



NSW[®] Submarine Telecom Systems

Turnkey solutions for the future, delivered today



NORDDEUTSCHE SEEKABELWERKE GMBH (NSW)

The submarine competence center within the General Cable Group

After NSW was founded in 1899 by Felten & Guillaume and the Deutsch-Atlantische Telegraphengesellschaft, Siemens became one of its major shareholders in 1931, and acquired the remaining stock in 1995. In 2000, NSW became a subsidiary of Corning Cable Systems. Since 2007, NSW has been a 100-percent member of the General Cable Corporation (NYSE:BGC) and has become the competence center for submarine cables for the General Cable Group.

The General Cable Corporation is one of the Fortune 500 companies, a world leader when it comes to developing, designing, manufacturing, marketing and

selling copper, aluminum and glass-fiber cables plus products in the energy, industrial and telecommunication sectors.

NSW benefits not only from General Cable's profound expertise, but also from its global reach in the wire and cable industry. Quality, state-of-the-art technology and customer focus are General Cable's top priorities.

Experience, Innovation and Service

NSW has been manufacturing underwater cables since 1899. NSW was already laying its first transatlantic submarine telecommunication cable in 1904, approximately 7,993 kilometers in length.

A century of experience in armored and non-armored cables for carrying power, signals, communications and fiber-optic applications has formed the foundation for a forward-looking organization, committed to innovation and unrivalled customer service.

NSW's research-and-development and product management teams work in close cooperation with General Cable's experts and specialists from leading suppliers of electronic telecommunications transmission equipment to create state-of-the-art solutions for the world's leading network operators.



APPLICATIONS

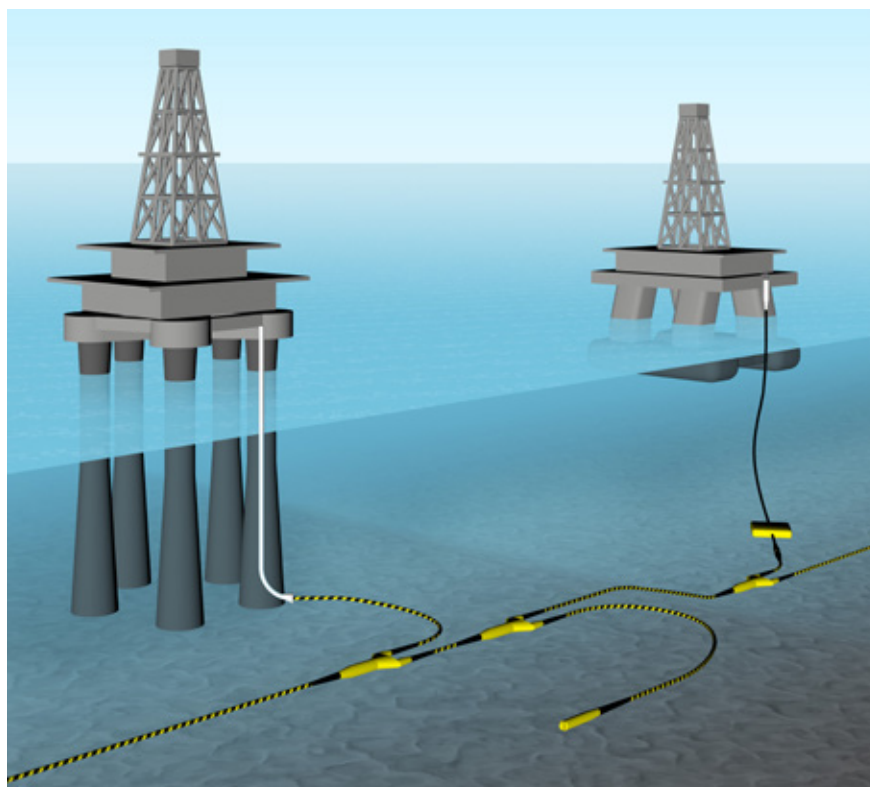
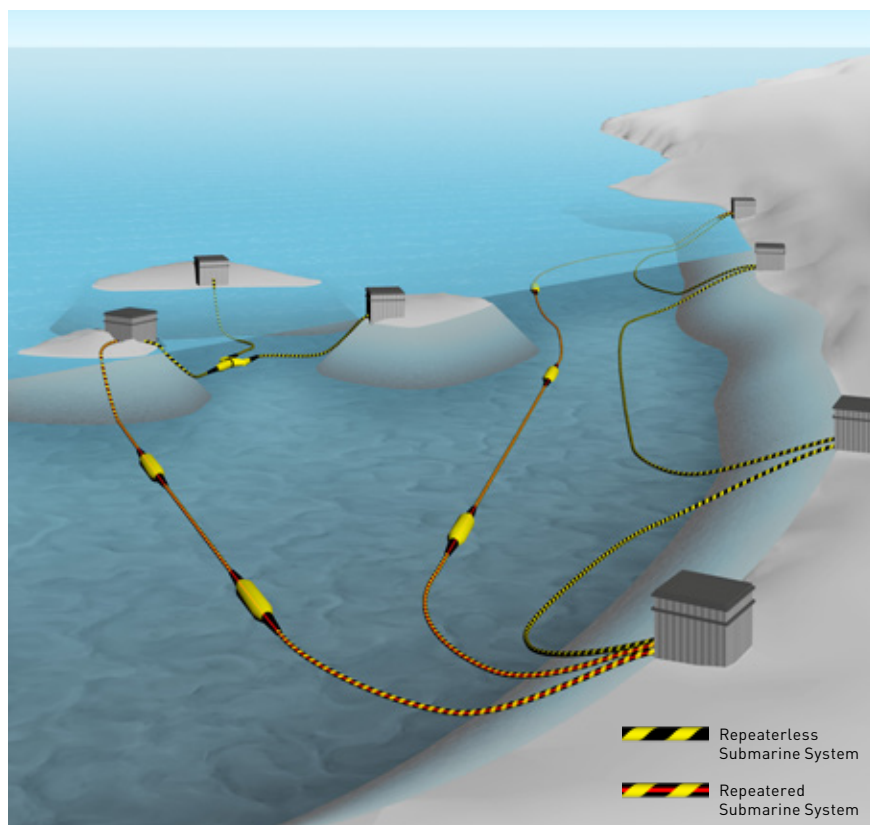
NSW® Submarine Cables for Telecommunication Networks

