CONNECTIONS 43

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R&M
Convincing cabling solutions

A Change at the Top that Promises Continuity

Dear Business Partners

After leading R&M as owners in the second generation for more than 16 years now in a number of different executive positions, we have decided to devote our attention to our strategic tasks on the Board of Directors as per September 1, 2012. We have the honor of introducing you to our new CEO, Michel Riva, in this issue of CONNECTIONS (page 15). Michel Riva has considerable international experience in industry. He will be continuing our growth strategy and will help make R&M even more successful with a customer-oriented innovation culture.

As owners of our family company, we are anxious for fundamental values, such as honesty, modesty and respect, to be retained as part of the company culture. Time and again, we have seen that these values have a knock-on effect with customers and partners who share our ideals. R&M will continue to be a family company and will still be wholly owned by the Reichle family. Last but not least, at strategic level we also want to ensure that profit continues to be invested correctly for the future – whether in terms of innovations, new markets or new personnel.

There are plenty of opportunities around. With our long-term customer relations, based on mutual trust, we have the perfect basis for making good use of these opportunities and also for being successful together. Take a look at the interview with the Chairman of the Board of Directors, Hans Hess, who is not only an expert on international industry but who has also given us immense support and shown great commitment in this "handover" at R&M.

As owners, we look forward to devoting our attention with great passion to a whole range of strategic projects at R&M and to continuing to nurture customer and supplier relations.


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Cover picture: A good network infrastructure is the basis for fail-safe data centers.

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The Evolution of a Network

Wiring a complete factory location for the future? Reaching that goal is facilitated with far-sighted, long-term, precise planning combined with the right choice of partner. Bobst Mex SA (CH) is the perfect example of how the metamorphosis of a large campus LAN can be a great success.

As the leading key player in the global packaging market, BOBST used to have a classical company network. Eight years and twelve project stages later, the company, still at the same site in Mex, now boasts a pioneering campus LAN with redundant FO infrastructure and fail-safe data centers. Far-sighted, precise planning and the right partners were the basis of a remarkable evolution.

"Putting everything together in Mex." That was the declared goal of BOBST, global leader in the manufacture of packaging machines, for its sites in French-speaking Switzerland. Administration, Service and Production as well as Sales and the Demonstration Center were all to be based in Mex near Lausanne. And that entailed extensive planning for the extension and reorganization of the factory.

Since 2004, network specialist Serge Lopez has been sketching plans for the future network infrastructure of the entire site. He was fully aware of the fact that the existing cabling would not be able to cope with the coming communication and IT requirements of the central company offices. Most of it was designed for use with 10BASE2 and 10BASE5.
There were already multimode fiber optic networks and a coaxial cable infrastructure for the administration building and the three existing production halls. There were even extendible tunnels, channels and distribution rooms. But the cabling technology was not even remotely suitable for the necessary migration or had quite simply become uneconomical. The floors of offices above the production halls and the administration building had sufficient port density, but the LAN connections in Manufacturing on the ground floor of the halls were nothing to write home about.

WHY R&M?

- **Quality of the products, systems, solutions**
- **Project support, expert consulting**
- **25-year warranty**
- **Qualified Partner Program**
- **Impressive release tests**

There were not the adequate expansion possibilities or redundancies needed to ensure high availability on the entire campus. These were the conclusions Lopez came to.

The situation is typical of many industrial facilities that were built 20 or 30 years ago.

The need for new IT services

BOBST had decided to build a further two production halls in Mex in addition to the existing ones. The long-term strategy of the group made it possible for the IT management to carefully think through and plan the future LAN infrastructure in detail.

And that was necessary because a whole range of new IT services was to be made available on the extended company premises. BOBST planned on equipping the main site with two viable,

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Serge Lopez attached great value to meticulous planning.

high-performance, redundant data centers. A private cloud was to be incorporated. Computer-aided design and manufacture (CAD and CAM) necessitated Ethernet support right down to the manufacturing domains. Fiber Channel over Ethernet (FCoE) was to be employed to support fast data backup.

> "The universal modularity of the R&M systems greatly simplified planning."
>
> Serge Lopez

Telecommunication was to be switched to Voice over IP (VoIP) and provide modern services such as the integration of cell phones. A full-scale WLAN was required for visitors, customers and employees. Video surveillance of the site premises was to provide HD video via the data network. And IT was to support top-quality video conferences.

