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R&M
Convincing cabling solutions

Thank You for Your Cooperation!

We conducted a poll among readers in the last issue of *CONNECTIONS*. The responses have prompted us to make some minor changes. In this issue, we step up our coverage of company news and include more articles on background information and on market and technology trends.

Over 500 responses came in from across the globe. Our thanks to all of you who participated. The lucky winners have already received their prizes.

In the second-to-last survey two years ago, 72 % of the responses were sent by fax. Now, two years later, that figure is just 50 %. Electronic tools are obviously starting to become common in our sector, too. We will take that into account in the next issue. To see how, you will have to wait until next time.

CONNECTIONS generally garnered high marks. We appear to have found the right blend but do gather from your responses that you would prefer fewer success stories and more news and background information. This issue therefore features fewer projects. In exchange, the space devoted to background information has been increased and will continue to be in the future. We will spice up the project reports in the future with more technical information.

In this issue, you will find information about standards in the health care market and the trend toward "the smart home." We tell you about the unique test procedures we use to make good on our claim as quality leader. Our brand is appealing. One unfortunate side-effect is that Chinese pirates are now selling their own imitations of our successful E-2000™* connector on the market. Complete with R&M label, mind you.

This issue focuses on the hot issue of data centers. We present our own comprehensive cabling solution for this sector, a solution that truly excels in installation convenience.

Sincerely,

Dr. Martin Rosatzin
CTO, martin.rosatzin@rdm.com

* E-2000™, manufactured under license from Diamond SA, Losone.

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Picture on cover: Data Center at Star Storage Romania

Masthead CONNECTIONS 38 / April 2010

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New chances but also new challenges – the modern data center is multifaceted and complex yet opens up many possibilities.

The new decade brings new market opportunities for data centers and may even mark the start of another data center boom. The key words are high speed, storage, virtualization, cloud, and unified computing. To remain successful, a data center operator has to increase density, boost efficiency and become more flexible. Cabling is the first step in achieving all three.

The data center market is as exciting, dynamic and attractive as ever. In 2009, more than USD 15 billion flowed into this sector in the form of bonds, stakes and investments. BroadGroup, a British consulting firm for the data center market, predicts these investments will continue in the years ahead.

Another individual talking about the solid future of data center business is Margrit Sessions, Director of Tariff Consultancy, a market research firm in London. Her company has calculated that European data centers will double their sales to EUR 7 billion between 2010 and 2015. Data centers might even be able to increase their prices because the market needs more and more storage capacity. Useful space or raised floor space will increase by 70 percent and even double in Switzerland. Tariff Consultancy says European data centers increase their capacity by 14 percent a year.

The market researchers from IDC predict growth in the outsourcing of data center services. The reason is simple. For ever more companies, it is too expensive and complicated to operate their own data centers professionally. By 2013, demand for outsourcing is expected to expand by an annual 23 percent to EUR 2 billion in the four main European markets (United Kingdom, Netherlands, Germany, and France).

Tough demands from all sides

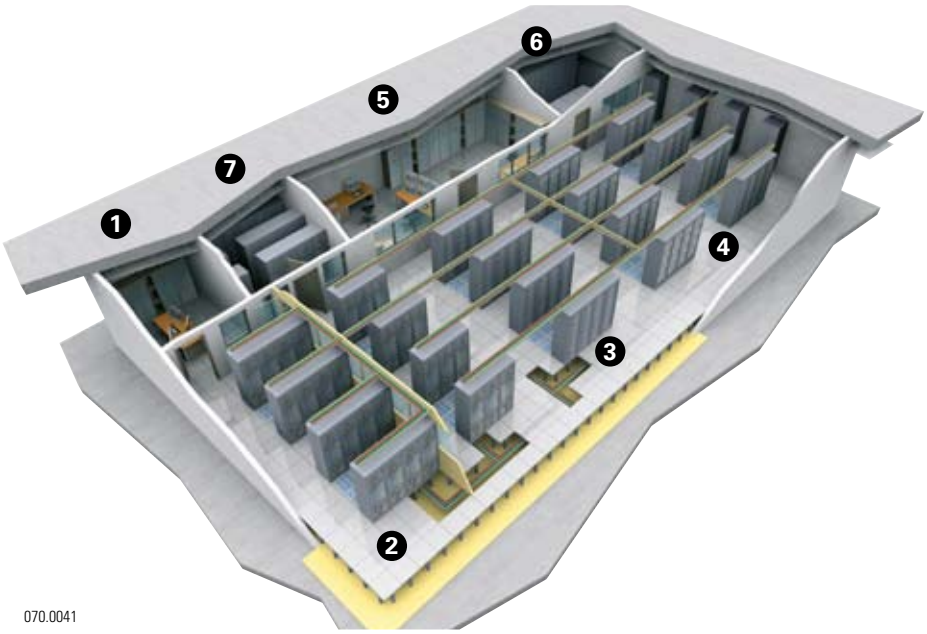
The market has every reason to continue investing in data centers. Gartner analyst David Cappuccio noted at the Gartner Data Center Conference in Las Vegas in November 2009 that data volume at businesses worldwide will expand by 650 percent in the next five years. Modern applications such as virtualization and software as a service, cloud and unified computing, Internet-based surveillance, IPTV, social networks and online games are spreading, leaving gigantic volumes of data in their wake. They all require ever more complex data centers with ever better performance.

Cisco estimated that Internet traffic will double by 2012 to more than 45 000 Petabytes (PB) per month, the equivalent of more than 46 billion Gigabytes of information. This data volume has to be transported and processed quickly and stored securely, a task entailing unbelievable demands on connectivity and server performance that may even cast doubts on traditional data center design.

In network infrastructure, 10-Gigabit Ethernet technology now dominates, from backbone to clients and applications. But preparations already have to be made today for the next technologies to come. The IEEE 802.3ba standard for 40/100 Gigabit Ethernet (GbE) will be adopted this year and Fiber Channel over Ethernet (FCoE) will be a topic for the storage area segment.

The requirements that business customers place on their own data centers and third-party operators are becoming tougher all

1. Entrance Room
2. Main Distribution Area
3. Horizontal Distribution Area
4. Equipment Distribution Area
5. Operations Center
6. Cooling & Power
7. Telecom Room



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Clear structures in the data center are essential for high availability.

the time. Service levels, availability, compliance, disaster recovery, response times and energy consumption are major parameters requiring optimization. In part, businesses are forced by regulatory bodies, environmental protection requirements or regulations from government and the market economy to optimize. Basel II, Sarbanes Oxley Act (SOX), FINMA, and ISO 27001 are four examples of this. Project and change requests involve increasingly tight deadlines, putting the people in data centers responsible for these matters under pressure, too. And as if that were not enough, there are also the consequences of the economic downturn, which demand a new type of strict cost discipline.

Dynamic scenario in all regions

These are the reasons why data center operators will in the near future have to centralize, consolidate, reorganize, and upgrade their installations and increase their density. Markets in Europe and the United States will see a generational change and a transformation because a substantial portion of the data centers is ten or fifteen years old and either in need of refurbishing or ready to scrap.

BroadGroup Director Steve Wallage says the next-generation data center is now on the agenda. The planning of the Lockerbie Data Center in Scotland is symptomatic for the current situation. Construction of the new building is due to start mid-2010. At a cost of USD 1.5 billion, it is one of the world's largest projects in the data center sector. People are looking for potential new sites in Canada, Siberia and Iceland for megaprojects because installations are easier to keep cool in these northern climes. The distance from urban centers is hardly relevant anymore because sufficient bandwidth is available in WAN.

Other regions have already gone a number of steps further. The Middle East, India, China and Southeast Asia are acting with speed and professionalism to build up a data center landscape whose infrastructure and flexible business models are forward-looking. In Southeast Asia, the capacity of the data centers will increase by 68 percent by 2013 according to the BroadGroup. A Gartner study noted that India is seeing annual capacity growth of 31 percent despite an energy supply that is not fully reliable. Experts are saying that India can become a data center hub for the entire world. Expansion plans are being implemented with a sense of purpose and determination. The new India-UK undersea cable system is spurring on the market. BroadGroup estimates the Indian data center market will attain a value of USD 1.5 billion in 2010.

The major players and investors in the Middle East are pursuing significant expansion plans as well. In their first Data Center Strategies Forum, held in Abu Dhabi in June 2009, they presented two outstanding goals for the next five years: to form regional alliances and to concentrate on the high-end segment of the highly available tier III and tier IV installations. Suppliers and operators in the Middle East would not even consider data centers with weaker specifications. There are three driving forces: security requirements, the demand for storage capacity, and the need for disaster recovery resources. Outsourcing solutions are not yet common there but they are being contemplated.

Around the globe, there is a dynamic scenario of data center growth and an array of exciting challenges facing operators. These factors all have a direct impact on planning, management and ongoing operations. Data centers today have to be extremely flexible and efficient to keep pace with these changes even though they run most reliably when they are simply left alone.

Order of the day: flexibility and efficiency

How can greater flexibility and efficiency be achieved? The first place to look is in planning and in the passive infrastructure, i.e. the cabling. This is still where the most lasting effect can be »

brought about at little cost. With an orderly passive infrastructure that is well planned and has a modular design, operators can handle upcoming migration processes or MACs with the same ease as ongoing operations.

TIA-942 and EN 50173-5 provide a base for qualified topology planning, following as they do the principle of structured, application-neutral cabling. These standards should be applied today under all circumstances, no matter how large the data center is, what the site conditions are or which business model is followed. ISO/IEC 24764 is to be added this year as a standard for structured cabling in data centers.

The official bodies paid particularly close attention to high availability and scalability in developing these standards. The layout of data centers and the structures of the cabling system are clearly defined from their entry into the building to the various levels of distribution and individual equipment outlets. The subdivision into core, distribution, access and clients is logical for everyone involved.

This approach helps to avoid typical mistakes and error sources from the outset. Data centers complying with these standards will satisfy today's operational requirements as well as the need for compatibility with future applications and technologies. The clear structure ensures that data centers can be modified and expanded without having to interrupt their operations. This makes the employees' job easier, especially when they work only temporarily at the data center. Operators can decide quickly and precisely the line length needed, the categories that could be used, and the volume of floor space or cable runs required.

R&M developed its range for data center cabling systems to fit this model. Under these conditions, operators can smoothly combine even copper and fiber optic cabling or change media from copper to fiber optics. With R&M, these steps can even be taken on a single distribution platform.

Standardized planning naturally takes into account cost/benefit aspects. For instance, the infrastructure can be divided into different priority levels. TIA-942 defines four tiers (I to IV) and specifies the level of availability each must deliver. Central criteria are topology, redundancy, supply and various other availability factors. With the tier model, the operator can select his requirements and those of his customers. It allows him to set a budget for implementation, distinguish between different installation products and put together individualized performance packages.

Toughest underlying specification

To meet the performance requirements today and over the next five years, data centers should generally apply the toughest specifications to the use of 10 GbE. For fiber optic cabling, that means laser-optimized 50/125 µm multimode OM3 fibers with MTP/MPO or LC connectors. For copper cabling it means shielded RJ45/Cat. 6_A components or Class E_A channel (also Cat. 7/Class F and Cat. 7_A/Class FA) in accordance with ISO 11801. This combination is a proven one, flexible to use, efficient to handle and compatible with the upcoming generations of active components. As a test recently released by the independent German testing lab GHMT AG shows, shielded copper cabling generally provides better performance for the transmission of 10 GbE than unshielded cabling.

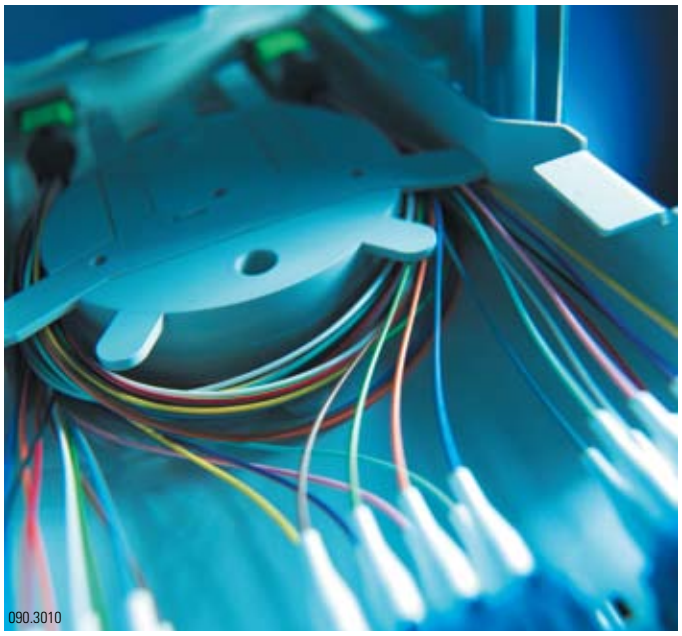
In the long term, operators will increasingly shift to fiber optic cabling in levels beyond the backbone to be able to provide even higher bandwidths, transmission capacity and signal quality. The 40/100 GbE generation will be based on a multilane version of parallel OM3 connections implemented with multiconnectors (MTP/MPO solutions) or bundled miniaturized connectors. Anyone with the foresight today to plan an infrastructure with OM3 specifications and to include blow-in systems, for example, will have an easier time later upgrading to a 40 GbE-compatible network. But copper solutions for 40 GbE are also being discussed.

Improved productivity means more cable

Improved productivity in servers and storage has greatly increased the density of cabling. When 40/100 GbE is introduced, the number of cables will multiply yet again, not to mention the indispensable redundancy required for reasons of security and reliability. Planners will have the difficult task of accommodating these growing numbers of cables in raised floors, in cable runs above the racks and in the racks themselves. R&M is there to assist these planners with its practical experience and far-sighted solutions.

R&M recommends using the newest types of copper and fiber optic cabling with reduced diameters. Even with these new products, cable management is becoming a big challenge and several aspects of it must be simplified. Striking labeling, simple-as-can-be coding and uncomplicated, intuitive cable routing on the rack are several of the factors that make daily work in the

With the new Cat. 6_A modules from R&M, data centers enjoy the full range of options for using 10 GbE on all levels.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Reliable, fast and clean: preassembled cables from R&M

aisles of a data center more efficient. The angled panel and systems for security, cable management and raceways from R&M are the appropriate solutions.

Availability requires quality

The desire for absolute availability is growing because functions and applications are being shifted in increasing numbers to the convergent IP network. If a network interruption causes an e-mail to arrive a little later or a video to be shown with a slight delay, these occurrences are not really damaging or harmful. But because of virtualization, data centers are managing an increasing number of vital systems for companies, buildings, public institutions and Internet services. Failures or transmission errors cannot be tolerated at all in these cases.