NSW has established itself as one of the leading turnkey suppliers for providing state-of-the-art submarine cable systems worldwide. NSW offers fiber-optic submarine cables, accessories and associated turnkey services. Investors and network operators are increasingly opting for the point-to-point or turnkey approach. By placing the entire project in the hands of a qualified expert, the risks that result from a lack of submarine project management experience are avoided, and time to market is brought down to a minimum.

NSW® Submarine Cables for the Offshore Oil and Gas Industry

The increasing complexity of data transmission requirements (platform-to-platform, platform-to-subsea control system and platform-to-shore), challenging technologies like “free-floating” platforms or sub-sea exploration and the need for higher levels of system reliability results in the development of new telecommunication system solutions for the offshore industry.

Remote control, automation and other bandwidth demanding applications are obvious trends in the industry. Fiber-optic submarine networks can be easily adjusted to continuously changing business environments and can be incorporated into future engineering concepts.



NSW[®] SUBMARINE TELECOMMUNICATION CABLES

NSW[®] MINISUB[®] is a rugged, lightweight fiber-optic submarine cable with unique features. Within the NSW[®] MINISUB[®] cable family, NSW offers repeaterless as well as repeatered cable types optimized for all network requirements.

Key design element of the NSW[®] MINISUB[®] is the central copper tube which ensures reliable protection of the fibers in the core against hydrogen ingress. NSW[®] MINISUB[®] fibers have excess longitudinal length and are not coupled to the cable's outer structure. This prevents fiber damage during cable handling and laying, and thus guarantees optimal fiber performance throughout the lifetime of a cable.

The high specific gravity of the cable results in optimal sinking speed to facilitate accurate laying exactly "on-route".

