the second lay length and the first lay length may have a predefined ratio. Specifically, the predefined ratio of the second lay length to the first lay length may be in a range of 1.3 to 6.7.

[23] The optical fiber cable 100 (as shown in FIG. 1) may further have an unstranded bundle binder 204 that may be disposed over each IBR bundle (*i.e.,* the first through fourth IBR bundles 200a-200d) of the plurality of IBR bundles 200. For example, the first IBR bundle 200a may have the unstranded bundle binder 204 disposed thereon. Specifically, the unstranded bundle binder 204 may have a lay length that may be in a range of 20 millimetres (mm) to 50 mm. Specifically, the lay length of the unstranded bundle binder 204 that may be kept in the range of 20 mm to 50 mm as below 20 mm, the optical fibers may be tightly bound, may face optical losses, and may take extra time to open up the IBR bundle and above 50 mm, the unstranded bundle binder 204 may not be able to hold the plurality of IBRs intact and there may be bulges or loose portions in the unstranded IBR bundles (*e.g.,* the first through fourth IBR bundles 200a-200d). Specifically, as the IBR bundles (*e.g.,* the first through fourth IBR bundles 200a-200d) are bound by the unstranded bundle binder 204, the additional lay length is required to provide extra EFL for ease in handling and maintaining optical efficiency during bends in the optical fiber cable 100.

[24] In some aspects of the present disclosure, each superbundle of the one or more superbundles 102 may have a superbundle binder 206. As illustrated, the plurality of IBR bundles 200 forming the superbundle 102a may be stranded by way of the superbundle binder 206 at a third lay length. In some aspects of the

present disclosure, the third lay length may be in a range of 40 mm to 70 mm. Specifically, when the third lay length is below 40 mm, extra superbundle binder (*e.g.,* the superbundle binder 204) length may be required and a time to open-up the superbundle may increase. Further, when the third lay length is above 70 mm, the superbundle binder 204 may not be able to hold the one or more superbundles intact. Therefore, the third lay length may be selected to be in the range of 40 mm to 70 mm. In some aspects of the present disclosure, the superbundle binder 206 may be adapted to bind the plurality of IBR bundles 200 (*i.e.,* the first through fourth IBR bundles 200a-200d) to form the superbundle 102a. In some aspects of the present disclosure, the stranding of each superbundle of the one or more superbundles 102 and the plurality of IBR bundles 200 may be, but not limited to, a helical stranding (*i.e.,* a unidirectional stranding), a SZ stranding (*i.e.,* a Bidirectional stranding), and the like. Aspects of the present disclosure are intended to include and/or otherwise cover any type of the stranding known to a person of ordinary skill in the art, without deviating from the scope of the present disclosure. In some aspects of the present disclosure, the unstranded bundle binder 204 and the superbundle binder 206 may be made up of a material such as, but not limited to, polyester, aramid, and the like. Aspects of the present disclosure are intended to include and/or otherwise cover any type of the material for the unstranded bundle binder 204 and the superbundle binder 206, without deviating from the scope of the present disclosure.

[25] In some aspects of the present disclosure, the plurality of IBR bundles 200a-200d may be formed by bundling one or more IBRs. In an aspect of the present disclosure, the one or more IBRs may be rolled and bundled using the unstranded bundle binder 204. In an example, the unstranded bundle binder 204 may have binder yarns where the rolled IBRs (or optical fiber ribbons) may be bent in a near-circular shape. In another aspect of the present disclosure, the one or more IBRs may be bundled using any other suitable means. The unstranded bundle binder 204 may be coloured binder yarns. The unstranded bundle binder 204 may be of same or of different colour. In addition, the unstranded bundle binder 204 may be made of any suitable material. In some aspects of the present

disclosure, at least one of the unstranded bundle binder 204 and the superbundle binder 206 may be a dual-end binder yarn. The term “dual-end binder yarn” as used herein refers to a binder is divided in two substantial equal ends (parts) and both the “ends” of the binder yarn are unwound from a single bobbin and used simultaneously during the binding process. In some aspects of the present disclosure, at least one of the unstranded bundle binder 204 and the superbundle binder 206 may be a single end binder yarn. As used herein “single end binder yarn” may be a binder that has a plurality of entangled yarns/threads, which are wound together around a cable core.

[26] The one or more IBRs has a plurality of optical fibers. The plurality of optical fibers may be intermittently bonded and form one or more IBRs. In addition, the plurality of optical fibers may be placed in parallel and adjacent optical fibers are bonded with special material intermittently along a longitudinal length and width. Further, the bonding with special material converts the plurality of optical fibers into intermittently bonded ribbons. The flexible matrix material between adjacent optical fibers may take a corrugated shape, concave shape, convex shape, flat shape or any other suitable shape. Furthermore, the joining of the plurality of optical fibers with a special material imparts rollable capability to the one or more optical fiber ribbons. The one or more optical fiber ribbons may be rolled and packed efficiently. The packed bundles of the one or more optical fiber ribbons are easy to handle and are used to further make an efficiently packed superbundle.