So data centers tend to have to use premium cabling with proven characteristics with respect to reliability, quality and durability. The cost of structured cabling as a percentage of the total cost of network infrastructure will remain at only about five to seven percent in future. Structured cabling is therefore well worth the money spent on it, especially since cabling generally outlives two to three generations of equipment and is responsible for most network failures. Advantageous solutions to use in this context are MTP/MPO or trunk cables terminated ex works, custom-cut and tested in accordance with the pertinent standards. Preassembled components achieve a degree of precision scarcely attainable in manual termination on site. Increased efficiency is another factor to consider. Preassembled cabling can be laid cleanly in floors, raceways and racks in less time and at a lower cost. R&M offers corresponding system solutions that apply stricter quality standards than required in the norms themselves.

Each data center today has to cut its power consumption because of costs and to conserve the earth's resources. Cabling and cable management can contribute significantly to achieving this goal. Orderly and well-structured cabling laid in a straight line facilitates the flow of air through raised floors and racks. Heat can be discharged more effectively and the cooling system works more efficiently and with less energy. For this reason, any superfluous or non-connected cables should be removed; they merely hamper the flow of air. Modern cables with reduced diameters also help to provide more space for the flow of air. Operators should install cable harnesses above the racks instead of in raised flooring wherever appropriate.

Plan consistently into the future

The fact is that data centers and their planners, operators and managers can only handle the tasks of today and tomorrow if they adopt a holistic approach to cabling. The correct cabling solution, ideally from a single company, will be the key to increasing efficiency and ensuring flexibility in the next-generation data center. Following the introduction of 10 GbE technology, systematic preparations should begin now for the era of Fiber Channel over Ethernet (FCoE) and 40/100 GbE. Each developmental step has to be geared to higher bandwidths and availability, increased density and scaling, improved cable management and consistent energy savings.


050.1741

Thomas Amrein, *System Management*
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Effective Guidance for Fiber Optic Cable

Snap connections for quick mounting: With the R&M Raceway System, installation and servicing costs can be slashed by as much as 50 percent.

The R&M Raceway System guides fiber optic cabling while also effectively protecting it. The system guarantees a minimum bending radius that is easy on fibers, ensuring maximum safety and reliability plus trouble-free operation for fiber optic networks.

The fibers are reliably laid in the sturdy PC/ABS plastic raceways from the building entrance all the way to the racks. PC/ABS is resistant to impact and breakage, heat-proof, flame-retardant, and resistant to electrical influences, so it provides every type of protection.

The demand for bandwidth and high-performance data transfer is growing everywhere, in data centers and storage centers, central offices and co-location points, hubs and header stations. This growth requires ever more fiber optic cables. Fiber optic raceway systems are now established as platforms for guiding and managing a large number of fibers. With the R&M Fiber Optic Raceway System, users now have available to them a complete and highly efficient modular solution featuring smartly designed quick installation plus all-round protection for fiber optic cables.

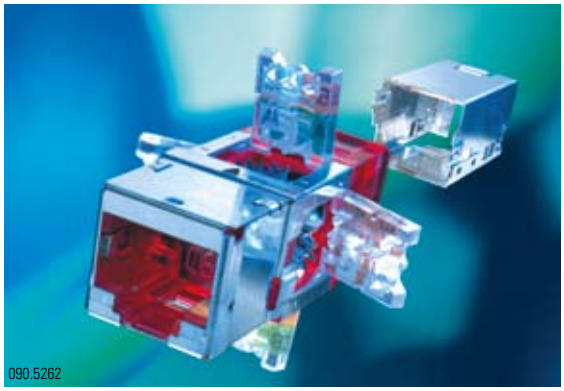
The raceway system can be used both in raised floors and above the racks. You connect the Raceway System modules simply by snapping them together. No additional special tools are necessary.

The range focuses on a smart and lean number of components, thus simplifying planning and ordering, warehousing and installation. Essentially, the system consists of main raceways, horizontal and vertical connectors, reduction elements and express exits that all ensure a minimum bending radius up to 40 mm that is easy on fibers. The raceway system is available in six sizes to accommodate 150 to 6000 jumper or patch cables.

Cable exits can be attached anywhere along the main raceway without interrupting it or cutting it up. You simply snap the exit in place on the raceway. With features like these, cable guidance can be flexibly adapted to local conditions in a given room or space. Fiber optic cabling can be shifted or added to without interrupting operations.

The R&M Raceway System can be combined with legacy cable guidance systems. The raceways are made of premium PC/ABS plastic, a material that is resistant to impact and breakage, heat-proof, flame-retardant, resistant to electrical influences, and halogen-free and that complies with the "Restrictions on Hazardous Substances" criteria and the UL2024/V0.

Patrick Schilter
Product Manager, patrick.schilter@rdm.com



The Cat. 6_A module has a special design that makes it reliable and user-friendly.

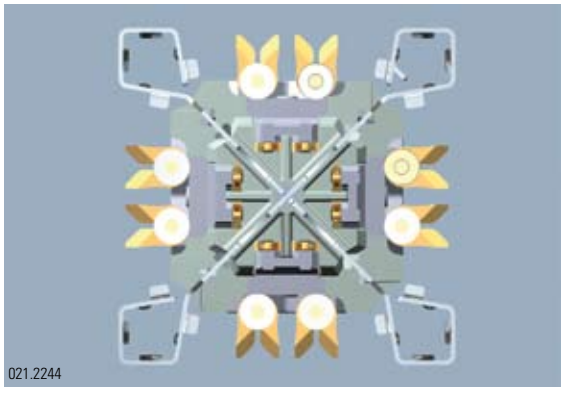
The new generation of RJ45 modules is in high demand. R&M had barely introduced the Cat. 6_A module when the first big contract arrived. Market introduction is underway. The key to the highest performing copper cabling of all time is ready for action.

The Cat. 6_A – with the A written as a subscript in accordance with the ISO/IEC 11801 standard – represents new levels of top performance and greater operating reliability in data networks (see *CONNECTIONS* 37, page 30). And the Cat. 6_A module from R&M is the key to this era. With this revolutionary technology, users enjoy unique advantages in terms of efficient, reliable installation and operation. As the Number 1 for Layer 1, R&M has gone to great lengths to design the most reliable and user-friendly module possible.

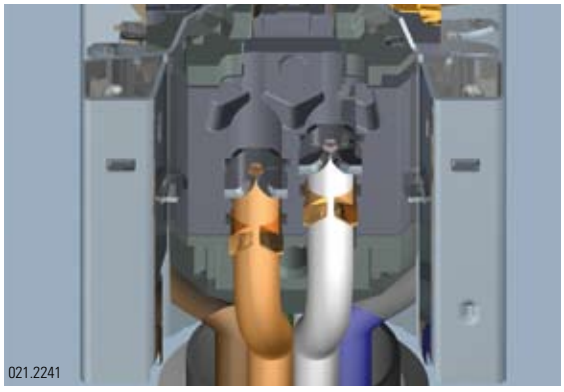
With the color coding, it is clear where each wire belongs.

The Cat. 6_A system from R&M incorporates several new innovations at once. For instance, the R&M Development Lab has found a new way to shield each copper twisted pair in the body of the module. The termination block is pyramid-shaped to ensure maximum spacing between the wire pairs. The X-separator, with integrated metal plates intensifies the shielding effect. Electromagnetic interference for the highly sensitive signals, known as crosstalk between the wires, is avoided to an unprecedented extent. This solution is unique on the market.

The Cat. 6_A module from R&M is designed for quick and easy assembly. The eight wires can be terminated without special tools and with minimal effort. They are conveniently laid in the wire guides. With the color coding, it is clear where each wire belongs. When the termination levers are closed each wire is precisely cut at exactly the same length. This symmetry ensures a consistent signal transmission. The wires are simultaneously pressed into the IDCs and reliably contacted in the process. Visit the special Cat. 6_A pages at *www.rdm.com* and watch a video on the convenient termination procedure for the R&M module requiring no special tools.



Each copper twisted pair is individually shielded in the body of the module.



Wires are terminated and precisely cut at the same time.

Regina Good-Engelhardt
Product Manager, regina.good@rdm.com

FTTH: New Growth with SCM

Springtime for Fiber To The Home. Now there is no limit to the extent fiber optic networks can expand. The new SCM system family from R&M will see to that. Modularity and ease of use will encourage growth in all segments, from central office to access network and building entry point.

The Single Circuit Management System (SCM system) from R&M is all set for takeoff. The market launch begins this spring and will trigger a new boom in FTTH projects. The SCM system family facilitates the efficient expansion of fiber optic networks with a unique approach.

Modular design, logical range and standard quick installation techniques are the keys in this breakthrough for network operators and boost to network expansion. Add to that user-friendly and reliable fiber management that makes it much easier to provide service to subscribers. Practical labeling is another highlight. Besides the large labeling field, numbered and colored clips help operators to maintain an overview. Subscribers can always be clearly categorized.

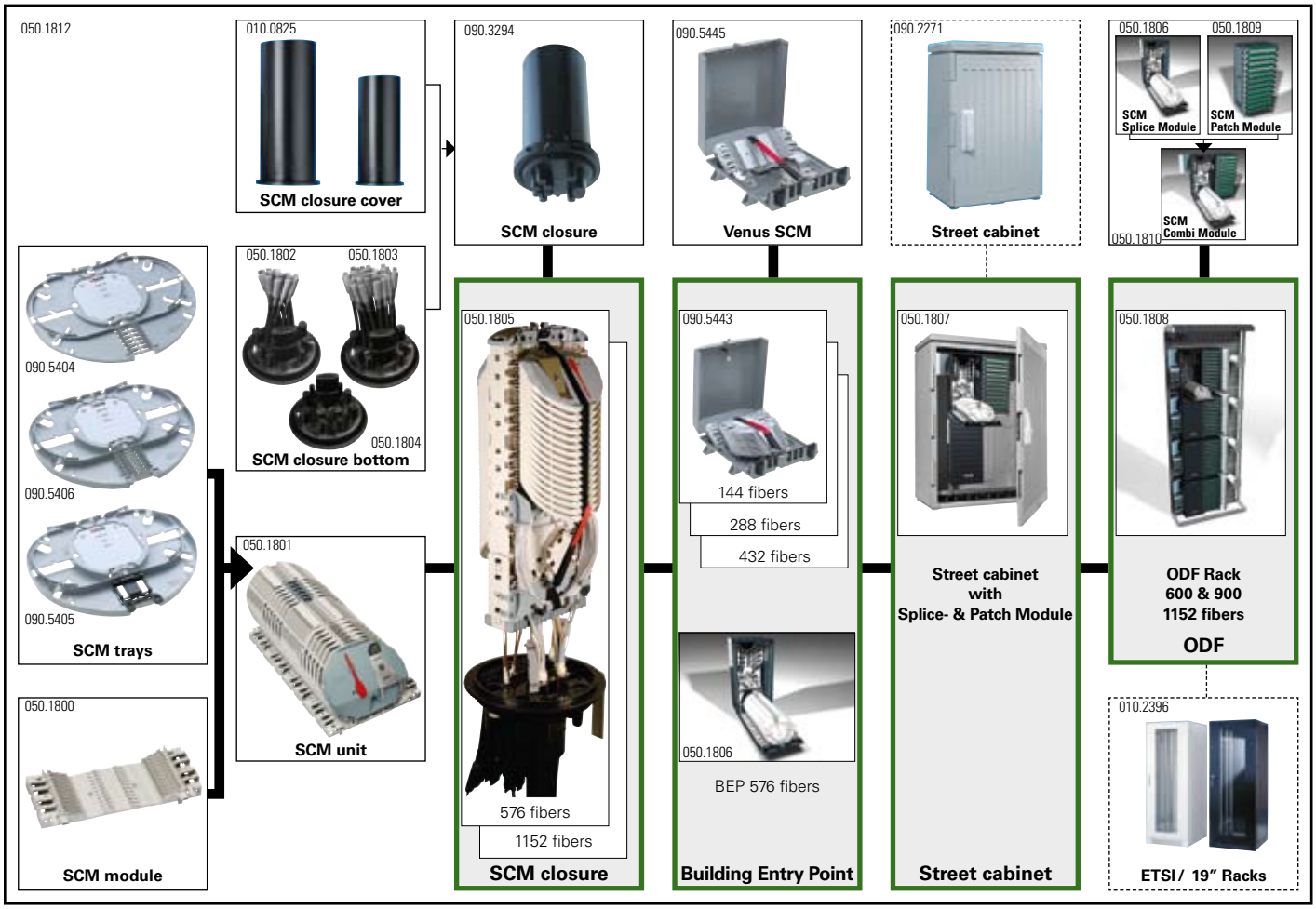
Initially, the compact splice tray system from R&M will be available for R&M splice closures and soon also for optical distribution frames (ODF), street cabinets and cross connection cabinets. The system family has a suitable range for the building entry point, too, in combination with the Venus Box from R&M. In each case, the SCM system ensures a 40-millimeter bending radius, a decisive criterion for quality in future high-power and xWDM applications.

R&M splice closure: potential for 1152 fibers

For the splice closure – a key product for providing service in the last mile – R&M makes available compact SCM modules that can be equipped with all splice tray types for a high packing density. Twelve SC or six SE or splitter splice trays fit on one module and can be combined any way desired. Users can select from splice trays with shrink-fit or crimp-splice protection. Excess length capacity is integrated.

To increase the capacity of the sturdy splice closure that is resistant to moisture and climate influences, you simply attach further modules. In addition, the SCM modules can also be mounted back-to-back in a flat arrangement. The R&M splice closures can accommodate up to eight modules, 96 trays or 1152 fibers or splices.

FTTH System Overview

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Dome closure with SCM


090.5443
Venus FLA SCM

An SC tray (single circuit tray) can be fitted with six fibers. For instance, you use one tray per multi-family dwelling or office building and have up to six fibers available for each apartment or floor. This offers enormous potential for Fiber To The Home, open access and value-added services. Individual end customers can be added with great ease in no time at all.

The SE tray (single element tray) holds 24 fibers so it can be combined seamlessly with the 24-fiber cable. This approach enables network operators to equip individual sections of a city or street with ample ultra broadband access networks or fiber reserves. The SE tray is employed wherever an operator plans to splice cables all the way through or wherever splice trays were previously used. The SE tray can also be combined with different types of splitters. The maximum number of splits per tray is 1:32.

Each component in the SCM solution for R&M splice closures is optimized for quick and convenient installation, from the bottom of the closure through fiber distribution and loose tube deposit to scalable module brackets and handy slim trays.

Venus Box: reliability at the building entry point

For passive FTTH network access in the building, R&M combines the SCM system with the reliable Venus Box. Modularity makes this possible. The solution for the building entry point is called Venus FLA SCM. The slanted arrangement for module mounting allows a high packing density so large residential complexes can be effortlessly connected to the fiber optic network. Twelve SC trays or six SE or SCM trays and splitters can be accommodated in the smallest box. That is the equivalent of 72 or 144 fibers. There are also plans to produce Venus Boxes with double and triple this capacity for SCM trays. The excess length reserve is completely integrated. The raceway can be pushed out all the way, enabling loop installations.

The Venus Box is protected against dust and moisture. It meets the criteria for IP54 protection. The fastening points are on the outside so no dust falls into the housing during installation. The optional lock provides additional operating safety and reliability.