Both repeaterless and repeatered types are available as lightweight (LW), lightweight-protected (LWP), single-armored (SA) and double-armored (DA) cables.

Repeaterless NSW[®] MINISUB[®] Submarine Cables

Repeaterless NSW[®] MINISUB[®] Submarine Cables can comprise up to 144 fibers. NSW[®] MINISUB[®] can be installed in water depths of up to 5,000 m. NSW branching units for the NSW[®] MINISUB[®] submarine cable family provide flexible fiber management and routing features.

Both cable transport and cable laying are facilitated by the highly compact design of the cable. It provides less weight for more convenient, but also cost-effective transport arrangements. Innovative and efficient means of transporting NSW[®] MINISUB[®] cables can greatly enhance turnaround time. Containerized modular tanks enable NSW to transport the cable on standard container vessels, offering regular feeder services as well as fast and reliable turnaround. On reaching its destination and depending on the lay spread involved, the cable can either be laid directly from the tanks, or alternatively coiled into the tanks of the cable layer.

Repeatered NSW[®] MINISUB[®] Submarine Cables

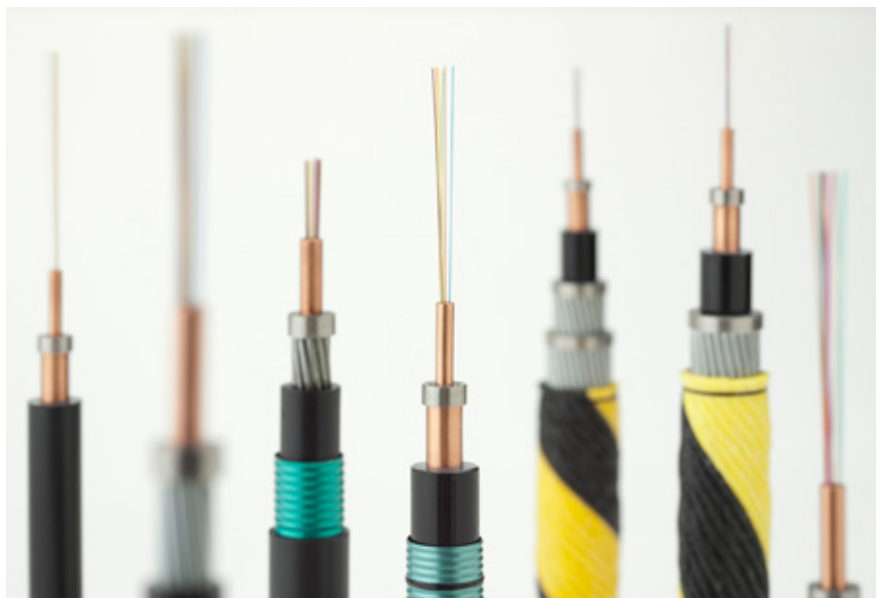
Repeatered NSW[®] MINISUB[®] Submarine Cable Systems, supporting up to 8 fiber pairs and

equipped with industry standard repeater technology, can be installed in water depths down to 8,000 m.

All NSW[®] Submarine Cables are Universal Joint qualified by the Universal Joint Consortia.

Low resistance of 0.60 hms / km by using both a central copper tube and an outer copper layer above the strength members reduces the overall power feed voltage and therefore the power consumption of the wet plant.

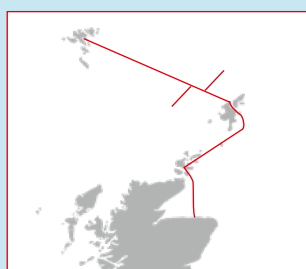
NSW supports its customers with cost-efficient system design, which also includes a careful look at route engineering, cable protection measures, transport logistics and wet plant installation.



SELECTED REFERENCES

2007

Manufacturing and installation of a 960 km repeaterless cable system Scotland–Orkney–Shetland–Faroe.



2007–2008

Manufacturing and installation of a 4,300 km repeatered cable system in the Mediterranean Sea.