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Meticulous planning

Serge Lopez started off by developing a step-by-step solution – totally in line with the corporate philosophy. Among other things, his concept envisaged an evolution within the existing facility renewing everything as efficiently as possible. For example, existing channels and racks were to be retrofitted in stages and old distribution rooms used to their best advantage. The old building infrastructure provided plenty of space for the modernization which meant no additional distribution rooms had to be built.

Serge Lopez divided the evolution phases into twelve individual project and migration steps. He defined all technical requirements down to the very last

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Data Center Topologies

With a forward-looking layout, a data center can grow along with the requirements and continue to develop. This approach, in turn, leads to a usable and efficient work environment.

A good data center layout adapts flexibly to new needs and enables a high degree of documentation and manageability at all times.

Customers can choose a variety of cabling structures from top of rack, end of row or dual end of row to middle of row or two row switching. The one they choose is not the crucial factor. All these structures support the different device designs if these aspects are taken into due account in the planning.

R&M therefore recommends structured, application-neutral cabling for use in data centers. With this approach, one and the same cabling structure can cover all device designs known today. The physical infrastructure can be used, expanded and adapted to new requirements over the span of many years.

detail and compiled consistent material standards. The different requirements made of bandwidth and security, number and type of LAN connections were described for every sector, every department and every workstation. A new nomenclature for the ports ensured further planning precision. Lopez selected suitable components for every area from the R&M*freenet* and R&M Data Center range. "The universal modularity of the R&M systems greatly simplified planning," explains the network specialist.

> "R&M provided absolutely reliable, fast and uncomplicated service and supported me in every phase of the project."
>
> Serge Lopez

The new infrastructure, which would support 10 Gigabit Ethernet, was to be completed after nearly two years of installation and migration – starting in spring 2010. Production, however, was not to be interrupted during the installation phase which meant that all work had to be planned absolutely precisely. The wiring and distributor retrofitting were to take place as far as possible outside regular working hours, in other words overnight and on the weekend.

So in addition to technical expertise in the area of complex cabling, sophisticated project management skills were required. "We have never ever seen such detailed planning," confirmed experts from the engineering offices working alongside R&M from the very beginning of the project.

Step by step to the finishing line

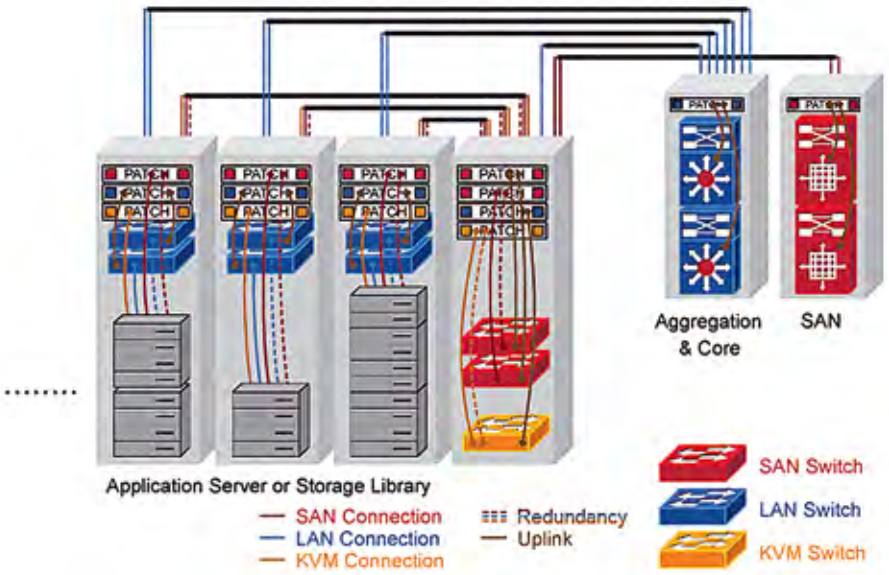
The first evolution phase in the merging of the sites had comparatively modest goals. The networks in all older buildings were to be retrofitted to Cat. 5. The second phase was to involve the integration of high-performance copper technology for the RJ45 format: Cat. 6_A. In the production halls, the ports were to be densified and also equipped with protective measures to combat dust and moisture to ensure they corresponded to protection index IP54.

A greater challenge was integrating the two new halls on the boundaries of the site into the campus LAN. A full-scale fiber optic network of categories OS2 and OM3 was the only way of ensuring a future-proof solution. Two backbones, routed separately for security reasons, were to connect the two data centers.