SCM modules will be available for distribution cabinets as an expanded solution for the building entry point. In this case, splice and patch areas are combined in pairs in a single module. One unit accommodates 48 SC trays and 288 fibers or 24 SE trays and 576 fibers.

Quick installation in central offices and street cabinets

Network operators can take a quantum leap to greater efficiency in their FTTH strategy by using the SCM system family for central offices and for street and cross connection cabinets. With minimal effort, the multifunctional modules can be installed in the optical distribution frame (ODF) or distribution cabinet. The click-in system eliminates the need for screws and special tools.

The combination module for the ODF provides a separate splice and patch area in a scalable unit. In addition, there is a breakout module for 288 LC duplex connectors. With the SCM system, it is possible to connect, distribute and manage 1152 or 2304 fibers in the ODF and 288 or 576 fibers in the street cabinet. All common types of cables on the market can be connected: loose tube, blow-in, micro and ribbon cables.


090.2800

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FM45 Satisfies All Requirements

R&M is expanding its FM45 range for industrial applications. The field-terminable RJ45 connector system is now available with metal housings.

An FM45 can be used anywhere. And anyone wanting to facilitate flexible cabling or a special application will find just the right configuration of field-terminable RJ45 connector at R&M. That is because R&M has given the FM45 a whole family of outer housings. They cover protection classes IP20 through IP67. The FM45 consequently serves as a sturdy connector at the office and in building installations, in a manufacturing facility or in an outdoor system video surveillance system.

R&M now rounds off the FM45 range with a die-cast housing. The new metal housing satisfies the requirements for protection class IP20 or environmental classification M1I1C1E1 in accordance with ISO 24702. It withstands acids, alkaline solutions, fluctuating temperatures typical of industry and continuous use at higher temperatures as well as lateral pressures of up to 5 kg. It was developed for cables with a larger outside diameter ranging from 7 to 10.5 mm. For cables with smaller diameters of up to 7 mm, R&M continues to recommend the use of the FM45 with a plastic housing. Tension relief is integrated. The connector system for industrial use meets the requirements of IEC 61918 and complies with the Guidelines of the PNO (the Profinet user organization).

090.5400

R&M solution for industrial Ethernet:
the field-terminable FM45 with a body made of die-cast metal

Bruno Ritter, *Product Manager, bruno.ritter@rdm.com*

Integrated Protection, Reduced Cost

R&M developed the SafeLine network insulator especially for use in clinics. It is a cost-effective solution for galvanic separation.

Strong nerves are essential in a clinic. Information always has to reach its destinations in fractions of a second, even where live equipment is involved. R&M gives clinics strong nerves free of dangerous voltages in the form of the no-maintenance SafeLine network insulator. The module for outlets provides galvanic separation, thereby eliminating a voltage risk.

ISO/IEC 60601-1-1 requires that active equipment, computers, etc. in clinics be fitted with separators so no surges can arise or inadmissible currents flow. This special equipment makes the devices considerably more expensive.

However, if you shift the required galvanic separation into the cabling, you can connect the more reasonably priced standard devices without any risk. Clinics can do just that by installing the SafeLine network insulator from R&M. The module is compatible with R&M outlets and part of the R&M *freenet* modular cabling system sold as a complete solution for clinic cabling.

090.5189

For galvanic network separation in outlets: R&M SafeLine

Bruno Ritter, *Product Manager, bruno.ritter@rdm.com*

"If it's good enough for them, it's good enough for us!"

R&M's Iberian office and one of Spain's top manufacturers of outdoor cabinets, Casbar Tecnologia Industrial, S.L., have long collaborated together to supply integrated outside distribution points to Casbar's telecommunications clients.

Casbar was so convinced by the quality of R&M products they regularly integrate into their own offering that they themselves recently decided to install a complete R&M LAN solutions for their own new Spanish headquarters, opened near Madrid in April 2009. The project involved a voice and data network installation for workplace connections (including R&M's pioneering Cat.6_A, VARIO*LINE* and color-coded security products) throughout the 15 000 m² building complex that houses the admin offices, production plant, logistics and distribution section, R&D lab, etc.

The Spanish have a saying – "In the blacksmith's house, a wooden knife". Not so in this case.

The Casbar company HQ: one of Spain's top manufacturers of outdoor cabinets

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R&M Supports Logica India to Keep its Momentum Going

Logica provides services in system design, applications and product development, applications management, infrastructure Management & BPO. Logica's Chennai facility in India is the fifth in the global Spark series, and focuses on ITS-based (Intelligent Transport Systems) solutions.

A competitive process of selection and testing by the IT managers, in which several suppliers' products were tested, saw R&M emerge the winner. Today, the R&M solution spans 6000 network terminations offering copper and fiber networking connected through a single fiber backbone across various floors. R&M cabling solutions and equipment were chosen for the Logica Chennai facility due to their superior technological excellence and reliability, and due to R&M's strong local presence guaranteeing on-time delivery of components and the presence of competent certified installation partners.

> *"Logica was very impressed with the technical solution and the design proposal for their office & datacenter network from the R&M technology team and R&M Certified Installation Partner."*

Why R&M?
- Reliability
- 20-year system warranty assured by R&M
- R&M certification of installers
- LS0H cabling components

You will find the full article on our website:
www.rdm.com > case studies > IT

Chennai is India's fifth largest city and lies on the south-east coast of the subcontinent.

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Paris La Défense Renovation of CB21 Building

With 75 000 m² of office space, this 187-meter-high emblematic building (formerly the "Tour Gan") is an integral part of the Paris La Défense business area renovation program. As a pilot site for the HQE Operations certification, it is fitted with state-of-the-art technical equipment.

INEO – GDF SUEZ Group, a leader in electrical engineering and information and communication systems, has been appointed as the prime contractor for installing the building's network infrastructure. The selected solution, Real10, is a comprehensive 10 Gigabit Ethernet solution – with R&M's full 20-year guarantee – which combines both copper and fiber-optic links. The project involves the installation of a cabling system consisting of 9300 links in a very tight timeframe, while ensuring high quality and performance.

"In evaluating the various tender bids, we were convinced by R&M's preconnectored solutions. In fact, the PREKO technology provided by Azenn* allows a high level of responsiveness. This ensures that we will have the right cable lengths for each floor delivered on site! The positioning of this offering in terms of price, the proximity of workshops as well as our knowledge of products and people, dictated our choice," said Pascal Rauner, Large Projects Manager for INEO Provence & Côte d'Azur.

"We trust R&M for their meeting deadlines and reliability; in just six months, 22 floors out of 24 have been completed according to our schedule," added Project Manager Pascal Dantzer.

* Azenn is a distributor specializing in infrastructure solutions for IT and telecommunications networks.

Pascal Dantzer – INEO Provence and Côte d'Azur

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The High-Performance Infrastructure Owner and Multiplatform Services Provider

View of a data center

(Left to right) Mihai Ciobanu, Project Manager; Cosmin Tudor, ICT Operations Manager; Laurentiu Duma, Technical Facilities Manager; Cristina Deac, Rep. Office Manager R&M; Viorel Delinschi, Business Development Manager; Dora Vidrighin, Sales Manager Private Networks R&M

Star Storage is taking advantage of the current outsourcing trend by providing its customers in Romania with corresponding services. The basis of their offer is a state-of-the-art data center that was planned and built in close cooperation with R&M Romania.

Star Storage was set up 10 years ago as a document management and storage solution supplier. In 2008 the company decided to follow the current trend and attract companies considering outsourcing their non-core business, such as data/application protection and document management, and offer them the relevant services.

As a consequence Star Storage invested in a high-quality infrastructure and elaborated service packs for SaaS, ASP, SSP, IaaS, MSSP and MSP. These targets materialized in a Tier III Data Center in accordance with TIA942, located in one of the most secure buildings, the FEPER Business Center, in the capital city of Romania, Bucharest. Together with the infrastructure and services, companies hosted in this data center are becoming compliant with current Disaster Recovery and Business Continuity regulations.

Start Storage's hosted customer perspective: reducing time to market

Once businesses have outsourced their non-core activities to a reliable infrastructure and multiservice platform supplier, they can focus on main targets: This makes them stronger and faster to market than if they built their own infrastructure. Reducing costs with equipment and IT in general, allowing managers to properly control budgets linked to IT, brings security to the business in these current times of unpredictability.

A joint Star Storage and R&M Romania team was established to create the physical infrastructure of the data center. The main target of the team was to create a solution answering today's demands and allowing future developments without any disruptions.

The design started with a detailed evaluation of the applications the data center was expected to run. The next step identified three types of service: telecommunication services, storage and network management. The possibilities of a 10 Gigabit Ethernet in the fiber-optic area were investigated.

The data center currently consists of 78 equipment outlet cabinets (EOs) distributed in six rows, two horizontal distribution area cabinets in each row, one for switching links terminations and one for SAN links terminations, redundant main distribution areas each consisting of three cabinets for routing, switching and core services links terminations. The optical distribution frame, placed in a different room, consists of two redundant cabinets, one for

the outside plant fiber termination accommodating the incoming lines from the telecom providers and the second to connect the data room to the relevant services, allowing maximum modularity and flexibility in creating the connections.

To evaluate the necessary requirements in the connectivity of each area of the infrastructure (EO, HDA, MDA), the planning team first determined the requirement of every individual EO when fully equipped with servers, then the influence of these servers on the SAN services and the requirement of each server in terms of telecom services and, on this basis, then calculated the necessary capacity of fiber optic connections between the individual EOs and the corresponding HDA and finally between every HDA and the two redundant MDAs. In terms of the ODF planning, the redundancy criteria were first determined and then the possible quantity of services offered.

Overall, at full capacity, the data center will have 6906 fiber optic links and 288 Real10 Cat. 6 links in the data room. First estimations suggest the ODF will host about 10 service providers each with two incoming links supported by different Network Operation Centers.

The monitoring rooms have been connected to various other systems with Real 10 Cat. 6 solutions, including R&M's security system.

"Number 1 for Layer 1"

Conclusions

The exemplary cooperation led the Star Storage – R&M Romania team to success. The fact that both teams share the same values, readiness to learn and proactive attitudes, made work easy and provided benefits such as excellent TCO (Total Cost of Ownership) as far as Star Storage's investment is concerned and recognition of R&M in Romania as a "Number 1 supplier for Layer 1".

R&M *E-2000™ connectivity with color coding

R&M VARIO*line* solution

R&M's high-density solution with horizontal patch cord management in 1U

*E-2000™, manufactured under license from Diamond SA, Losone.

Why R&M?

- Local support team able to understand the demands of data center applications and create the right solution with respect to international standards
- Understanding the customer's business model and responding to it with the right modular and flexible approach in design
- Getting involved in all project phases from design to the final testing

R&M products used

- 19" FOM distributor 40U, 900x2000x400 mm ODF
- Fiber module 7HP, metal, splice, 12 x *E-2000™ G.652.D, APC, ceramic, C/1
- MPO module 7HP, metal, 6xLC-Quad G.652.D, APC/APC, ceramic, D/3
- MPO module 7HP, metal, 6xLC-Duplex G.652.D, APC/PC, PhBr, D/3
- Fiber module 7HP, metal, splice, 6xLC-Duplex OM3, PC, PhBr, M/4
- R&M security system/color coding
- VARIO*line* preterminated fiber optic cables, OM3 with LC connectors
- Trunk cable 12MPO – 12MPO G.652.D, APC, D/3, 45 m
- Real10 Cat. 6 links for the monitoring room and the switch management

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The Einstein, Hotel & Congress, St. Gallen

The Hotel Einstein, the top address in St. Gallen, expanded its hotel operations and built a new congress center and fitness and wellness park. The Einstein satisfies the most demanding standards of quality and turned to ETAVIS Grossenbacher AG and R&M for installation and cabling.

St. Gallen is known as a global center for textile design. As home to HSG, one of the best universities in the world for business administration, economics, law and social sciences, the city is also always abreast of the latest developments in politics and economics.

Einstein: hotel, congress center and fitness park

The Einstein St. Gallen is the leading hotel in the city and a veritable institution locally. Until now referred to as the "mini grand hotel", it has now opened a modern congress center as well. The Einstein combines congress facilities, hotel and fitness park in a single establishment.

The handsome neoclassical hotel building with its textile past was renovated. Two new buildings sprang up alongside it: an elegant congress center with an ultra-modern infrastructure and a fitness park.

The hotel has 113 rooms and suites offering first-class comfort. The congress center has a concert hall with seating for 300, a banquet hall for 440, a plenary chamber for accommodating 150, five flexibly configurable conference rooms for up to 90 people, seven break-out rooms for up to 25 people, and one board room.

The 3000-square-meter fitness and spa facility boasts the latest generation of fitness equipment, Asian baths featuring a crystal bath heated to 36° with a transparent floor, a roof garden, an organic sauna, an ice room, a steam bath and much more of what the guests' hearts desire.

Unsurpassed quality for unsurpassed comfort

When the Einstein came to choose materials, equipment and network, only the best was good enough. Stunning interior design is evident in all the rooms. The Einstein sets new standards with marble, elegant cherry wood and textiles of the finest quality in keeping with the venerable tradition of St. Gallen as a textile center.

All hotel rooms have large flat-screen television sets. All seminar/conference rooms are fitted with audiovisual systems satisfying the full range of requirements and able to accommodate all possible types of equipment and interfaces. One room has what is currently the largest flat-screen plasma set in Switzerland. The board room is equipped with a top-of-the-line video-conferencing system. The Einstein also guarantees maximum safety and security for its guests and operates a video surveillance system in

The elegant congress center has absolute state-of-the-art infrastructure.

HD quality. All rooms, even the smallest, have a coffee machine and built-in refrigerator, further proof of the hotel's customer orientation!

Top quality also extends to IT and cabling

A project with the quality standards of an Einstein has to incorporate top IT as well. Head of IT Sascha Menzi: "Quality and flexibility are top priorities for us. That is the only way I can ensure all applications for today and tomorrow from an IT standpoint!" The solution provided by R&M covers the entire LAN including a data center. Besides the usual applications, all multimedia systems are run over the LAN, as are video surveillance, the visitor information system and the W-LAN. The multimedia facility contains the hotel video system, too. CATV panels are used there to provide full coverage.

> *"I have always been able to rely completely on R&M!"*

Electrical planners were invited to tender in 2008. ETAVIS Grossenbacher AG and R&M were awarded the contract because the Einstein Hotel had always been highly satisfied with their service in the past.

Head of IT Sascha Menzi: "Our existing cabling was also taken care of with material from R&M. As this material was professionally installed by ETAVIS Grossenbacher AG, I have always been able to rely on it completely for the last ten years."

Planning was a major challenge because changes were constantly submitted as the project progressed. Max Morach, telecom project manager for the installation company ETAVIS Grossenbacher AG: "I have already been working for a long time with products from R&M and enjoy doing so. Both our companies are high-end firms and are accustomed to meeting the toughest quality expectations. I have always been able to rely completely on R&M!"