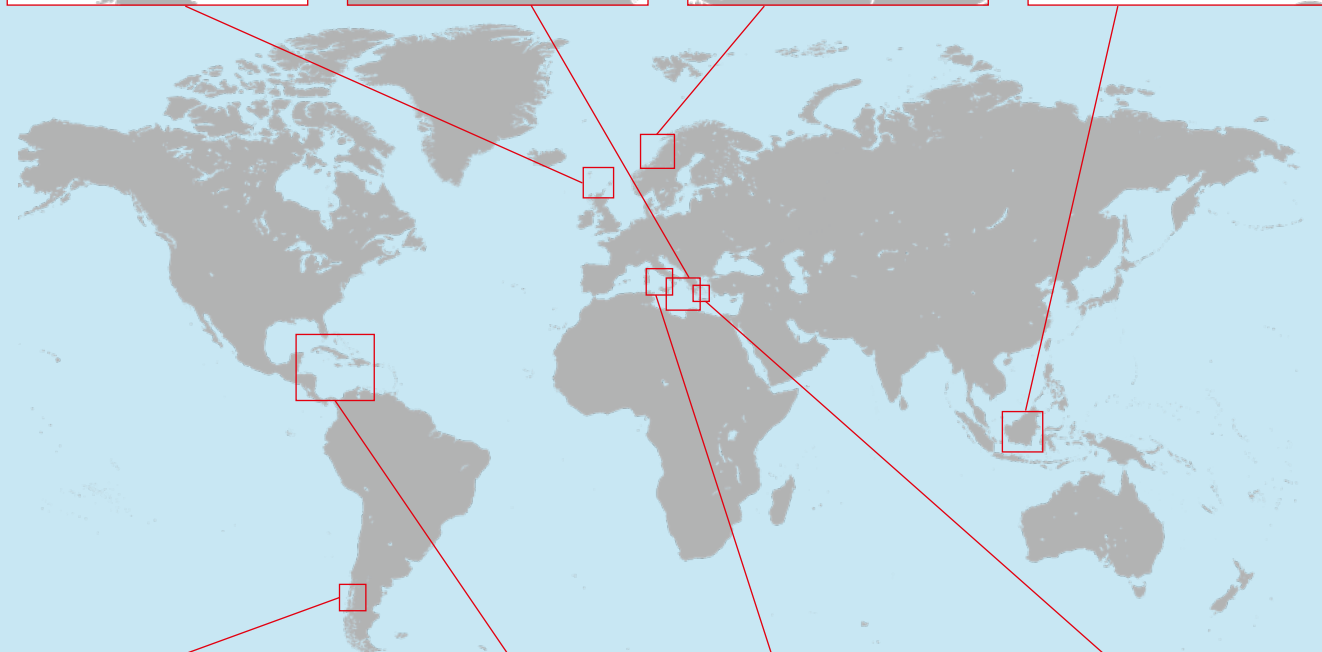
2006

Manufacturing and installation of a 855 km repeaterless cable system along the Norwegian coastline.



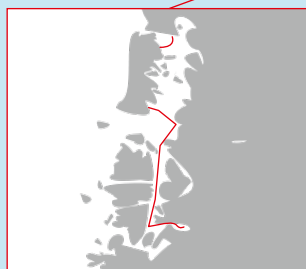
2009–2010

Manufacturing and installation of a 1,200 km repeatered cable system in Borneo and a 500 km repeaterless cable system Java–Bali.



2015

Manufacturing and installation of a 400 km repeaterless cable system in Chile.



2000–2002

Manufacturing and installation of a 6,800 km repeaterless cable system, connecting 20 countries in the Caribbean.



2005

Manufacturing and installation of a 625 km repeaterless cable system Sicily–Sardine–Italy.



2006–2008

Manufacturing and installation of a 1,000 km repeaterless system, connecting Greek islands with mainland Greece.



IMPLEMENTATION

Turnkey Project Management

NSW's customers benefit from a century's experience in successful implementation of turnkey submarine cable projects. The faster a project can be implemented, the more economical financing becomes. NSW supports customers to achieve profitability through efficient management of their turnkey projects. An optimum trade-off is maintained between the cost and the technical measures to meet the customer's present and future objectives.

