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Statistics of PMD Outages

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Abstract Polarization mode dispersion (PMD) is a potentially limiting impairment in high-speed long-distance fiber optic communication systems. Using extensive data on buried fibers used in long-haul high speed links, we discuss the proposition that most of the temporal PMD changes that are observed in installed routes arise primarily from a relatively small number of "hot spots" along the route that are exposed to the ambient environment, whereas the buried, shielded, sections remain largely stable for month-long time periods. It follows that the temporal variations of the differential group delay (DGD) for any given channel constitutes a distinct statistical distribution with its own channel-specific mean value. The impact of these observations on outage statistics is analyzed and the implications for future optoelectronic fiber-based transmission are discussed.