The congress center has been well received, even better than expected, and already enjoys a large number of guests. One of the first special events staged there was the launch of the new BMW X6. Sascha Menzi grins as he recounts the preparations: "We were able to get the vehicles from the road into the large hall without damaging anything."

Technical data

- 70 kilometers of cable
- 1700 ports
- Real10, shielded
- 23 CATV panels for CATV transmission via twisted pair

For more information

http://www.einstein.ch

A good team: Herbert Stoffel, Sascha Menzi and Max Morach (left to right).

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Steady Growth with Ups and Downs

The new training center is an example of the realization of corporate architecture.

Schindler is a global corporation known for its premium human transport systems. It recently moved into a new training center at its headquarters in Ebikon, Switzerland. Fiber optic and copper products from R&M were used for the structured cabling in the building.

Founded in 1874, Schindler Holding AG with headquarters in Hergiswil in the Swiss canton of Nidwalden today employs some 43 000 people in 130 countries and six continents. The company specializes in planning, manufacturing, building, installing, servicing and modernizing transportation systems for people in nearly all types of buildings. The traditional Swiss company transports about 900 million people a day worldwide.

Schindler is among the top ten companies in Switzerland based on size of workforce and in the top twenty based on sales. Elevators and escalators are the two key business segments. Together, they accounted for 62 % of total sales in 2008. Schindler Holding also holds a 64 % stake in Also Holding AG, a provider of logistics services. Schindler is the world's biggest maker of escalators and moving walkways, and the second biggest producer of elevators following the Otis Elevator Company.

Training worldwide

The global Swiss corporation recently moved into a new building at its headquarters in Ebikon, the Technology Training Center, known as TTC for short. This five-story structure houses the corporate learning and development activities and the program for master trainers, who are trained there and then sent out to teach colleagues around the world. The TTC has a total of 18 elevators. Three are for building operations, seven are for tests (maximum performance, heat, smoke, etc.) and the remaining eight are for training.

The new training center required reliable and flexible high-performance building cabling for LAN (Local Area Network), data center, video surveillance, video conferencing systems and phone equipment. The in-house building management department has an electrical installation sub-department that is usually responsible for installations. Its main task is to make arrangements for the many reassignments. Each year there are 1000 to 1200 reassignments at headquarters in Ebikon, where some 1500 people work. In other words, each employee receives new assignments every 16 months on average. Dynamic organizational development is the reason for this figure. New teams are put together, task forces formed, new products developed.

Strong partnership

The capacities of the electrical installation sub-department did not suffice for handling the structured building cabling in the TTC. In the course of an evaluation, a decision was made to bring in an external partner to do this job. After checking several suppliers, Schindler opted for the Freenet system from R&M and for two certified R&M partners to handle planning and installation, namely Herzog Kull Group in Rotkreuz (planning) and CKW Conex AG in Lucerne (installation). For Peter von Rohr, Head of Electrical Engineering at Schindler, perfect installation and perfect products are top priorities: "Installation has to be first-class. After all, my team and I are responsible for the network operating flawlessly and trouble-free." Further key arguments in favor of R&M were quality and product performance, the complete range and the excellent service. Schindler also greatly appreciates and likes to use the R&M color coding system for ensuring correct connections.

The distribution spaces on the five floors are flexibly designed in order to accommodate any expansions that may occur. As a result, the network can be used for existing applications as well as for future ones.

Bird's Nest National Stadium, Beijing: Schindler supplied 175 elevators and escalators for the 2008 Summer Games, including 16 escalators for the Bird's Nest National Stadium.

Schindler supplied 27 marine elevators for Costa Luminosa, including scenic elevators decorated with rose crystal and sculptured glass.

Escalator in Caracas: Zona Rental de la Plaza Venezuela (subway station), Caracas, Venezuela

Elevator lobby showing Schindler's Miconic 10 destination control system: It calculates which elevator will reach which floor fastest, and directs passengers to the car taking the most direct route to their floor. The desired floor is punched in before the passenger enters the elevator.

Hong Kong's tallest building, the International Commerce Centre (ICC): At 490m, its 118 floors will be served by 81 Schindler elevators and 38 escalators.

New York's Hearst Tower, one of the Big Apple's most environmentally advanced buildings, is equipped with Schindler elevators.

R&M network for Schindler training center/R&M products used:

- Campus cabling (buildings interconnected among each other) and vertical cabling: fiber optic
- Tertiary cabling (horizontal): Cat. 6 Star Real10 STP (shielded twisted pair, i.e. shielded copper cabling), for 10 Gigabit Ethernet
- 48 port panels
- RMS splitters (one link is split into four phone lines)
- ST connectors (fiber optics)
- 1U racks for fiber optics
- VS modular splitter for telephony

The RMS45 splitter/cable sharing solution from R&M for standard RJ45 sockets:

The product consists of a microsplitter and field-terminable connectors for patch cables. With the RMS45, cable sharing is easier than ever. The structured building cabling already installed remains unchanged. The splitter is used only in places where multiple link uses are really required. If the need for cable sharing disappears, the RMS45 can be removed and used elsewhere. With the double-pair connector in the RMS45 model, an outlet can be put to double use, e.g. concurrently as a LAN connection for a PC and as a VoIP terminal. With the single-pair connector, up to four services, e.g. phone lines, can be made available at one R45 outlet.

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DAS Renews the Cabling at the Head Office in Amsterdam

The DAS head office in Amsterdam (Photo: Barend de Keijzer)

The information flows at legal aid insurer DAS have changed drastically during the past 20 years. As a result the ICT infrastructure had to be completely replaced. That was a complex job which had to be carried out without hampering office activities. DAS opted for installers HIG and for R&M cabling systems.

The Dutch insurance company DAS offers legal aid insurance, legal advice, collection services and consultancy, and training and reassignments in the field of credit management to private individuals, small and medium-sized businesses and lone independent entrepreneurs. The company has more than 1500 employees at offices nationwide. The network cabling in the head office in Amsterdam is about 17 years old. As Robert Balk, ICT management advisor at DAS, explains, "Our telephone and data exchange activities have grown exponentially in recent years. In addition, we are now offering new collection activities from fifteen or so branches which have been, or still have to be, connected to the network. It was time to review the situation."

John de Zwart, Senior ICT Manager at DAS, adds, "We decided to tackle the entire infrastructure, including the active network equipment. This would give us a consistent network for voice and data which could cope with new developments and would allow sound management."

Hot swap

Recabling is a drastic operation in an active environment. As Robert Balk clarifies, "Due to reasons of costs and continuity, we opted for a 'hot swap', that is the complete swapping of the ICT infrastructure without anyone having to move and without interrupting anyone's work."

HIG installers from Reeuwijk turned out to have the right track record as regards work in fully operational environments. In the words of Robert Wisseloo, ICT advisor at HIG, "In order to

guarantee the high quality requirements and required support as regards the supplier, we based our offer on R&M cabling systems. We know that R&M distributor Forehand in Rotterdam not only supplies, but also provides instructions on materials, tools and assembly methods. This was an extra guarantee."

> *"The references and the value for money aspects were also excellent."*

(Left to right) Robert Wisseloo, installer at HIG Telcommunicatie; Robert Balk, DAS Rechtbijstand Amsterdam

Choice

DAS supported that choice, as Robert Balk explains: "We first looked for quality and durability. We found what we were looking for in the cables and the construction of the connectors of R&M, in the security options, such as the interlocking to the connectors and the official R&M certification at the end of the process, on the basis of validated measurement data. The references and the value for money aspects were also excellent."

The activities were completed within four months. In the words of Robert Wisseloo, "It was a concerted effort on the part of the installers and the users of the offices. For example, we carried out the work we had to do in the call center between 6 and 8 in the morning."

Approach

The work was carried out in one tower at a time, starting at the top and working downwards. A specialist company made sure that the ceiling tiles were removed at the right time. Meanwhile, HIG laid the old cables next to the cable ducts so that the new cables could then be fitted directly in their place. At the same time, electricians installed the required 230 V cabling. The cabling was installed and tested and was then ready for use by DAS. At that point the old cabling was removed and the ceiling tiles replaced.

"We regarded voice and data consistently as a single unit. This meant that the single old network cable was replaced by two STP cables. The relatively small diameter of the protected R&M Cat. 6A cables meant that they still fitted in the existing cable ducts and could generate 10 Gbps performance which is the current maximum," Wisseloo explains.

Space for extras

John de Zwart believes there are also substantial benefits from the network management point of view. "Thanks to the much greater port density on the R&M patch panels, we were able to use four units instead of six. This, together with the virtualization of our servers, generates a great deal of space. Suddenly you have 'room' for the future. On top of this we prepared connections (consolidation points) for work islands – out of sight above the ceilings in all the offices. Should these be needed we can simply install a feeder pillar. Plugging in is then all that is required to activate eight new data connections." Robert Balk adds, "Telephony is one of the mainstays of DAS's existence. The new network is also suitable for Voice-over-IP and that offers all kinds of extras."

Communication

Robert Balk regards communication as one of the most important ways in which to bind people to the project. "All DAS employees were kept fully up-to-date via our Intranet. John and I were always around and available to answer questions and whenever a work location was about to undergo the switch to the new cabling, we always informed the people who would be affected." He concludes with the words, "The new cabling at the head office is a new and solid foundation for two essential DAS mainstays, namely data and telephony."

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New Toyota showroom

Third-party system certification

Toyota Egypt ensures itself a robust end-to-end cabling solution and high-performance network thanks to R&M's Swiss quality and innovative network cabling solutions. Toyota Egypt now has in place an integrated multibranch network equipped with maximum performance and flexibility for future expansion.

Recently El-Salam for Engineering Equipment (QUIP), a well-known Egyptian systems integrator, completed the new data center for Toyota Egypt, implementing R&M's enterprise cabling. The resulting installation provided Toyota with best of breed network components and the highest cabling specifications.

Thus Toyota Egypt once again selected R&M, this time to provide an end-to-end cabling solution deploying its enterprise cabling portfolio throughout Toyota Egypt's branches and service centers across the country. Toyota Egypt is part of the regional Middle East conglomerate Al-Futtaim Group and is the sole distributor for Toyota Motor Corporation products in Egypt with full service centers nationwide for sales, service, and spare parts. The company has a total of six branches/centers in Egypt with three in Cairo, and three in Alexandria.

With QUIP as the installer, work on the branches began at the beginning of 2009 and all branches were completed in less than six months. QUIP has experience with a number of key installations in a wide variety of sectors such as oil, banking, telecoms, education, and the governmental public sector. Each technical team member is also a certified R&M installer.

Maximum network performance

The entire project includes the implementation of the entire network infrastructure and backbone with R&M's advanced enterprise cabling products including R&M Cat. 6 copper cabling and fiber OM2 cabling throughout Toyota Egypt's six branches and service centers across the country. Additionally, selected branches are also deploying R&M's new revolutionary Real10 Cat. 6A solution.

Toyota Egypt opted for the innovative Real10 Cat. 6A solution to ensure maximum network performance and enhanced operating reliability for those branches that would be seeing large amounts of network traffic within its multibranch network. Overall, R&M's Real10 Cat. 6A solution will enable Toyota Egypt's corporate network to obtain substantially more bandwidth and transmission quality in the long term.

"We sought a complete end-to-end solution."

"Our network infrastructure requirements were quite rigorous. We sought a complete end-to-end solution coupled with high-quality components and performance, and flexibility for future planning," said Hossam Ismail, IT Director, Al-Futtaim Group, Egypt. "Given our criteria, R&M was the clear choice due to their advanced cabling product portfolio, zero-defect components, and forward-looking designs."

Left to right: Mr. Mohamed El-Saadany (Toyota), Mr. Alfred Tharwat (R&M), Mr. Hossam Ismail (Toyota IT director), Mr. Alaa Mohamed (QUIP), Mr. Ibrahim Sadek (QUIP), Mr. Mohamed Abdelkawy (Toyota)

Reduced EMI

To provide Toyota Egypt's network sufficient protection against external EMI (electromagnetic interference) and ensure less power loss by reducing the radiated signal from the cable, R&M's Real10 Cat. 6A shielded copper solution (STP) was installed.

Shielded cabling was also preferred by Toyota Egypt due to its scalability and flexibility to handle future data transmission speeds and demands on the network and has the advantage of reducing the effects of electrical hazards when properly grounded and bonded.

The R&M Real10 Cat. 6 connection module also represents innovations in EMI reduction. The R&M Real10 shielded Cat. 6 module features 360° shield coverage with lead-free coating along with fast and simple patented shield contact with integrated cable strain relief.

R&M's Real10 STP Cat. 6 channel complies with the latest cabling standards (Class E_A requirements of amendment 1 of the second edition of ISO/IEC11801 and Category 6A requirements of ANSI/TIA/EIA 568-B.2-10) as well as the transmission requirements of the IEEE P802.3an standard for 10 Gigabit Ethernet.

To ensure a future-proof investment, the Real10 Cat. 6 module's ability to greatly eliminate electromagnetic interference enables future high-performance data transmission even beyond today's 10 Gigabit Ethernet standards.

Optimal planning flexibility with R&M

Network planners can also be assured that R&M's advanced cabling product portfolio allows for extreme flexibility while planning their networks. R&M backs its products with continuous R&D to ensure that its products overcome current and future network constraints.

> *"Forward-looking components such as R&M's are giving our clients a maximum ROI."*

"Clients such as Toyota Egypt recognize the importance of using high-quality, forward-looking components such as R&M's, as they ensure our solutions remain compliant to the latest industry standards, giving our clients the maximum ROI," stated Eng. Alaa Mohamed, Sales Manager, QUIP.

"R&M's zero-defect components and overall design philosophy greatly contribute to the ease of our network installations, allowing for trouble-free implementations in record time," added Eng. Ibrahim Sadek, General Manager, QUIP.

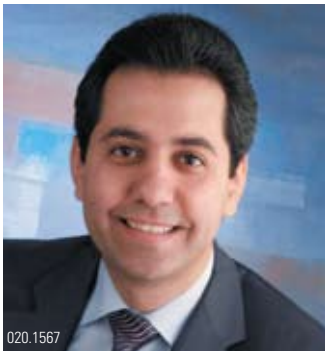
We're extremely pleased Toyota Egypt chose R&M as their network cabling provider. R&M's well-known Swiss quality and innovative solutions such as our Real10 Cat. 6A solution were certainly determining factors for Toyota Egypt as our solutions are proven to deliver maximum speed, performance and reliability.

Why R&M?

- Performance
- Reliability
- End-to-end solution
- Quality
- Planning flexibility

R&M products used

- Cat. 6 UTP connectivity
- Real10 Cat. 6 STP connectivity
- Fiber backbone (OM2)



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Structured Connection for New City

Al Wahda City 1

Although Dubai may be the poster child for development projects in the UAE, sister emirate and capital Abu Dhabi is almost as busy, with numerous ambitious plans for green-site developments and refurbishment of parts of the capital.

Although new project announcements may have slowed in the current economic conditions, we're now seeing a string of developments announced a few years back at commission and handover stage.