[27] In an aspect, the plurality of optical fibers may have a diameter that may be in a range of 160 micrometres (μm) to 260 μm. In another aspect, the plurality of optical fibers may have a diameter of 200±10 μm. In yet another aspect, the plurality of optical fibers may have a diameter of 160±10μm. Alternatively, the plurality of optical fibers may have other suitable diameter. In general, an optical fiber refers to a medium associated with signal transmission over long distances in the form of light pulses. The optical fiber uses light to transmit voice and data communications over long distances when encapsulated in a jacket. The plurality of optical fibers may be single-mode optical fibers or multi- mode optical fibers.

The plurality of optical fibers may be of ITU.T G.657A2 category. Alternatively, the plurality of optical fibers may be of ITU.T G.657A1 or G.657B3 or G.652D or another category. The plurality of optical fibers may be coloured fibers. The one or more optical fiber ribbons may have a pitch of 250µm. Alternatively, the pitch may vary. The one or more optical fiber ribbons may use colour coded ribbon matrix, band stripe printing or the like for ribbon identification. In some aspects of the present disclosure, each optical fiber of the plurality of optical fibers may have a macro bending loss of less than 0.25 Decibels (dB) at 1550 nanometres (nm) for 10 turns on a mandrel with a radius of 15 mm.

[28] Each superbundle of the plurality of superbundles 102 may have one or more water swellable yarns 210. In addition, each bundle in the plurality of superbundles 102 may be held together by at least one of the one or more binders, water blocking tape, an aramid yarn(s), a glass roving yarn(s) and a metal tape. In some aspects of the present disclosure, at least one of, the one or more binders, water blocking tape, an aramid yarn(s), a glass roving yarn(s) and a metal tape may surround the core 104 such that at least one of, the one or more binders, water blocking tape, an aramid yarn(s), a glass roving yarn(s) and a metal tape may be positioned between the core 104 and the sheath 106. The one or more water swellable yarns 210 may act as a water blocking element. The one or more water swellable yarns 210 may be adapted to facilitate in prevention of water ingression in the one or more superbundles 102. In an aspect, the one or more water swellable yarns 210 may be placed inside at least one of the one or more superbundles 102, inside at least one of the plurality of IBR bundles 200, and in-between a pair of adjacent bundles of the one or more superbundles 102. In another aspect of the present disclosure, the one or more water swellable yarns 210 may be located in the core of the optical fiber cable 100. In another aspect of the present disclosure, the one or more water swellable yarns 210 may be placed inside one or more of the plurality of IBR bundles 200. In addition, the one or more water swellable yarns 210 may be placed inside the plurality of superbundles 102. In some aspects of the present disclosure, there may be three water swellable yarns 210. In some aspects of the present disclosure, the number

of the water swellable yarns 210 may vary. In some aspects of the present disclosure, the one or more water swellable yarns 210 may have a weight of 9000 denier. Alternatively, the one or more water swellable yarns 210 may have other suitable weight. In some aspects of the present disclosure, the one or more superbundles 102 may be formed without the one or more water swellable yarns 210.

[29] In some aspects of the present disclosure, the plurality of IBR bundles 200 and the one or more water swellable yarns 210 may be placed longitudinally and bundled using the unstranded bundle binder 204. In an aspect of the present disclosure, the one or more super binders may be a binder yarn. In another aspect of the present disclosure, the unstranded bundle binder 204may be any other suitable means. In an aspect, the plurality of IBR bundles 200 and the one or more water swellable yarns 210 may be SZ stranded to form a superbundle of the plurality of superbundles 102. In general, the SZ stranded may have two turns of 4 bundles of the plurality of bundles in clockwise direction. The plurality of IBR bundles 200 may have a defined lay-length followed by two turns in anti-clockwise direction with same lay-length, where the process is repeated. In general, the lay length is a length of a binder required to complete a rotation of 360° around a group of IBRs (bundle or superbundle). The number of bundles and turns may vary.

[30] FIG. 3 illustrates a slotted optical fiber cable 300. The slotted optical fiber cable 300 may have a sheath 302, a core 303, and a skeleton structure 304. The sheath 302 may be an outer covering of the core 303, and thus for the slotted optical fiber cable 300. The skeleton structure 304 may be arranged within the sheath 302 of the slotted optical fiber cable 300 such that the skeleton structure 304 forms plurality of slots of which first through fourth slots 306a-306d are shown. Each slot of the first through fourth slots 306a-306d may be adapted to accommodate the one or more superbundles 102 (as discussed in FIG. 1 and FIG. 2). In some aspects of the present disclosure, the skeleton structure 304 may be stranded (not shown) to maintain the lay length of one or more superbundles 102. The one or more superbundles 102 may be wrapped by a water blocking tape (not

shown). In some aspects of the present disclosure, the one or more superbundles 102 may be wrapped by a tape that is made up of a material such as, but not limited to, a synthetic material, aramid yarn, fire-retardant material, and the like. Aspects of the present disclosure are intended to include and/or otherwise cover any type of the material, without deviating from the scope of the present disclosure.