In addition, eight entry points or main distributor frames were to be integrated completely into the fiber optic network in the old and new buildings. This would not only result in a high-performing network but completely redundant cabling. Detailed specifications were developed for the two retrofitting and extension phases for the entry points of the buildings. Every network cabinet was to be retrofitted or newly equipped according to a fixed concept. Two further new buildings, at a distance from the central ones, would also have to be connected: a porter's lodge and a staff restaurant. A total of 7000 links had to be set up.

The practical implementation was then just a question of organization. Serge Lopez: "We had the ideal partners.

BOBST pays great attention to detail – and that includes the Data Center.



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R&M provided absolutely reliable, fast and uncomplicated service in the good old-fashioned way and supported me in every phase of the project." All in all, the principle of a structured campus LAN was implemented extremely efficiently and successfully – "according to our own vision and high standards," as Serge Lopez explained. Perfect planning reduces stress and costs and also stops people from being demotivated. He has already made plans for the coming years. Calculations for more switches with greater port density in the production halls are already lying in the bottom of his drawer – next to a 25-year warranty from R&M for the cabling solution. ■

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Re-invigorate the Cultural Hub of Melbourne

A premier concert venue in Melbourne, Hamer Hall provides opportunities for artists and audiences to experience live music performed by the finest musicians from around the world.

Located at the gateway to Melbourne's cultural precinct, Hamer Hall has recently undergone a two-year $135.8 million re-development, part of the Southbank Cultural Precinct Re-development to re-invigorate this vibrant cultural and community hub. Musicians and audiences can now enjoy superior stage technology and acoustic performance, making this one of the world's most sought after concert venues.

Getting the framework right

A properly designed and installed structured cabling system provides a solid framework that delivers predictable and consistent performance, allowing the flexibility to grow and change the network over an extended period of time without significant changes to the backbone. This was an important mission undertaken by R&M in the Hamer Hall project.

Support from Madison Technologies through on-time product delivery and assistance to the installer was one of the key elements of the project success. The chosen solution was the Unirack (FOBOT) solution set, which came to site with pigtails, connectors and other parts ready to be spliced and installed. The FO solution included R&M's unique laser shuttered LC-Duplex OM4/OS2, which caters for issues relating to OH&S in the COMs room and in public areas while working with high-end laser types within the FO network. Pacific Services Group (PSG) carried out excellent installation with R&M solutions in record time and in full compliance with R&M installation and testing guidelines. Special thanks to David Spiteri and Martyn Orford, Senior Project Manager and Principal Foreman of PSG, as well as to the team for their great support during the project duration.

A milestone achieved

Being directly involved in a major re-development like this was a huge milestone for R&M. This has once again confirmed the Swiss cabling company as a genuine specialist in the Australian market. The project was delivered with the help of great partners, who have,

THE R&M SOLUTION

- **RJ45 connection module Cat.6_A STP**
- **Installation cable Real10 Cat.6_A U/FTP**
- **Unirack LC FOBOT 48F (black)**
- **Closed 1U cable management**
- **Splice wall outlet 2xLC OM3**
- **CP (U-Box)**
- **Harsh environment PUR patch cord (for stage platforms)**

along the way, provided excellent support and assistance. "Working as a team with PSG (installer) and Madison Technologies (distributor) has been a pleasure and we truly value this great partnership", said Emmanuel Beydon, Country Manager for R&M Australia.

> "Working as a team with PSG and Madison Technologies has been a pleasure."
>
> Emmanuel Beydon

After various site inspections and discussions with the customer, R&M and its partners studied the requirements and recommended performance matching products that best suit the client and application needs. Advanced staging systems and technology were implemented to provide best live stage performance for audiences, both visually and acoustically. In order to meet the requirements of such applications, R&M supported the deployment of the Neutrik etherCON Cat. 6 RJ45 Data Connector, which is specifically designed for Ethernet networking in audio, commercial, entertainment, live stage production and DMX lighting. This is a product created through the partnership with Neutrik, an internationally recognized corporation with more than 35 years of know-how and experience in the design and manufacture of innovative interconnection systems.

In addition, this was also the first R&M Cat. 6_A shielded project ever undertaken in Australia. The jack meets and exceeds the latest cabling international standard 11801 Edition 2 for 10 Gbit/s over Ethernet, and the quality of the initial tested links was also said to be exceptional. The closed cable management, a recent innovation by R&M for use in data center and office cabling, was also installed for its optimized design for high density patching.

David from PSG complimented the high level of professionalism demonstrated by R&M and Madison, and the superior product quality. "We know that we are working with a group of professionals who know their work well," said David. ■

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R&M now offers reference cables for FO connectors in stable boxes. The reference cables come with measurement protocols that provide information on fiber position, as well as attenuation and interferometry values.