One of these is the Al Wahda City 1 project, due for occupancy in Q1/10 – a purpose-built, multiuse residential and business development centrally located in Abu Dhabi opposite the Abu Dhabi Bus Station. The project is owned by Al Wahda Sports Club and is conveniently located near the Al Wahda Mall.

Main contractor CIVILCO (Civil Engineering & Contracting Company) appointed the contract for MEP on the project back in March 2007 to Thermo LLC, comprising three tower blocks with common basement levels. The multiuse property contains:
- a double hotel block
- a 31-floor residential tower
- a 32-floor office tower

The development has been described by the developer as "modern sophistication offering a full range of amenities and services for the discerning consumer". Consequently the provision of state-of-the-art communications, security and entertainment services was essential to the project's success. And with future flexibility of use a possibility, future-proofing of the network infrastructure and cabling system was essential.

Customer overview

Thermo LLC, founded in 1976, is a leader in MEP (Mechanical, Electrical and Plumbing) engineering and contracting. It offers high-quality, comprehensive services as a single or multiservice engineering contractor for both small and large projects. Headquartered in Dubai, Thermo maintains offices in Abu Dhabi, Sharjah, Al Ain and Doha, Qatar. It has an annual turnover of DHS 3 billion. Other recent projects include Terminal 3 Dubai Airport, Motor City (Dubai), Abu Dhabi Financial Center and Al Masa Tourist Complex (Al Ain)

Project Manager overview

With valuable and sensitive information being stored, processed and communicated, and sophisticated software controlling many security systems, information technology is a vital element in any organization's security. The G4S IT division is at the forefront of this field. Since 1994, G4S has been providing its services to the UAE governments, embassies, banks and over 750 companies across the UAE. On a global scale, the company operates in over 110 countries and employs more than 570 000 people. In UAE it has around 10 000 staff and offices in Abu Dhabi, Dubai, Sharjah, Al Ain , Rak Al Khaimah and Fujairah.

Enabled services

- IP telephony for hotel rooms, offices and residencies
- Data network in offices
- High-speed Internet access

Equipment installed

- 84 km Cat. 6 UTP
- 2615 Cat. 6 connection modules
- 687 16- and 24-port patch panels
- 9120 1.5-meter Cat. 6 patch cords
- Fiber optic solution for the backbone

Key customer benefits

- One-stop supplier
- Future-proof investment
- Reliability of customer-facing solutions
- Easy migration path to 10GB Ethernet
- Full IP support across the network
- Cost efficiency
- Flexibility in delivering future services

(Left to right) Mohamad Jahmi, Projects Engineer, G4S; Ahmad Issa, Operation Manager, G4S; Hassan Alayoud, Senior Electrical Engineer, Thermo L.L.C; Abdul Rahiman Poonathingal, Team Leader, G4S

To design and implement the physical network, Thermo appointed cabling specialists R&M, Dubai-based but with wide experience of major projects across the region and an enviable reputation. Key evaluation criteria were scalability, flexibility, efficiency and long-term reliability. Thermo had worked with R&M before and so knew that the products and support matched these criteria. In fact, as soon as winning the tender, R&M engineers became fully integrated with the design process and became involved in testing other vendors' products to ensure compatibility and efficiency.

R&M had also worked with the project management company G4S a number of times over the previous decade, most notably on the Dubai Palm. In fact, G4S' 14 branches across the UAE all have R&M products installed, so there was familiarity with the R&M product range.

The network had to support both the data center and security systems as well as business systems such as Internet access and multimedia. The backbone consists of Cisco core layer and multilayer switches, with fiber connectivity. R&M delivered multiservice accessibility based on this backbone to 7782 network access points throughout the various towers.

The network roll-out began in November 2008 and lasted 14 months, with no implementation problems. R&M is now moving into the support phase. A 20-year warranty has been offered for all R&M products installed.

"R&M products are easy to use."

Although the design and implementation were not particularly complex, a critical part of the network design was the option of network extension and incorporation of new networks and services in the future. "Important to us was also the ease of use of the R&M product set," explains Gerald Martis, Sr. Project Manager, Thermo. "While some vendors' products are hard to manage, that's not the case with R&M."

Because structured cabling systems lay out a platform that serves as a starting point for information and system building, a flexible interface using standardized elements allows the easy integration of data, audio, video, multimedia or a combination. "In my view, all new businesses should use structured cabling systems to ensure quick and reliable operation that stays on top of the competition," adds Alaa Darwish, Sales Manager, Private Networks, R&M.

However, key to that success is early involvement in the planning and design process. R&M consultants brought their expertise to the project because getting data and voice cabling in before walls are finished is critical to cost efficiency. From initial plans, R&M enabled changes to the installation, including consistency of delivery, support for multivendor equipment, simplified troubleshooting, simplified updating and future-proofing for new application roll-out.

For future upgrades, the standardized components at the heart of the R&M system will be easier as well. Support for any future applications will require at most only minimal updates. Usefully, many G4S team members are QPP certified – R&M's training program that guarantees quality control across the whole installation and maintenance lifecycle.

"R&M deals very professionally with partners and customers."

"R&M deals in a very professional way with partners and customers. We are seeking in the future to deliver the most fascinating technology to the end user," Gerald Martis, Sr. Project Manager, Thermo.

Alaa Darwish
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Networked Wind Turbines

Anyone trying to produce power out at sea needs extra sturdy cabling. Planners chose R&M solutions for BARD Offshore 1, the future wind power station off the shore of the German island of Borkum.

Over the next several months, one of Europe's first offshore wind power stations will be built 40 nautical miles northwest of the German island of Borkum. By the end of 2010, a total of 80 wind turbines, aka wind power plants (WPP), will be set up in the North Sea. They will form a gigantic grid that will extend over 60 square kilometers of the sea and produce 400 megawatts of electrical energy.

This power has to be monitored around the clock during storms and in heavy seas so operators and power utilities can make optimum use of the offshore power station. To that end, each WPP will be integrated in an efficient and indestructible information network that all comes together at the staffed BARD 1 platform.

IT Head Oliver Becker at BARD Engineering in Emden, the planning and operator company: "From the standpoint of IT, what offshore mainly means is remote maintenance and remote control to ensure safety and efficiency." Extensive and highly available data forms the basis of continuous economical operation: data on station status, on the substation, on the grid, on maintenance work, or on the age and construction of individual components.

Unique alliance of expertise

From the very start of planning, the BARD Group brought in experts from a variety of areas relating to network and informa-

A BARD offshore wind turbine has a total height of about 152 meters; the rotor has a diameter of a good 122 meters. (Source: BARD-Group/Meyer)

Machine holder in the assembly area for the BARD wind power plants in Emden: The cast-steel parts are about six meters in height and each weighs more than 70 tons. (Source: BARD-Group)

The top site for the BARD residential and transformer platform during the construction phase at WSY dockyard in Klaipeda, Lithuania: On completion, it will be installed in the BARD Offshore 1 wind park. (Source: BARD-Group)

Offshore rotor blades in front of the factory at BARD Emden Energy GmbH & Co KG: Each blade is nearly 60 meters long and weighs about 28 tons. (Source: BARD-Group)

Modular distributor solution for the BARD platform

tion technology. Two of these experts were R&M and the Vater Group, a renowned specialist in IT systems and a certified R&M partner. The setup of the wind farm is therefore being guided by an internationally unique alliance of expertise, which ensures that the best solutions are found for a station operating on the high seas. The scale of electricity production from wind power planned for BARD Offshore 1 would hardly be conceivable without this community effort.

Sea cables connect the wind turbines to the platform. They contain copper conductors for energy transmission and optic fiber for data transmission. R&M splice closures serve as transition points between sea cables and fiber optic cabling at the platform. Sea water and aggressive sea air are unable to harm the sturdy splice closure housings.

For the data network on the platform, the Vater Group selected high-quality fiber optic and copper solutions from R&M. The modular design of the R&M range greatly simplifies planning and installation. A high-density optic fiber connection also had to be devised as a solution to meet the special needs on the platform. R&M was able to adapt its multifunctional Fiber Module to fit this purpose. It accommodates 24 single-mode fibers and six LC quad adapters. That means 288 fibers can be installed at a 3-U level.

BARD Engineering will use further customized versions of the UniRack splice storage unit and the Fiber Module to establish the communication connection to the connected power utilities and maritime authorities.

Seaworthy distribution cabinets

There are even plans to install fiber optic cabling into the wind power plants. This cabling must withstand the harsh climatic conditions at sea and the enormous torsional forces that occur in the towers and turbine installations. To this end, R&M is supplying strands of specially reinforced and completely pre-terminated fiber optic cabling. R&M also teamed up with network specialists from the Vater Group to develop a seaworthy fiber-optic distribution cabinet made of metal for mounting on a top-hat rail.

Convinced of the quality of R&M solutions, BARD Engineering has in the meantime taken further steps. It set up a large part of the local data network at the manufacturing sites with cabling systems from R&M.

BARD Engineering is now looking ahead to the near future with great anticipation and confidence. The date for putting the installation into operation is fast approaching. There will be many lessons to learn from the initial experiences the teams have with the wind farm. Oliver Becker from BARD Engineering: "Power on this scale also has to involve responsibility." It is precisely this responsibility that is evident in the partnership with R&M and the Vater Group. Oliver Becker: "Together, we are all rolling up our sleeves and getting to work."

Jens Hertwig
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Leading the Fiber Optic TV and Networking Market in Poland through 10 Years' Partnership

A data center at UPC

In the highly competitive world of networking services, carriers must strive to create the most efficient, reliable and lasting network infrastructures. In Poland, UPC has become a leading network operator boasting over a million subscribers accessing a network built during a ten-year long and focused partnership with R&M.

UPC's Polish network is today an impressive fiber optic backbone infrastructure reaching more than two million households. It provides data networking, cable television, broadband Internet access and voice applications to consumers and businesses. UPC is a subsidiary of Liberty Global, Inc., the international network operator with presence in 14 different countries reaching more than 17 million end users.

Since its inception, UPC maintains a high focus on building a modern fiber optic backbone network ensuring cost efficient operations and the ability to develop services to the demanding customer base. Evidently, a source of world class fiber optic expertise was needed, and R&M was the answer.

Already by the year 2000 UPC relied on various R&M fiber optic products in parts of its network. By 2005, UPC set about a major upgrade of a distribution node in the town of Gdansk. The quality and technological excellence of R&M products led the way. The network node became a very modern installation, deploying modular, global type patch panels and cross and installation cables, ensuring ease of management, flexibility and reliability.

UPC went on to work in partnership with the dedicated team at R&M Poland to base its continued fibre optic network backbone roll-out on R&M systems throughout all its nodes. A cooperation which started a decade ago is today proof that in operator-supplier relationships a good product is not the only value. The experience and ability to work with flexibility are equally important, helping to create modern projects which again can be the basis for future improvement.

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R&M cabling equipment was chosen for Continental's factory facilities in India due to superior technological excellence and reliability, and due to R&M's strong local presence guaranteeing on-time delivery of components and the presence of competent certified installation partners.

In 2008, international automotive supplier Continental AG, on behalf of its Automotive Systems Division, signed a Joint Venture Agreement with RICO Auto Industries Limited, India, to build a hydraulic brake systems plant in the city of Gurgaon, 20 kilometers from New Delhi.

This smart new factory will build hydraulic brake products and other products such as calipers for front and rear axles, drum brakes, master cylinders, brake boosters and load sensing proportioning valves for vehicles of all classes and will supply to OEM customers in India.

The networking installation highlights R&M's credentials in supplying products to harsh and demanding industrial production areas: It is the first place in India where R&M's high-quality IP54/IP67 network products for industrial networking have been installed.

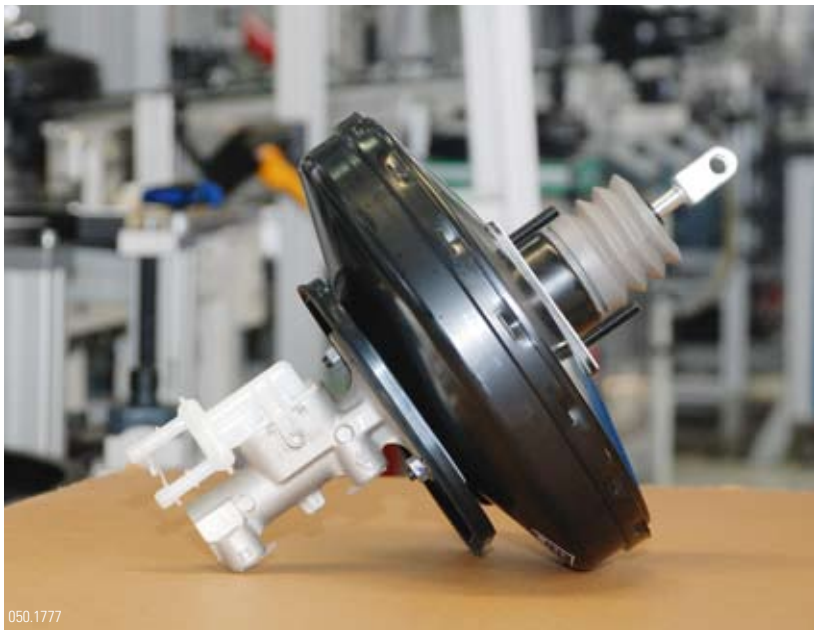
Continental made a forward-looking choice of cable grade and implemented a network based on Cat. 6 S/FTP ensuring data speeds of up to 10 Gbps. All termination modules implemented are currently of the Cat. 6A standard. The network backbone is based on R&M OM3 Fiber Optic cabling and connectivity between two R&D offices and the machinery shop is based on R&M SM Fiber Optic cabling.

"The quality and stability are very satisfying".

"The quality and stability of R&M products are very satisfying and R&M's local support ensures reliability of delivery," explained Mr. Anoop Verma, Operational Head of the facility.

Continental-RICO's IT team is very impressed with the technical solution designed and with the support extended by Mr. Vinodkumar Vaniak, technical specialist at Netsol, an IBM company (R&M certified installation partner).

Following the success of R&M's networking solution at Continental-RICO in Gurgaon, R&M has been recommended as supplier to other divisions of Continental (Conti Tire & Conti Tech). R&M is also involved in LAN networking projects for Continental in other parts of India like Bangalore, Sonipat (Haryana) and Manesar.



Booster assembly at the Continental-RICO plant in Gurgaon, India

R&M's high-quality network products for industrial networking

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Glass Fibers for UMTS Base Stations

Mobile communication site in eastern Switzerland

The iPhone was only the beginning. More and more customers are going onto the Internet with smart mobile phones. As a result, the volume of mobile data traffic is growing rapidly and UMTS antennae and their base stations need higher performance cabling. Swisscom has opted for a glass fiber optic solution from R&M.

The market launches of the two iPhone versions alone boosted growth in mobile Internet communication in recent years by up to 70 percent according to the news agency Pressetext. In the European Union (EU) mobile communication customers paid about EUR 33 billion for the use of mobile data services in 2009. The European Information Technology Observatory (EITO) predicts that this figure will rise to EUR 36 billion in 2010, a growth rate of 10 percent. Two thirds of mobile communication customers in Germany have a phone with Internet connectivity.