[31] Thus, the optical fiber cable 100, 300 having one or more superbundles 102 that further has a plurality of Intermittently Bonded Ribbons (IBRs) bundles 200 has optimized rollability and robustness that further facilitates in high density packaging of the optical fibers. Further, the optical fiber cable 100, 300 of the present disclosure reduces scrap generation and resin material usage. Further, as the optical fiber cable 100, 300 utilizes unstranded IBR bundles (*i.e.,* the plurality of IBR bundles 200) to make one or more superbundles and has the first lay length of the plurality of IBR bundles 200 in the range of 350 mm to 700 mm further improves ribbon twisting and avoid breakage in bonded portions.

[32] The foregoing descriptions of specific aspects of the present technology have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the present technology to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The aspects were chosen and described in order to best explain the principles of the present technology and its practical application, to thereby enable others skilled in the art to best utilize the present technology and various aspects with various modifications as are suited to the particular use contemplated. It is understood that various omissions and substitutions of equivalents are contemplated as circumstance may suggest or render expedient, but such are intended to cover the application or implementation without departing from the spirit or scope of the claims of the present technology.

[33] While several possible aspects of the disclosure have been described above and illustrated in some cases, it should be interpreted and understood as to have been presented only by way of illustration and example, but not by limitation.

Thus, the breadth and scope of a preferred aspect should not be limited by any of the above-described exemplary aspects.

We Claim(s):

1. An optical fiber cable (100, 300) comprising:

   a core (104, 303) comprising one or more superbundles (102), wherein each superbundle of the one or more superbundles (102) comprising a plurality of Intermittently Bonded Ribbon (IBR) bundles (200) such that each IBR bundle of the plurality of IBR bundles (200) comprising a plurality of unstranded IBRs (202), wherein each IBR bundle of the plurality of IBR bundles (200) is stranded at a first lay length that is in a range of 350 millimetres (mm) to 700 mm;

   a sheath (106, 302) that surrounds the core (104, 303).

2. The optical fiber cable (100, 300) of claim 1, further comprising a unstranded bundle binder (204) disposed over each unstranded IBR bundle of the plurality of unstranded IBR bundles (200), wherein the unstranded bundle binder (204) has a pitch that is in a range of 20 millimetres (mm) to 50 mm.

3. The optical fiber cable (100, 300) of claim 1, wherein each IBR bundle of the plurality of IBR bundles (200) comprising a plurality of optical fibers such that each optical fiber of the plurality of optical fibers has a macro bending loss of less than 0.25 Decibels (dB) at 1550 nanometres (nm) for 10 turns on a mandrel with a radius of 15 mm.

4. The optical fiber cable (100, 300) of claim 1, wherein the one or more superbundles (102) has a predefined occupancy that is greater than 0.5.

5. The optical fiber cable (100, 300) of claim 1, wherein each superbundle of the plurality of superbundles (102) is stranded at a second lay length, wherein the second lay length is greater than the first lay length.

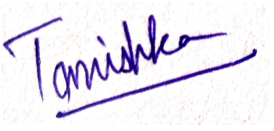
6. The optical fiber cable (100, 300) of claim 6, wherein the second lay length and the first lay length has a predefined ratio that is in a range of 1.3 to 6.7.

7. The optical fiber cable (100, 300) of claim 1, further comprising a superbundle binder (206) disposed over each superbundle of the plurality of superbundles (102), wherein a lay length of the superbundle binder (206) is in a range of 40 mm to 70 mm.

8. The optical fiber cable (100, 300) of claim 1, wherein the core (104, 303) comprising a plurality of slots (306a-306d), wherein each slot of the plurality of slots (306a-306d) occupying at least one superbundle of the plurality of superbundles (102).

9. The optical fiber cable (100, 300) of claim 3 and 8, wherein at least one of the unstranded bundle binder (204) and the superbundle binder (206) is a dual end binder.

Dated this 14th of February, 2023

Signature: 

Name of the Signatory: Tanishka Jain
Patent Agent (IN/PA-5199)

ABSTRACT

OPTICAL FIBER CABLE WITH INTERMITTENTLY BONDED RIBBON (IBR) SUPERBUNDLES

[1] The present disclosure provides an optical fiber cable (100, 300). The optical fiber cable (100, 300) has a core (104, 303). The core (104, 303) has one or more superbundles (102). Each superbundle of the one or more superbundles (102) comprising a plurality of Intermittently Bonded Ribbon (IBR) bundles (200) such that each IBR bundle of the plurality of IBR bundles (200) has a plurality of unstranded IBRs (202). Each IBR bundle of the plurality of IBR bundles (200) is stranded at a first lay length that is in a range of 350 millimetres (mm) to 700 mm. The optical fiber cable (100, 300) further has a sheath (106, 302) that surrounds the core (104, 303).

FIG. 1.