Business Case Development

The feasibility of adding new bandwidth supply depends on economic and technical characteristics of the systems already in place. Additional regional network rings can bring capacity to users in areas not immediately contiguous with landing points of transoceanic systems, and can also provide an economically attractive complement to existing terrestrial networks. In close cooperation with the customer, NSW reviews the feasibility of a proposed cable system, and supports the preparation of a detailed business case to satisfy the requirements of equity investors or lending institutions providing project financing.

Desktop Study

Once the frame parameters of a project have been defined, NSW prepares a desktop study in which all available information on the proposed submarine cable route

is collected and evaluated, the system architecture is reviewed and the final technical parameters of a system are defined. Initial legal, commercial and contractual preparations for implementing the project are made hand-in-hand with the customer in order to gather all required approvals in time.

Marine Survey

NSW carries out detailed seabed surveys along the proposed cable route through competent partners to align and update the database of the desktop study prior to the cable manufacturing phase. NSW's experts are on board the survey vessel to monitor the work and data on the cable route. Depending on the geophysical and environmental data collected, the cable type and protection measures (armouring, protec-

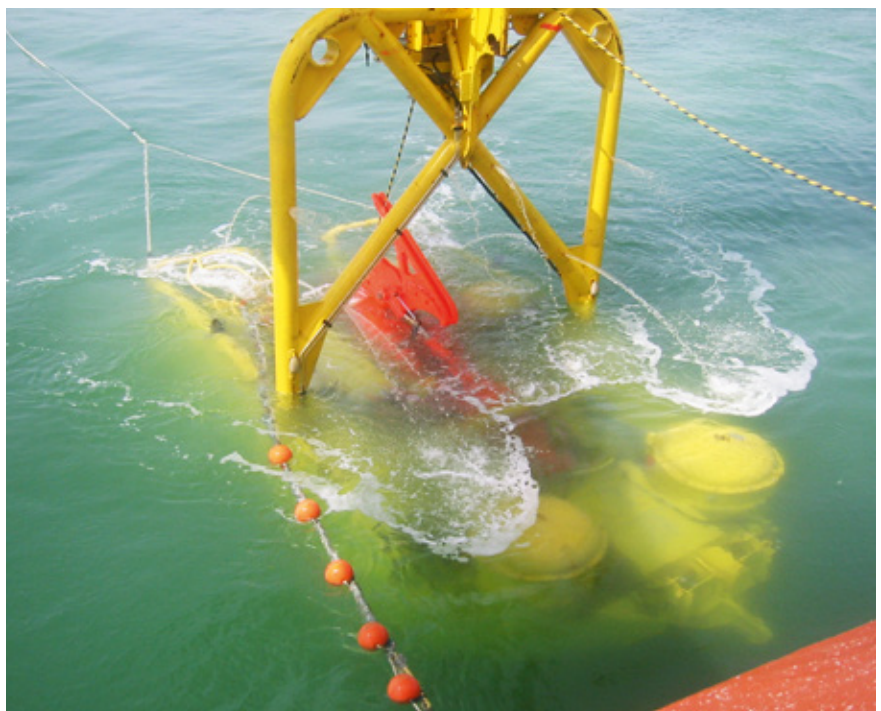
tion sleeves, burial depth etc.) as well as all necessary cable joints, housings and other system details will be specified.

Project Communication

The key element of NSW's project management is a small, dedicated project team with a direct communication path to the system owner. NSW's local project office allows fast, effective and regular exchange of progress in the same time zone, enabling ad-hoc meetings to address the challenges of the project in face-to-face consultation with the system owner.

Installation and Commissioning

NSW's laying and logistics concept allows simultaneous cable manufacturing and installation. To facilitate uninterrupted lay-



QUALITY

ing operations, laying vessels are supplied by feeder ships, making it unnecessary for the cable-laying vessels to return to the cable factory to load cable in the course of the project. Cable shore end operations can be effectively executed as direct landings from the main lay vessel, or even be planned by a pre-laid shore end by a small strategic spread utilizing local resources. NSW's experienced cable laying crew fully monitors the laying operations to ensure highest quality during the operation.