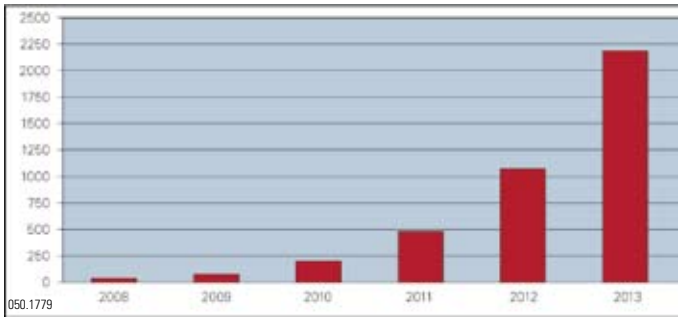
The use of smart phones and netbooks is spreading rapidly, increasing mobile Internet use. The UMTS standard and the third mobile communication generation (3G) laid the groundwork for fast data transmission suitable for multimedia. In many countries, including Switzerland, the UMTS network operators are now busy expanding their mobile communication data networks.

With the use of UMTS on the rise, the copper cabling employed thus far at the antenna sites is often barely enough for voice transmission only. Given the fast growth in transmission rates and mobile data use, providers now find it necessary to network their antennae and UMTS base stations (Node B) with the most modern fiber optic technology available. The current trends are Fiber To The Site (FTTS) and New Generation Node B.

Swisscom has already equipped all central installations with glass fiber optic cabling. The mobile communication sites are now following. By the end of 2009, more than 1000 top sites were upgraded. In 2010 another 750 sites will be equipped with glass fiber optic cabling. This ambitious program requires installation to be done well and quickly. That is why Swisscom selected R&M as its cabling partner. R&M provides the appropriate logistical support. The convenience of installing R&M solutions was another factor in Swisscom selecting the company. Swisscom uses, among other products, the 19" UniRack for splice connections and the 19" FibereasyRack for breakout connections plus high-end E-2000™* APC8 connector systems with riser cables.

At the same time Swisscom Schweiz AG is shifting from Asynchronous Transfer Mode (ATM) technology to Internet Protocol (IP) in the infrastructure for the mobile communication network. An all-IP application currently poses risks. All services could fail if the network is disrupted. For the time being, a two-track solution is eliminating this risk. Voice is transmitted conventionally over copper or glass fiber optic cabling and ATM while data travels over glass fiber optic cabling and IP. The goal, however, is to transmit all services over IP so voice transmission is also rendered Internet connective, similar to Voice over IP (VoIP) in the landline network.

The modification of the antenna stations often proves to be an extremely expensive and elaborate task. If they are on private property, the owners have to be asked for permission each time and often try to raise the rent for the location at the same time. There are also difficulties with the public authorities. Antennae



Growth in mobile data traffic, worldwide in Petabytes. (Source: Cisco Systems)

Rooftop location for antenna

Mobile communication site in Ticino

have to be replaced often and a building permit is required for each new antenna. When that time comes, local residents and public authorities often use whatever possibilities they have to delay or block the upgrade.

UMTS: milestone in the history of mobile communications

The UMTS extension Evolved High-Speed Downlink Packet Access (HSDPA+) has been available since 2008 with a transmission rate of 7.2 Mbps (downstream); the counterpart HSUPA (upstream) increases the rate of transmission to 2 Mbps. Swisscom now offers download speeds of as fast as 28.8 Mbps (Geneva) and is preparing for 42 Mbps. These capabilities enable fast Internet access, mobile multimedia video and data applications, visual telephony, stock exchange transactions and online travel reservations from anywhere. The third-generation mobile communication standard has long been considered a milestone in the history of mobile communications.

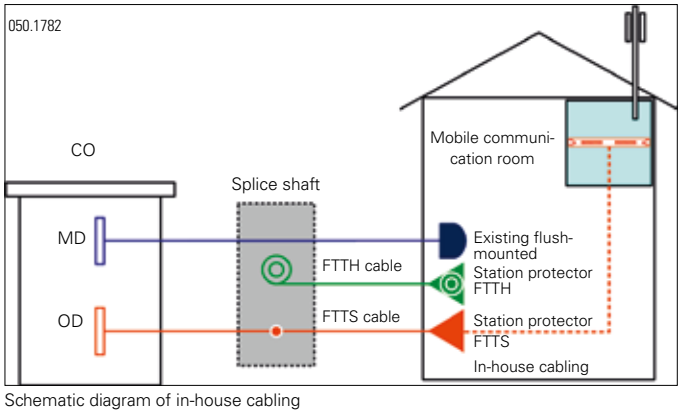
The next generation of HSPA+ is already in the starting blocks, though. It is called Long Term Evolution (LTE) and should enable downstream speeds of over 100 Mbps. The successor to UMTS is not used throughout Switzerland, but pilot projects have already been initiated.

The sluggish takeoff of UMTS

That kind of success for UMTS was certainly not evident at the outset. Although the network operators had a bidding war for the licenses in the summer of 2000 that went into the billions range, the initial euphoria dissipated quickly when companies realized what huge investments they would have to make to achieve full-coverage service. It was only after a lot of back and forth that the first suppliers tackled the undeveloped UMTS market.

In Switzerland, the licensees Swisscom Mobile, DiAX (today known as sunrise) and Orange began building up the infrastructure. As market leader, Swisscom Mobile is the service provider for all important cities. The network expansion is also extending to freeways and other important connecting roads, small cities and to certain rural regions. Today more than 92 percent of the population has UMTS-HSPA services. The competitors concentrated on urban areas. The late start and initially slow network expansion have turned out to be advantages. Companies can now use a much more modern cabling technology without the teething problems and drawbacks of the first generation.

* E-2000™, manufactured under license from Diamond SA, Losone.



Schematic diagram of in-house cabling

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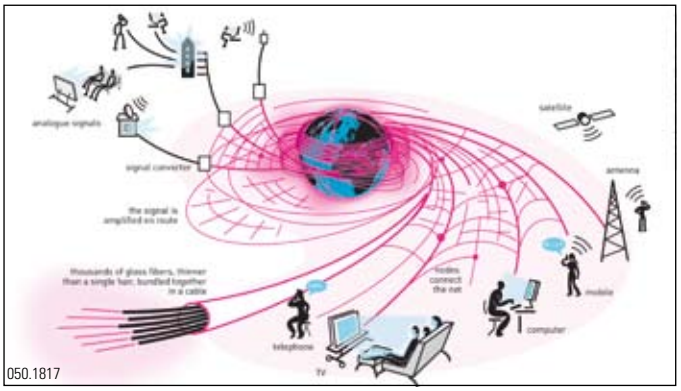
World's Highest Honor for "Father of Fiber Optics"

Charles K. Kao
(Photo: Markus Marcetic © Royal Swedish Academy of Sciences)



Overview about FO applications. (©Airi Iliste/The Royal Swedish Academy of Sciences)

In October 2009 Professor Charles K. Kao, a Chinese-born engineer and researcher now retired and living in the US, was awarded half of this year's Nobel Prize in Physics for "groundbreaking achievements concerning the transmission of light in fibers for optical communication." The man known as the Father of Fiber Optics and credited with setting the communication revolution in motion over 40 years ago finally received the world's highest honor for his achievements at a time when the benefits of his life's work are really beginning to be felt by everybody.

The Nobel Prize for Physics isn't often awarded for scientific achievements that mean anything to the ordinary man on the street. In fact, the last time was back in 2000 when it went to Jack S. Kilby, who first invented the integrated circuit board in 1958 and thus laid the foundations for the development of the microprocessor. Now it has gone to the person whose research shaped the future of communication technologies.

Up until the early 1960s, the high levels of attenuation in fiber optic cables meant that data could only travel a few meters before light loss reduced the signal strength by half. But around that time, Charles Kao was conducting research into the problem at Standard Telecommunications Laboratories (STL) in Harlow in the UK. He discovered that, far from being an inherent property within the technology, light loss in fiber optics was actually a result of imperfections in the glass.

Kao changed the direction in which the research was conducted at STL, focusing not only on the optical physics of the fibers but also on their material properties. As a result, he was also the first person to suggest that silica glass was the best material for long distance communications.

When in 1966 he presented his research to the Institute of Electrical Engineers in London, it was treated with skepticism by the engineering community and many even openly laughed at it. Slowly however, the industry began to come round to his ideas which have since become the backbone of optical fiber communications technology.

Prof. Kao continued to research the development of techniques and configurations for glass fiber waveguides, as well as different fiber types and system devices for civil and military applications and peripheral supporting systems for optical fiber communication. In the mid-1970s, he did seminal work on glass fiber fatigue strength and also played a major role in the engineering and commercial realization of optical communication throughout his working life, publishing over 100 papers and holding more than 30 patents in the field.

As industry-leading innovators in the area of fiber optics, and maximum exponents of using the highest quality materials in our components, we at R&M congratulate him for his contribution to the development of the communications technology that shapes all our lives today and on receiving the Nobel Prize.

Dr. Martin Rosatzin, *CTO*
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Sources:
– Wikipedia.org (Biography Charles K. Kao)
– "Lighting the way to a revolution" – Article by Rebecca Morelle, BBC News science reporter (2004)

FTTH (Fiber To The Home) is taking broadband services into homes over glass fiber optic cabling. Fiber optic cabling normally ends at the building entry point. However, in-house cabling using optical fibers has definite advantages.

In an initial development phase, the building connection will be executed with single-mode fibers, as will that of the end customer. This is what is being done in immediate projects undertaken today.

In a second phase, one-millimeter plastic optical fibers (POFs) could be installed in-house at the end customer's home throughout the market (as in Japanese strategies, for economic reasons). Japan and Europe are therefore involved in associated applied POF research right now in order to prepare the IEC standards that are still missing. R&M AG is doing much to help advance these efforts.

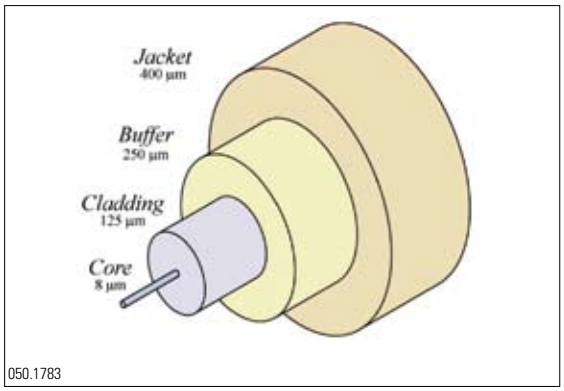
Transmitting the optical signals on into the home is merely a logical step because old copper cabling will have a hard time handling the data quantities and distances expected in the future. Although laying glass fiber optic cabling requires some new knowledge with respect to selection and installation techniques, optical waveguides are essentially trouble-free in operation. POF installation might also be able to be done by do-it-yourselfers. When it comes to handling, plastic optic fibers are highly tolerant to errors.

In FTTH building cabling, initial use will be made today of single-mode fibers with an optimized bend. After all, optic conductors are as insensitive to electromagnetic radiation as they are sensitive to bending. Too small a bending radius increases attenuation all the way to total failure so conventional fibers should not have a bending radius of less than 30 mm. Bend-optimized fibers are specified in ITU G.657 A and B as having a bending radius of 7.5 mm. Manufacturers even advertise with radii as small as 5 mm. Plastic optical fibers are moving in the same direction, especially to avoid mechanical breakage due to excessively small bending radii.

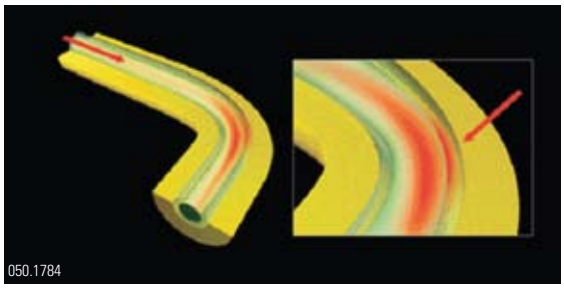
As with all conductors, glass fiber optic cables are laid in empty tubes. In new buildings, sufficient empty tube capacity should be planned as a standard feature. Even in a building with conventional copper cabling and without available empty tubes, in-house cabling with glass optical fibers could be a reasonable alternative. Conventional copper cabling requires holes through walls and laying the cabling under plaster, in other words elaborate construction work. For glass fiber optic cabling, small breakthroughs suffice and the cabling can be easily laid in shadow gaps or behind baseboard. Plastic optical fibers can also be laid effectively in 230-Volt installations already in place (because of increased stiffness). ETSI TS 105175-1, from January 2010, has the first guidelines for POF applications.

The advance is predestined to occur even though a private user today may find it impossible to imagine applications requiring a bandwidth far larger than 100 Mbps. A few years ago it would have been impossible to imagine that storage space would be offered today in the Terabyte range comparatively inexpensively at Gigabyte rates.

As an example of a premium triple-play connection for voice, data, and video, the following bandwidth needs can be cited as approximate values: four voice channels at 120 kbps each, fast data service at 3.5 Mbps, four HDTV channels at 19 Mbps each – for a total of 80 Mbps at the end customer's home.



Basic structure and geometry of a single-mode glass fiber (source: Wikipedia, Bob Mellish)



If the fiber is bent to a greater extent, part of the optical energy will go into the cladding and be transformed into heat there (EXFO, Dr. A. Girard).

If extremely high specific optical energy of 500kW/cm² (CATV networks) to MW/cm² (transit networks with amplifiers) coincides with an extremely cramped space (no bending radii), then a) the transmission characteristics could be greatly disturbed and b) major fire damage could occur (examples are known from British Telecom, refer also to IEC 62547 TR Ed. 1.0).