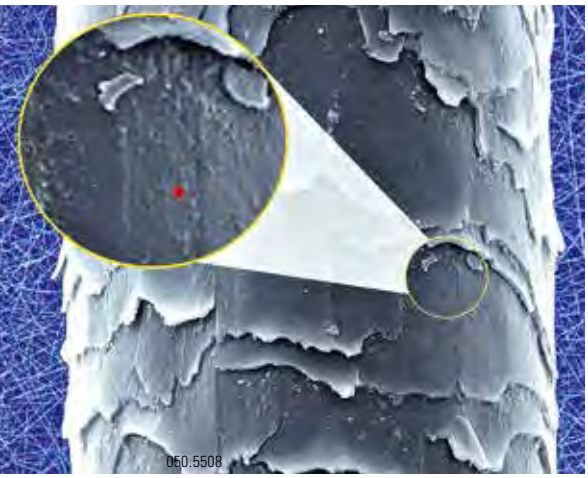
R&M Increases Precision in Fiber Optics

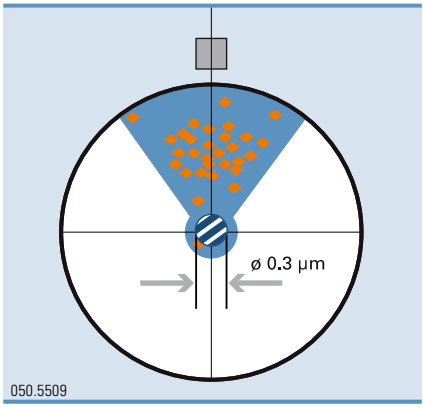
New reference cables from R&M make it possible to test the quality of fiber optic connectors more precisely than ever before. They are aligned precisely to the nanometer and set standards in quality testing.

R&M has been manufacturing fiber optic connectors in top Swiss quality for years now. The products fulfill Grade A* criteria and their quality is constantly well beyond what the standards require. R&M has now transferred the high demands made of fiber optic systems to reference cables.

Manufacturers, test labs and users need reference cables for the final testing of fiber optic connectors. The exact position of the fiber within the ferrule is crucial in these cables. The fiber core that transfers the light has a maximum eccentricity of 0.15 µm or a concentricity of 0.3 µm with respect to the ferrule in the R&M solution. These narrow tolerances are necessary to be able to test serial connectors repeatedly allowing comparisons. R&M uses these absolutely centric reference cables for worst-case measuring that is second to none in quality control.

Comparison of sizes: The tolerance range of an R&M reference cable is 233 times smaller than the diameter of a human hair (approx. 70 µm). The red dot in the yellow circle shows the tolerance range of the fiber position. Photo composition.





A keyhole picture of an aligned FO connector: blue area = admissible area for the fiber offset; orange dots = typical distribution of measured connectors (fiber axis); blue hatched area in the center = the admissible area of the fiber axis of the reference cable (0.3 µm). Most connectors show a smaller offset to each other than to the reference connector. This means the each-to-each values are the same as or smaller than against the reference.

To date, reference cables were only available with an eccentricity of 0.3 µm – in other words with tolerances twice the size. In every test, users had to take into account a factor for testing inaccuracy.

Better quality testing

R&M aims both to deliver the best possible quality and be able to prove it. This is why the company developed its own new reference cables. In addition to the eccentricity values, R&M also defines the exact position of the fiber axes in the tolerance range for these cables. This makes the results of comparison tests even more reliable.

The alignment of connectors has to be absolutely reliable. In other words: In every connector, the fibers should be stored in a defined and documented sector to be able to guarantee light transfer between the fiber stubs that is as loss free as possible. If this is not the case, the attenuation values in specific use (in each-to-each connections) can increase quickly although the connector looked good in the reference measurement. For more details, take a look at the white paper "Manufacturer-Neutral Quality Grades for Fibre-Optic Connectors". ■