Commissioning comprises all required acceptance tests, training of customer's personnel, as well as a complete as-built-documentation package including all installation logs.



Quality Management at NSW

Out of conviction, NSW has implemented quality standards in its company processes and expanded them to an integrated management system according to ISO 9001 and ISO 14001. As work safety is an essential part of NSW's philosophy, we are also certified according to BS OHSAS 18001. Consequently, the synergies created by a holistic system can be employed in the interests of our customers.

Independent companies use regularly occurring inspections to monitor compliance with the requirements of the standards. The certification documents from DNV GL Business Assurance Zertifizierung und Umweltgutachter GmbH attest that NSW uses an active and well-functioning quality and environmental management system.

The criteria for production and environmental management systems contained in the ISO 9001/14001 standards apply throughout the world, and of course NSW cables and jointing technologies possess the full range of quality approvals (ITU-T, IEC, ISO Certificates).

Measuring and Testing at NSW

A wide range of measuring and test equipment and trained staff experienced in all the relevant measuring methods and test standards is available. NSW works in accordance with national and international test standards. In addition, NSW makes use of independent test bodies such as BAM, PTB, VDE, FGH as well as other certified laboratories.

In order to assure the quality of NSW products, intensive, long-term investigations are carried out on the product and materials, going far beyond the specified test requirements.

The continuous checking, monitoring and evaluation of the tests is just as much a part of the investigations as the subsequent documentation of the results.



ENERGY

Markets: Transmission, Distribution, Generation
Products: Underground Cable, Substation Cable, Overhead Conductor & Cable



RENEWABLE ENERGY

Markets: Solar, Hydro, Wind
Products: Panel Wire, Cu & AL PV Wire, Tower Wire & Cable, Collection System Cable, Industrial Cable, Utility Cable



CONSTRUCTION

Markets: Residential, Commercial, Institutional
Products: Building Wire, Portable Cord, Industrial Cable



INDUSTRIAL

Markets: Food & Beverage, Automation, Water/Wastewater, Pulp & Paper
Products: Control Cable, Instrumentation Cable, Power Cable, Automation Cable, Portable & Temporary Power Cord, Solar Cable



TELCO

Markets: Independent Telephone Operating Companies (ITOCs), Regional Bell Operating Companies (RBOCs)
Products: Air Core Cable, Filled Core Cable, Wire Products, Central Office Cable, Optical Cable, Indoor/Outdoor Telephone Cable, Drop wire Cable



ENTERPRISE & COMMUNICATIONS

Markets: Commercial/Residential Buildings, Data Centers, Education, Finance, Federal/Government, Healthcare, AV, Manufacturing
Products: Datacom Cable, Fiber Optic Cable, Electronics Cable, Telecommunications Cable



OIL, GAS & PETROCHEMICAL

Markets: Upstream, Downstream, Midstream
Products: Offshore Cable, Subsea Cable, Onshore Cable



MARINE

Markets: Shipyards building, Ships & Other floating vessels
Products: Power, Control Instrumentation & Communication Cables



NUCLEAR

Markets: Nuclear Power Plants
Products: Power, Instrumentation, Control



MINING

Markets: Surface, Underground
Products: Portable & Trailing Mining Cable, Mine Power Feeder Cable, Industrial Cable



TRANSPORTATION

Markets: Automotive, Agricultural Equipment, Rail & Transit, Heavy Duty & Industrial Trucks, Bus
Products: Rolling Stock Cable, Signalling Cable, On-Vehicle Data Communications, Control & Power Wire and Cable, Battery Cable, Primary Wire, Electric Vehicle (EV) Products, Wire Harnesses and Assemblies



MILITARY

Markets: On Land, At Sea, In the Air
Products: Communications Wire & Cable (Cu & Fiber), Shore to Ship Power Cable, Wire Harnesses & Assemblies

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