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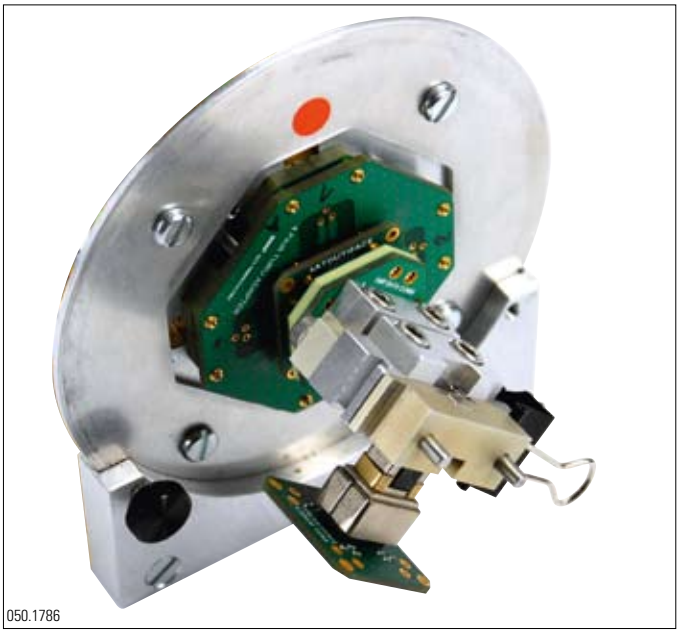
Cat. 6_A – Re-Embedded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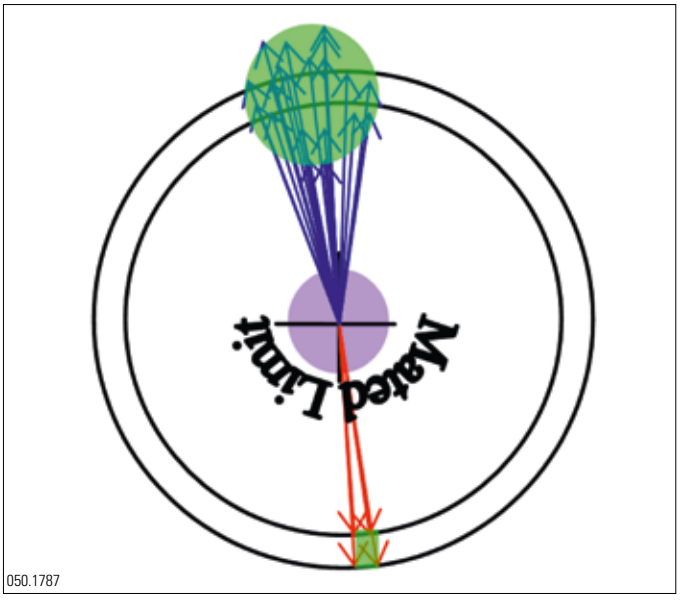
Reference plug on the direct probe fixture (DPF)



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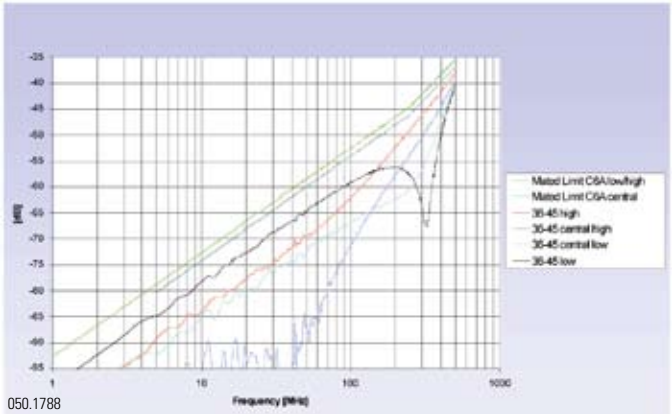
Result of a NEXT test: The red vectors represent different plugs. The blue vectors stand for the connection modules. They have to be in the green range so that all figures resulting from vectoral addition hit the violet range, i.e. the "mated limit" or limit for the mated connection.



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NEXT values of a Cat. 6_A UTP connection module from R&M, calculated using the re-embedded method. The curves show the NEXT (near-end crosstalk) between the twisted pairs 36 and 45 under four different virtual test conditions.

The re-embedded test defined in IEC60512-27-100 simplifies component testing at the manufacturer's premises and increases reliability and safety for users. It is suitable for components of all categories but is not necessarily a characteristic of quality.

Put the plug into the module and everything should work, regardless of which manufacturer made the components. It should be a matter of mix and match. That is what electricians and end customers want. But the higher the bit rates in the data networks, the narrower the tolerances the manufacturers must satisfy and the more difficult it becomes to guarantee the testing procedures, the mixing and matching.

De-embedded was the catchword in the specifications for Cat. 6. It not only served as the name of a test method, it was also synonymous with quality.

With Cat. 6_A, much tougher requirements have now been laid on the table for the quality of signal transmission. The re-embedded method in accordance with IEC60512-27-100 is now recommended for testing. But one thing should be mentioned from the outset: These are test methods, not quality designations. It is only important to have the components satisfy the specifications.

With the re-embedded method, it is easier to achieve the high measuring accuracy required. This method is also faster, which has a nice effect on the cost side of the equation.

Re-embedded means calculation instead of insertion

In the de-embedded method, 12 test plugs were identified in an elaborate procedure for use in testing a connection for all limiting cases, i.e. limits of the defining parameters NEXT (near-end crosstalk) as well as FEXT (far-end crosstalk) and RL (return loss). To find these 12 plugs, a reference plug first had to be designed. It was measured together with a reference module and then separated – de-embedded – so the parameters of the test plug could be determined by subtracting the known module value.

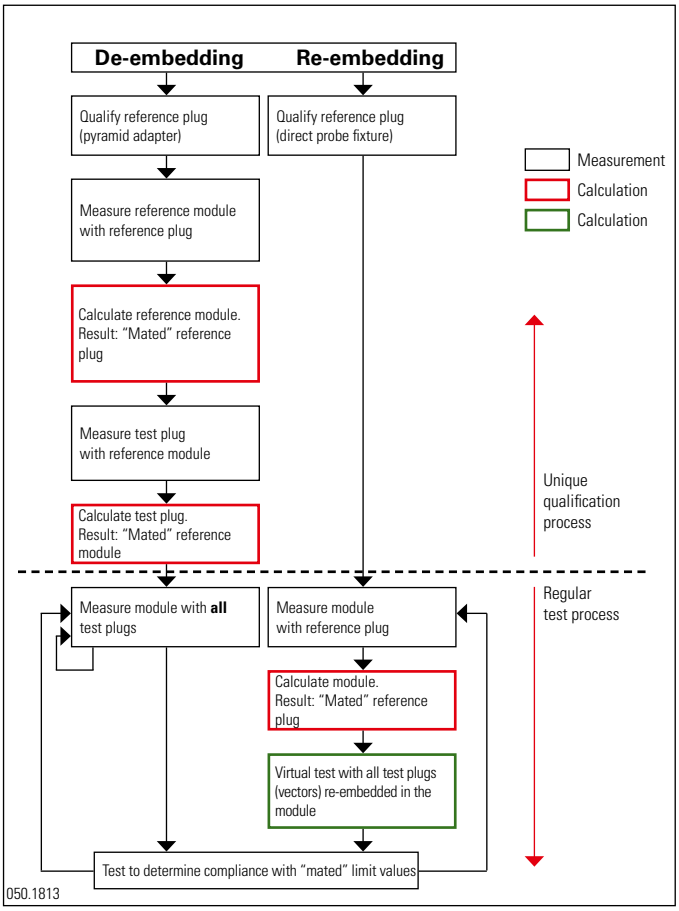
By contrast, the re-embedded method utilizes the fact that each sinusoidal signal is uniquely defined by its frequency, amplitude and phase. The limiting cases are simply gone through arithmetically, with the parameter values of 14 virtual "test plugs" being added together in terms of the right amplitudes and phases, i.e. in terms of vectors.

To do so, a reference plug is needed. The difference is that this reference plug is not measured with the known pyramid whose larger dimensions inject a degree of uncertainty into the measurements. The reference plug is connected to a network analyzer using a direct probe fixture (DPF); the influences of the feed lines can be arithmetically offset in the analyzer. This approach is considerably more precise.

Read the data sheets carefully

R&M uses the re-embedded method in accordance with IEC60512-27-100 on all its newly developed products (e.g. Cat. 6_A). That is an appropriate choice both physically and economically. Even more importantly, R&M achieves greater accuracy using this method. But the ultimate goal is to satisfy the specifications in the standards. Do not allow yourself to be fooled. "Underwent re-embedded testing in accordance with IEC60512-27-100" is no indication of quality. However, re-embedded is an excellent test method and not just for Cat. 6_A.

A current whitepaper from R&M explains this method in detail. You can download the document from the company's website: *www.rdm.com > Service & Support > Downloads > White Paper.*



Comparison between de-embedded and re-embedded test methods

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Clinic Cabling: More Than a LAN

Service quality is a top priority in the health care sector.

In medical care institutions, a typical commercial data network far from suffices. Modern clinics and practices, medical centers, rehab and nursing care institutions put a variety of enormous requirements on cabling. Planners can go to R&M to find total solutions from a single company.

The health care sector is shaped by an unusual diversity of communication and IT applications that pose tough requirements on cabling. The reliable LAN infrastructure in accordance with ISO/IEC 11801 or EN 50173 with a transmission capacity of up to 10 Gbps Ethernet could be reasonable for straight data communication between offices or examination rooms, but a more differentiated approach must be taken to infrastructure in other areas.

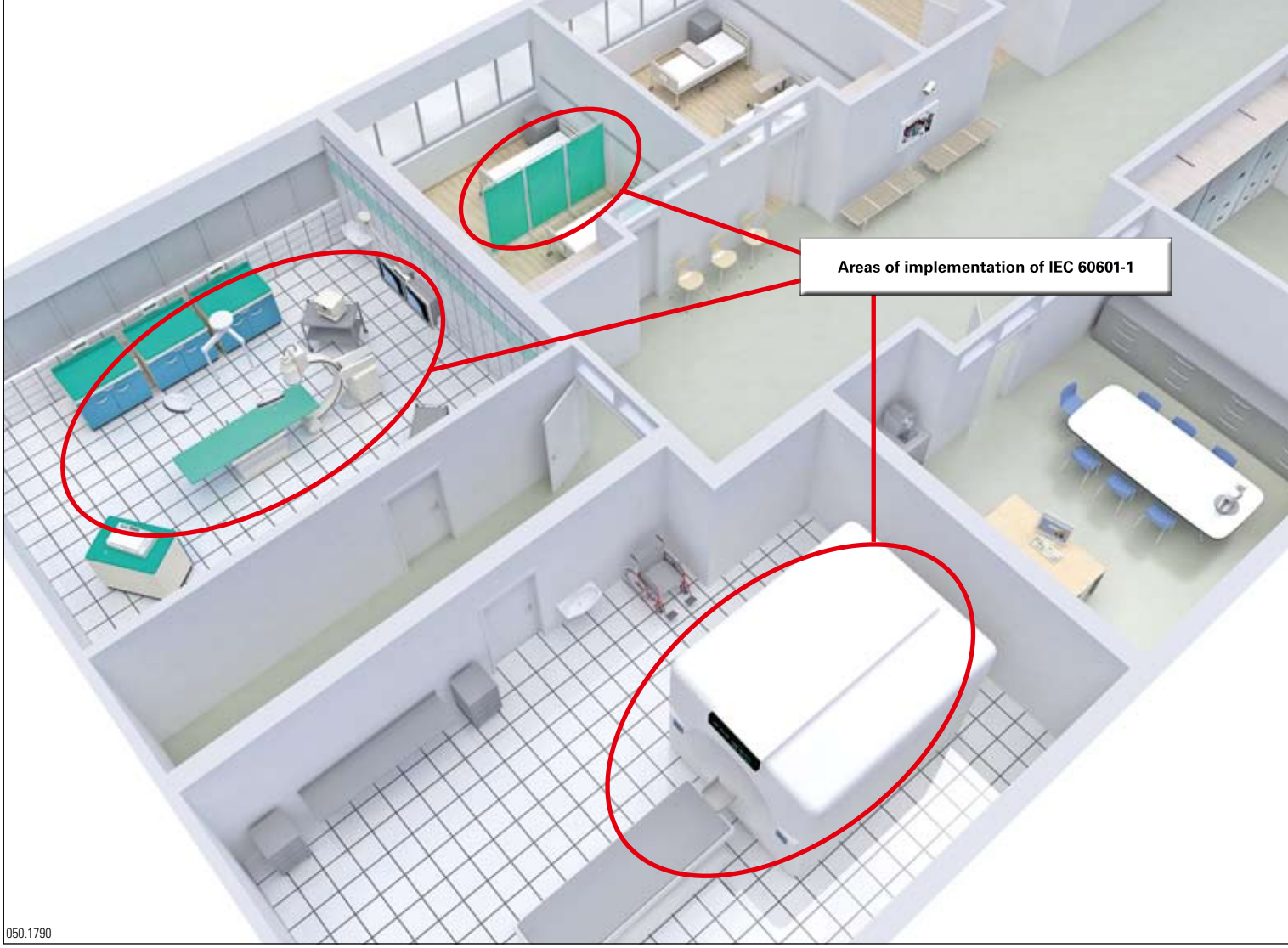
For example, special shielding of cabling is needed for several highly sensitive diagnostic devices to ensure that no electromagnetic interference occurs. Imaging diagnostic processes in particular generate huge quantities of data that have to be available at high speed throughout the clinic. The network connections in operating rooms, labs, kitchens or in-house laundry must withstand harsh loads and conditions otherwise only encountered in industrial plants. ISO/IEC 24702 is applicable in this case. Moisture, vibrations, hectic situations or frequent changes in connectors must not be allowed to cause mistakes or network failures under any circumstances.

Ideally, a single IP network should be used for running facility management, access control, video monitoring, hospital information system, Internet, VoIP and mobile communications. In many instances today, we expect flexible, multimedia service right at the hospital bed of the kind we have at home or in a hotel. Patient information and monitoring, entertainment and communication must be integrated at a single point.

No matter what requirements and applications you consider, in the health care sector the important thing is to achieve increased quality, safety, availability, flexibility and performance of the networks at the most favorably priced conditions possible.

A further serious factor must be considered, however: protecting the patients from voltage surges or inadmissible currents through connected medical equipment. Planners must provide for network insulation or galvanic separation for the area immediately around the patient within a radius of at least 1.5 meters. This is required by the international standard IEC 60601-1:2005-12 (Safety Requirements for Medical Electrical Systems).

Specifically, the standard requires double shielding in relation to the power network. The technical acronym for this is "2 MOPP" (two means of patient protection). The member countries of CENELEC must introduce the current valid standard by 2012. IEC 60601-1 (or EN 60601-1) and its various national versions as



The IEC 60601-1 standard protects the patients from voltage surges or inadmissible currents through connected medical equipment.

adapted for specific countries are not binding but they are actionable.

Typically, the devices themselves have to date been fitted with separation equipment for use in clinics. This special equipment makes the devices considerably more expensive. However, if you shift the required galvanic separation into the outlets and cabling, you can connect the more reasonably priced standard devices without any danger and keep patients free from risk. For this solution, R&M offers SafeLine, a network insulator conforming to IEC 60601-1. This solution has two advantages: low-priced network insulation for each hooked-up medical device and also the certainty that the equipment constellation in the patient's environment complies with the requirements of IEC 60601-1 in each case.

R&M proves once again that it is the leading specialist in the kind of premium cabling needed in the health care sector to cover all requirements of an "intelligent hospital." With the modular cabling solutions from R&M, medical facilities can plan, develop and scale their entire passive IT and communication infrastructure in keeping with their needs. They can flexibly combine and make all-purpose use of copper and fiber optic cabling.

Supplemental solutions, such as the three-level R&M safety system and the IP protection system, reduce error sources, ward off disturbances and tampering attempts and increase the availability of data networks. With the RMS45 cable-sharing solution from R&M, clinics can make flexible, multifunctional use of a number of outlets and thereby cost-effectively increase the intensity of infrastructure use. The qualification program for installation partners and life-long guarantees underscore the reliability of R&M solutions.