Download R&M white paper:
www.rdm.com > Service > Downloads > White Papers

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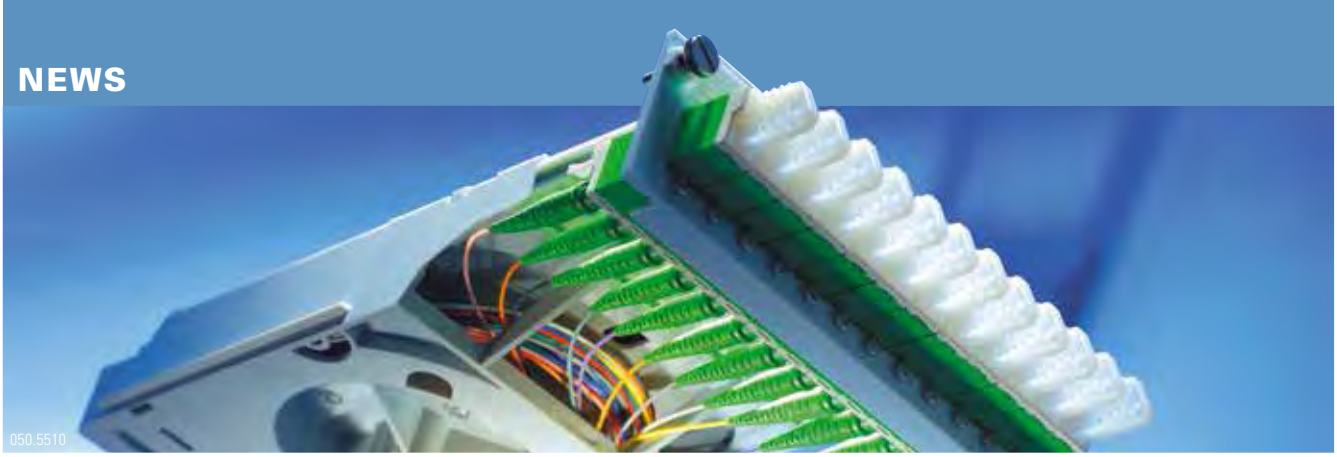

Complete High Density Platform

Today, high density in cabling is standard. Nobody has space to waste in racks and network cabinets. R&M's High Density (HD) Platform reflects this trend – now with trays for high density FO solutions.

R&M is extending possible uses of the HD platform for 19" applications. The range now features inserts for R&M FiberModules and R&M MPO Modules. The trays are simply pushed into the high density platform.

The tried and tested standard concepts for bundled FO distribution – FiberModules and MPO Modules – also show their strengths in the high density version: well laid-out connector panels, simple operation, high operational reliability, extremely precise manufacturing and one-hundred-percent quality control.

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MPO Modules and FiberModule

For planning and installation, the following simple equation still applies: one installation cable = one FiberModule.

The HD platform for sophisticated applications in office and data center cabling provides the maximum packing and power density imaginable on one height unit (1 U). The HD platform becomes a 48-port panel with the FiberModule – whether as the breakout or splice version – and with the HD MPO Module.

If you base your planning on MPO/MTP® connectors and 24 fibers per adapter, up to 1152 connections can be established on one height unit. Because in a grid of four, there is space for 48 multifiber connectors. Alternatively, you click in 48 LC-Duplex adapters for 48 bi-directional FO connections into the module holders. Or up to 48 Cat. 6_A ISO modules by R&M.

These are just a few examples. The HD platform can be assembled and equipped in a number of ways. It is even simpler to integrate pre-terminated units into the rack making any installation job a piece of cake. For HD FiberModules and HD MPO Modules R&M provides pre-terminated solutions with VARIO-*line* cables and MPO/MTP® trunk cables.

High density made by R&M thus means that users remain fully flexible. There are no limitations in comparison to earlier generations of patch panels. The HD platform covers all medium- to long-term cabling requirements. It is the universal basis for the age of 10 and 40/100 Gigabit Ethernet high-end applications. And at the same time, it provides the standard R&M "get more": convenient handling, easy labeling, intelligent protection with the R&M Security System, as well as unsurpassed stability and material quality. ■

