Technical Note
TN26: Splicing issues encountered when using bend insensitive fibre

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This technical note covers some important information to assist when splicing bend insensitive fibre.

Background

In November 2006 the ITU (International Telecoms Union) published the G.657A standard for Bend Insensitive Singlemode Fibre, which led to several techniques being developed to achieve this performance enhancement.

The five primary types are 'Extremely Small Core', 'Small Core', 'Optimised Matched/Depressed Cladding', 'Voids Assisted' and the most common, 'Trench Assisted

| Extremely small/ small core | Optimised MC/DC | Voids assisted | Trench assisted |
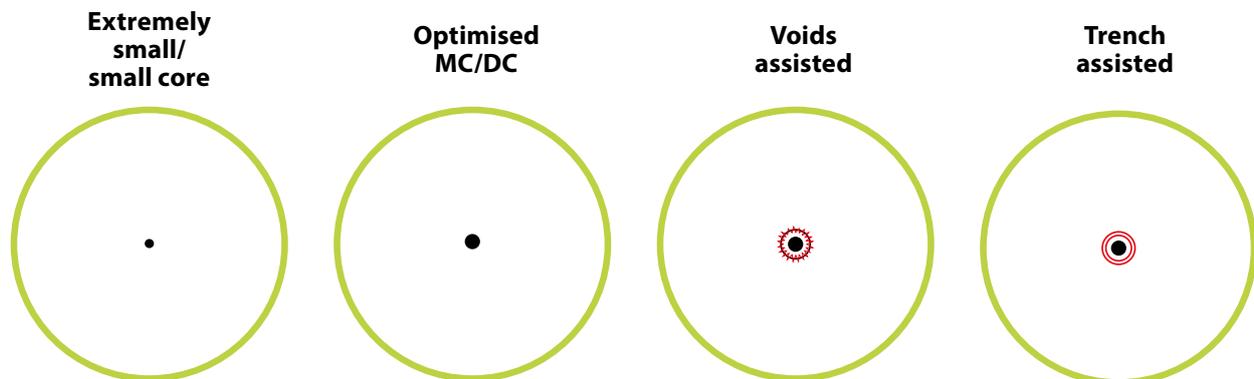
The first two have a very low Mode Field Diameter (MFD) of between 6 and 8.5 µm; they are not popular due to potential high splice losses. The performance enhancement provided by Optimised Matched/Depressed Cladding is only very marginal so rarely encountered. 'Voids Assisted' It is difficult for 'Voids Assisted' to have good performance, therefore it is costly to manufacture in comparison to 'Trench Assisted'.

The trench, or moat as some people call it, surrounds the core in both Bend Insensitive Singlemode and Multimode fibre to reflect lost light back into the core. The trench is an annular ring of lower index glass surrounding the core with very carefully designed geometry to maximize the effect.

This Technical Note has been produced by Paul Cave, Technical Manager, on behalf of Excel

Potential Issues Encountered

On several occasions installers have reported that they have had problems when splicing Bend Insensitive pigtails to standard fibre. Invariably, after further investigation it is identified that they have been using a 'Core Alignment' splicer, which is either an older model or a low-cost machine based on older technology.

These machines have become confused by the 'trench', leading to them believing the core is bigger than it actually is, which means that they are not able to align the two cores correctly leading to faults being reported and high splice losses.

Conclusions and Recommendations

With the increasing amount of Bend Insensitive fibre being specified and installed, this occurrence will continue to be reported.

Some recommendations to ensure the fusion splicer being used is capable of handling Bend Insensitive fibre are:

- Use a machine from a recognised manufacturer such as Fujikura or Sumitomo.

- Use a core alignment machine that has been manufactured within the last 10 years.

- If it is an older model check whether there are any software or firmware updates available from the manufacturer, regarding the use of Bend insensitive fibre.

As a last resort the machine can always be operated in Cladding Alignment mode, however this runs the risk of higher splice losses.

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