Hermann Christen, *System Management*
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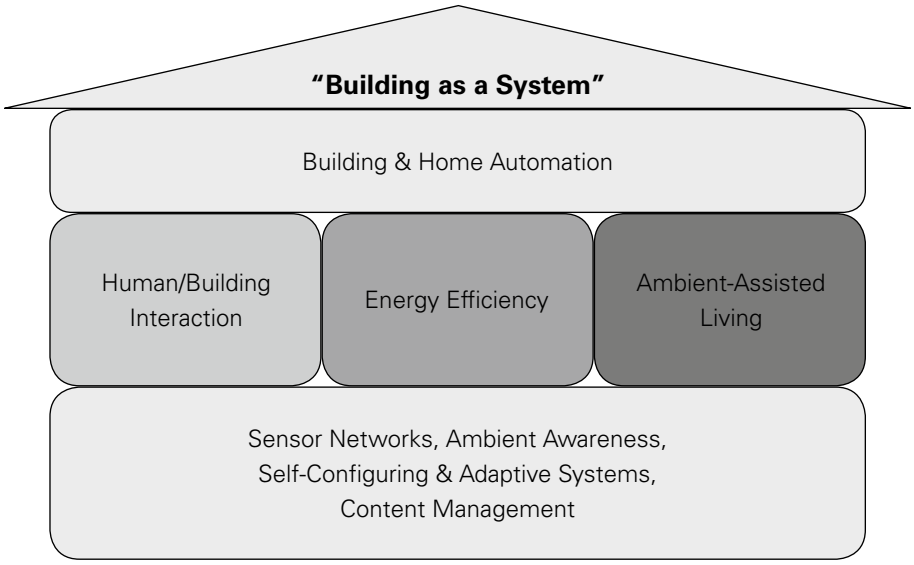
What will intelligent homes of the future look like? At the iHomeLab located on the campus of Lucerne University of Applied Sciences and Arts a team of experts is researching scenarios for the future. R&M supports this think tank in the area of home cabling.



The iHomeLab views a building as a system. The three main pillars of intelligent living are reflected in the research priorities of the laboratory: human/building interaction, energy efficiency, and ambient-assisted living.
Figure: Lucerne University of Applied Sciences and Arts.

A view of the lounge at the iHomeLab: The future of intelligent and networked living is waiting to be discovered in this modern atmosphere.
Photo: Lucerne University of Applied Sciences and Arts.

The iHomeLab: This futuristic cube opens up a view of the future for intelligent and networked living. Photo: Lucerne University of Applied Sciences and Arts.

The iHomeLab is a Swiss research and network platform with international impact. Developers and planners, architects and electricians can learn about the latest findings from the research projects. With its extensive program, the laboratory provides information about the basics of intelligent living. Important tasks are to promote acceptance of forward-looking infrastructures on the housing and real-estate market and to raise the awareness of those involved.

Networking provides the basis

One fundamental finding the lab has made is that intelligent living depends on networking. This means various disciplines being closely interwoven, from architecture through building and electrical equipment to IT. It also refers to the technical networking of the various systems in a building, from the heating to the stereo system.

What form does networking take in actual practice? Experts and users are focusing in increasing numbers on this question. More than 2500 people have visited iHomeLab since it opened in November 2008. R&M is one of over 60 partners supporting the activities of this innovative laboratory. "These figures are impressive proof of how keenly interested people are in 'intelligent living' and of how big the need is for information in this area," says Professor Alexander Klapproth, Head of iHomeLab.

Complex integration

The Lucerne laboratory sets a real example when it comes to networking. No matter what the focal topic, from comfort and convenience to energy efficiency and safety, iHomeLab closely intertwines its areas of research and conducts in-depth analyses of various aspects of life. The goal is system integration.

Professor Klapproth: "Integrated systems for intelligent living are already available on the market, but they are too expensive and too complex to operate, at least for normal consumers."
Please also visit *www.ihomelab.ch*.

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Innovation and Idea Management at R&M

Innovative high-end products have always been a hallmark of our company. CTO Martin Rosatzin (Ro) and Innovation Project Head Matthias Gerber (Ge) want to strengthen the culture of innovation at our company even more. In the following interview, they explained to *CONNECTIONS* just how they intended to do so.

How important is idea management for R&M?

Ro: *R&M has traditionally put a big emphasis on research and development. We are bundling our technological expertise in high-frequency technology and fiber optics, laying a unique groundwork for constant innovation. We are active in standard-setting bodies and try to detect trends very early on.*

Ge: *In our corporate culture, every R&M employee is also responsible for finding new ideas for innovation. We rely on the ideas we get from our employees.*

How does R&M come up with new ideas for Innovation?

Ge: *There are two ways we come up with new ideas. First, systematically with a focus on strategic search fields in the teams and at workshops, or second, spontaneously, by collecting ideas over the Intranet.*

Ro: *The spontaneous ideas have to be filtered first. We have to check an idea to see if it is relevant to our strategy. If it is, we pursue it immediately or put it in a buffer. We prioritize ideas in regular reviews and continue to pursue them as soon as resources are available.*

Ge: *We use a simple company suggestion scheme and invite employees the world over to participate. This approach also ensures networking with the various markets in which we conduct business.*

Ro: *Every idea is fed into the system no matter how wacky it may seem. That is crucial. And the ideas do not necessarily have to be related to products only. It is important that a large number of ideas are fed in. Quantity does not necessarily yield quality but you do need a certain amount of information to come up with good ideas. Our funnel for collecting ideas has to have an ultra-wide mouth.*

How does a person who submits an idea see what is done with the idea?

Ge: *Nothing is more demotivating than zero feedback. To ensure motivation, it is crucial to follow each idea up to a certain point and to give feedback to each person who submits an idea. All idea processes are traceable!*

Ro: *Each submitted idea is systematically recorded, processed and tracked. All employees are entitled to pursue their own ideas and those of others. In many cases, people add to the ideas of others and build on them.*

Can you tell us more about this platform?

Ge: *Sure. We have a SharePoint-based platform accessible to all employees. There you find the strategic search fields already mentioned and use them to search for specific ideas. The employees can bring up their new ideas there.*

Do you have a bonus program for good ideas? Are bonuses given out?

Ge: *That is a critical subject. The risk of offering monetary incentives is that the people who provide the ideas can hold onto them for a long time if, for example, the company has no resources for a certain period of time. They purposely submit them later in order to land the bonus. Another risk is that individuals submit ideas that were actually developed in a team and receive the bonus for it while the other team members go empty-handed. This runs counter to the idea of good teamwork.*

Ro: *Precisely! What happens is that an idea is further developed by other users in keeping with the concept of shared ideas and shared knowledge. It is only when that happens that really good ideas arise. Who deserves the bonus? The person who submitted the initial idea or the person who gave it its final form?*
It is crucial that we carefully continue developing our existing culture of innovation exchange. If we switch to direct financial incentives, this culture could be disrupted, which would not be in the spirit of R&M. Our culture is based heavily on teamwork and not just on excellent solo performers.

Back to the innovation process for a moment. Now, what happens to the ideas that have been fed into the system? How are they transferred to Development and to Product Management?

Ro: *Representatives of the innovation team think the fed-in ideas through to the end, often with the help of employees from the pertinent departments. That is the "tube for smooth-walled development".*

Ge: *The innovation funnel has to work properly to the very end because advances are extremely time-consuming. When the innovation phase comes to an end, the idea is passed on to Development and then "Operation Excellence" enters the scene.*

Ro: *The three milestones in the process are as follows: innovative idea – business idea – business case. Three aspects are examined before an idea can become a genuine case: technical feasibility, market relevance and relevance to R&M. Then we ask: Do we have the right people and the necessary resources?*

Ge: *It is like in the gem business. The first step for us is to analyze the raw material. We cull out the normal stones and glass. Then we analyze the gemstones and classify them. If we find a diamond, we cut it and polish it until we can show all its facets. That is the job of our innovation experts!*

Much has been said about resources. How do you plan for and ensure that you have the necessary resources?

Ge: *Resource management is natural extremely important. Resources are always scarce. Early on in projects, we turn to our innovation people. The dedicated line organizations do not become involved until we begin with concrete implementation.*

Ro: *We have a multiproject planning tool for doing precise resource planning. It helps us a great deal in planning the various projects. With this tool, we maintain full control over all the projects that are running parallel to each other!*

Do the ideas relate to products only?

Ro: *All kinds of ideas can be submitted, including ideas on processes, services, etc.*

Ge: *The ideas not related mainly to products are passed on to those responsible for the given subject area.*

What do you do if you receive too few ideas from your rank and file?

Ro: *Let's talk about internal sources again before we turn to external ones. Our Sales give us direct inputs from the market. With the international professional network we have set up, we come upon new ideas all the time. As already mentioned, we definitely have to open up the subject areas wide, very wide, when collecting ideas. Internally and externally! That is the only way we can come up with groundbreaking ideas. A sharp focus is also needed. Strategic relevance is another important factor. We need search fields that cover the strategy. In this case, we look for specific ideas in order to close any gaps we may have according to strategic specifications. We do so internally or with external sources.*

Ge: *We have cultivated external sources for years and collaborate intensively with universities of applied sciences and arts and standard-setting organizations. Ideas can also come from analyses of competitors, from suppliers or even directly from customers!*

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Dr. Martin Rosatzin, CTO

Matthias Gerber, Innovation Project Head

Dr. Martin Rosatzin and Matthias Gerber being interviewed by René Eichenberger, Head of Corporate Communications

The Plague of Product Piracy

Everyone has seen them, the fly-by-night merchants peddling their wares on beaches and city sidewalks in many tourist regions. Buying their supposedly branded goods usually ends in disappointment and sometimes a big fine. The product piracy of industrial goods is occurring more and more frequently, too, with serious consequences.

Just a few years ago, brand piracy was mostly confined to consumer goods like watches, garments, software and cigarettes. In recent times, it has also begun increasingly to involve industrial goods. The following figures clearly indicate how huge the market for imitation products has already become:

– Fakes and imitations account for 10% of total world trade[1].
– The economic loss worldwide from this trade amounts to EUR 200 to 300 billion a year[1].
– The cases of brand piracy have increased 13-fold since the year 2000[2].

At R&M we have known at least since 2006 about E-2000™* connectors and adapters being illegally produced and sold. These fake copies are not only of inferior quality. Even more importantly, they are harmful to health. Tests in the R&M laboratory have shown that the optical and mechanical properties are poor and the plastic used is neither flame-retardant nor halogen-free.

R&M therefore makes constant efforts to inform its customers accordingly. Only with due caution can they avoid the risk of accidentally purchasing a fake. Do not trust any dealers who offer allegedly R&M products at rock-bottom prices! This is true of the E-2000™* as well as the LC connector. The high level of R&M quality, durability and compatibility can only be guaranteed at licensed producers and these traits have their price.

The appearance of the fakes is improving all the time, making them increasingly difficult to distinguish from the original products. The initial imitations had crude errors and were clearly distinguishable, e.g. the logo was rotated by 180° and the like, but recent ones we have seen are difficult to detect merely from appearance. For example, we had a customer complaint recently about defective pigtails that were ostensibly E-2000™* products. The R&M engineers were the first to recognize that they were actually imitations.

It speaks well of R&M that the E-2000™* products are being imitated so extensively and does not surprise us. It is always the top products and lead manufacturers that are hit hardest by product pirates. But we can do without this kind of quality confirmation. R&M will therefore continue to do everything in its power to fight brand piracy and the misuse of its logo as well as the production of non-licensed E-2000™* products. A corresponding manufacturing tool was found in 2009 and confiscated by the local authorities.

With actions such as these, we help to protect not only our company from economic loss but also our customers from inferior imitations that perform badly.

Sources:

1 *http://www.plagiarius.de*
2 *European Commission, Taxation and Customs Union; 2009_statistics_for_2008_full_report_en.pdf*

* E-2000™, manufactured under license from Diamond SA, Losone.

Specially priced fake of the FORTIS B-42 Official Cosmonaut's Chronograph
Original: FORTIS Watch Ltd., Grenchen, Switzerland (left);
imitation: manufacturer unknown (right)

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The Final Word

Igloo effect as an opportunity

As a mountain lover I did my military service in the Swiss Armed Forces as a mountain private in the scenic Swiss Alps. There is one experience I will never forget. Spending several days in a makeshift snow bivouac was part of training. That may sound quite romantic when you first hear it but we chose what was probably the coldest week of the year, and the fresh powder made it all the more difficult to build a stable shelter. It quickly turned out to be a major challenge and provided me with a lesson I will always remember.

We were a group of four and our task was to build an igloo that would serve us as a survival shelter for five nights. My best colleague and I were anything but thrilled when we found out about the two other soldiers assigned to our group: One was nicknamed "Mr. Know-it-all"; the other, "Mr. Scaredy-cat".

After two hours we had finished building our snow shelter, when suddenly the snow roof caved in, burying Mr. Know-it-all underneath. We managed to shovel him free within a few minutes using a shovel and an avalanche beacon. Mr. Scaredy-cat wanted to give up after this experience and return to the valley but we persuaded him to stay. After another two hours of hard work, our snow home was finally standing again and at last we could settle in for a cozy stay.

We laid out our insulating mats and sleeping bags and then changed into dry clothes. We stuffed our sopping leather boots with newspapers in the hope they might be dry the next day. After all that, we fixed ourselves some tea. The tea was steaming under our noses when Mr. Scaredy-cat suddenly surprised us by conjuring up a chocolate cake out of his backpack. We enjoyed it with our tea. We had fortified the tea beforehand by pouring a little schnapps into it. It was a cozy atmosphere in our igloo even though the candle we had burning in front of us was primarily an oxygen sensor. We were well aware that many mountain alpinists before us had suffocated in snow caves from a shortage of oxygen.

I had never before gotten to know and to appreciate strangers as quickly as I did during those first 24 hours of our stay in the great outdoors. As a team, we focused on our individual strengths without dwelling on our weaknesses, which unfortunately is so often done! For instance, we learned to appreciate Mr. Scaredy-cat's traits. With his great sensitivity, he had finely honed sensors that benefited us in different situations. He also displayed a good sense of humor, especially when analyzing our superiors. Mr. Know-it-all, for his part, gained our recognition and respect by managing to dry our boots overnight.

I derived few military benefits from that week. But I did learn what it meant to stick together in an emergency, to concentrate on individual strengths and to return from the mountains as a closely-knit team. It was an exciting and valuable experience!

From those few days, I learned to approach other people with respect as much as possible instead of prejudgment and to look for their genuine strengths. In doing so, I found it helpful to set aside my own ego somewhat and apply the necessary modesty and empathy to try and find common, binding values with other people while generously overlooking their weaknesses.

At R&M we are using the somewhat chilly economic climate as an opportunity to become fit for the upturn ahead. We are becoming better acquainted in a number of projects that are underway and are consistently applying our individual strengths to this work. Recognizing and practicing shared values is a big part of our ability to prevail successfully as a team.

One question remains, however: Do we always need an "igloo effect" to trigger this positive change?


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