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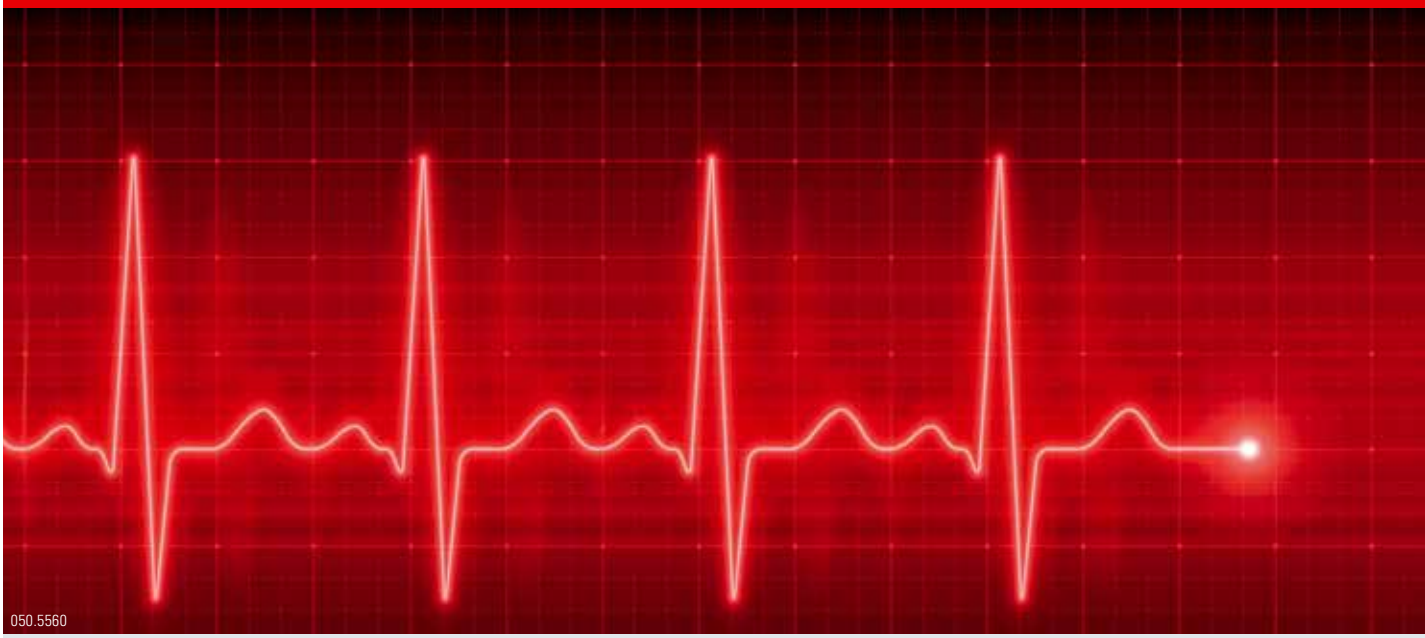

Frontier Mediville,

a Global Hub for Medical Innovation and Treatment,

Selects R&M's Cabling Solutions

India is rapidly emerging as a global hub for innovation in medicine, healthcare, and life sciences, as well as a leader in scientific research and medical tourism. The emergence of India as a single destination for availing all these services is a result of the country's well-trained medical staff, state-of-the-art hospitals and diagnostic facilities, as well as the availability of best-in-class treatment at relatively low costs to patients from India and around the world.

"Given the critical nature of the research and medical treatments being carried out, we want to build IT infrastructure so that our employees and users remain connected without facing any disruption."

Dr. Cherian, Founder of Frontier Mediville

One such ambitious project is Frontier Mediville. The brain-child of the world renowned cardiac surgeon, Dr. K.M Cherian, Frontier Mediville was conceived with the vision to provide world-class healthcare to every global citizen. This medical village is established on a 360-acre campus in Elavur Village, a rural setup near the city of Chennai.

Several diverse projects will form part of Frontier Mediville. Key projects to be developed in future phases will include:

- A unique **Bio-Hospital** that would provide state-of-the-art care in all sub-specialities supported by modern sciences such as stem-cell technology, tissue engineering, nano-technology etc.
- A **National Medical Science Park** to serve as a platform for professionals to not only keep pace with global scientific research, but also conduct basic and applied research.
- A **Herbanarium** to house and develop genetically engineered plants and medicinal plants to extract molecules for therapeutic treatment.
- The **Medical University** with medical research and experimental surgical facilities: It will aim to enhance the academic education of future medical professionals.
- The **Sterile BioMedical Corridor** will facilitate manufacturing of consumables, disposables, as well as pharmaceutical products required for hospitals and research laboratories.

In addition, Frontier Mediville will house facilities such as a five-star hotel, holis-

tic therapy centers, a shopping mall, a golf course and indoor sports stadia, all of which make it a compelling destination for medical tourism.

To support a project such as Frontier Mediville and the diversity of applications and research, there has to be a strong focus on building a reliable, high quality IT infrastructure. "Given the critical nature of the research and medical treatments being carried out, we want to build IT infrastructure so that our employees and users remain connected without facing any disruption," says Dr. Cherian, the founder of Frontier Mediville.

R&M was given the opportunity to be part of the maiden project, the National Medical Science Park (NMSP), as a result of R&M's focus on the quality of cabling products and a portfolio of products that could address the needs of Frontier Mediville.

As a hub for research, training and treatment with a focus on regenerative medicine, data is being generated constantly in the form of medical research findings, laboratory test results, patient information, and data from other facilities. To take into account the existing and upcoming infrastructure, a fiber optic network was created for backbone and campus-wide connectivity while copper cabling systems were deployed to provide connections to users and to the equipment.

THE R&M SOLUTION

- **Real10 Cat. 6 FTP, 100 000 meters**
- **Fiber optic 12-core OM3 cables, 10 km in length**
- **R&M Security System color codes and patch guard**
- **IP54 rated splash guard and splash caps**

Cabling with a secure physical layer

R&M worked closely with the installer to create the fiber optic network using 12-core OM3 cables of up to 8 km in length. The Real10 Cat. 6 FTP solution was used to offer connectivity to 1500 nodes as well as data and voice connectivity in office areas. To augment security in critical areas of the offices, R&M's Security System was recommended. In this case, the Patch Guard locks were used with copper patch cords to fulfill the security requirements and the color-coded caps were used on the ports for simpler identification.

IP protection

Another notable issue was the need to keep dust and fluid away from several research areas in the facility which were prone to fluid splashes. To do so, R&M IP54 rated products, such as the splash guard and splash caps, were deployed since the equipment was connected to the network through copper patch cords. R&M conducted on-site visits to ensure timely completion of the project.

"The National Medical Science Park is a major milestone for Frontier Mediville. I am satisfied with R&M's successful deployment of required solutions for this phase and their on-time completion of this project." said Dr. Cherian. ■

Overview of the impressive area:
www.connections.rdm.com

www.frontierlifeline.com

Gladious Subash | R&M India
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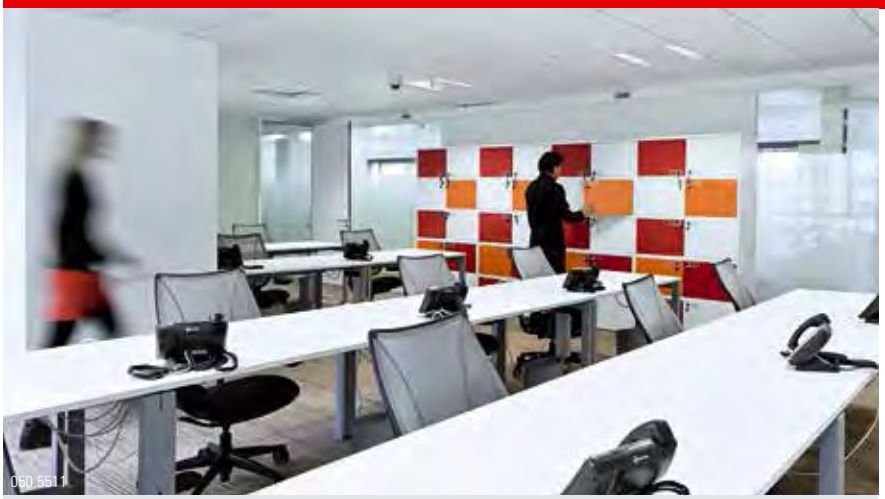

R&M Networks the "Link"

Until January 2012, Ingénico's Paris team worked at two different addresses. In 2011 the management decided to concentrate the entire subsidiary in a single new building in view of the outdated localities and favorable real-estate market.

The company is global leader in the electronic pay system sector. Its success is based on excellent technology and the company thus wanted its new headquarters, due to accommodate 650 employees, to reflect its technology lead. Mobilitis, advisor to Ingénico on the move, was given a short list of requirements leaving no doubt about the company's purpose: technology and sustainability.

Ultimately, a 14-story building was chosen, with the environmental label HQE (haute qualité environmentale, or high environmental quality). On completion, the building now features, for example, electronic controls for the entire building equipment and appliances as well as twelve video conference rooms. The offices too had to be equipped in accordance with the prevailing method of working in the company: Teams put together on an ad hoc basis necessitate highly mobile workstations. So reliable network connections were required everywhere. The structure of the building would make changes to the network at a later date difficult. So the chosen solution also had to be future-proof.

B-Telec Consulting, the chosen planner for the project, met this challenge by selecting R&M products. In concrete terms, this means that on 10 000 m² of office space, 100 kilometers of Cat. 7 S/FTP cable connect the approximately 2500 RJ45 (Cat. 6_A ISO) ports with the distribution cabinets installed on every floor. These in turn are connected to the IT room via an FO OM3 line via LC-Duplex connections. To ensure redundancy, an additional network was installed on an RJ45 copper basis (Cat. 6_A ISO).

Didier Buzonie, consultant at B-Telec Consulting, explains the choice of R&M products as follows: "The quality of the products, their reliability and the general performance of R&M solutions guarantee exceptional sustainability of the infrastructure. The 10G products used represent a gain of over 7dB in terms of Next with more than 90 % of the installed connections which is outstanding. And the Swiss manufacturer also has another trump up its sleeve: its technicians." With its installation partner BD Com, the specialists from R&M monitored and supported the project throughout, ensuring results that corresponded exactly to the customer's requirements.

Sébastien Michard, BD Com: "BD Com is a company specializing in top-of-the-range IT cabling. Why has BD Com opted to collaborate with R&M on its projects? It is a very simple choice: With our customers, such as Mobilitis, we prioritize the integration of top-quality products offering very high performance levels. This enables us to provide a 25-year system warranty."

Occasionally, employees refer to the new HQ with its premium-class network infrastructure as the "Link". ■

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New CEO

Michel Riva has been the new CEO of R&M since the beginning of September. At the same time, co-owners Martin and Peter Reichle stepped down from their positions in operative management to devote their full attention to their tasks on the Board of Directors. They will, however, continue to represent the owner family with personal contacts to business partners.

Michel Riva, 47, is from Switzerland. He has held a number of executive positions both in Switzerland and abroad including spells at Hoffmann La Roche and DuPont. Over the past eight years, he redefined the Bonding Systems Division strategy at Forbo in Baar leading it to strong and profitable growth.

The experienced business economist took up his duties at R&M with great joy and commitment. "I am particularly impressed by the top quality of the R&M products and the acknowledged innovative strength of the company. R&M's great growth potential was a further reason why I decided to take up this challenge," says the new CEO with conviction.

A new era began in the management structure at R&M on September 1, 2012. The Board of Directors, the management and all employees would also like to take this opportunity to welcome Michel Riva and look forward to working with him. The new CEO will address our esteemed business partners personally in the next issue of CONNECTIONS. ■

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R&M*freenet* uniPhy: AIM Retrofittable Solution

The need for AIM systems will increase considerably in the near future because the physical infrastructures in data centers are becoming ever more complex and can only be controlled completely with automated technology. R&M has been observing this trend for some time now and is developing a corresponding solution. It is called R&M*freenet* uniPhy and is a project R&M is engaged in together with several renowned software and hardware partners.

R&M*freenet* uniPhy will allow AIM functions to be retrofitted into standard R&M platforms. The system consists of two components: R&M*freenet* uniPhy Manage and R&M*freenet* uniPhy Monitor.

R&M*freenet* uniPhy Manage is a software application for the administration of physical infrastructures. It is built around a central database and provides both inventory functions and an application for resource management. This enables the optimum use of free capacities. uniPhy Manage has a work order system that helps support controlled changes to the infrastructure. This means modifications can be planned in advance and their execution monitored. A visualization of the network on different layers as well as high-performance search and report functions round off the program. uniPhy Manage is modular in structure and contains interfaces for exchanging data with third-party systems.

R&M*freenet* uniPhy Monitor enables real-time acquisition of network connectivity. This acquisition takes place using RFID technology. Transponders on every port observe which cable is plugged in where and where it goes to. The universal HD platform from R&M can be retrofitted with uniPhy Monitor. Both copper and FO connections are supported with R&M*freenet* uniPhy. The system works with R&M standard patch cords. LEDs on the patch panels help technical personnel with all patching tasks. ■

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Cogas Accelerates Installation of Glass Fiber Connections

Cogas, a network operator in the Dutch province of Twente, is installing glass fiber connections in residential homes, offices and shops in nine different municipalities. Thanks to a customized solution from R&M, based on high density Optical Distribution Frames, they can fit nearly 1000 additional connections in every distribution cabinet and fast-track their planned rollout.

TANGO

For nearly half a century, Cogas has been the energy and cable network manager for approx. 130 000 households and companies in eastern Netherlands. During the course of time, these regional infrastructure services have been extended with the business units Cogas Duurzaam (COGAS Sustainability) for sustainable energy projects and Cogas Meetdiensten (COGAS Metering Services) that processes national measuring data on energy flow for low- and high-volume users. In late 2011, having gained initial experience with glass fiber connections to 150 residential homes the year before, the company started installing fiber optic cables across the entire region. "This project forms part of our TANGO program, which stands for To Achieve New Growth Opportunities, and was initiated by our business manager Menno van Dijk," says Program Manager Ivar ten Velde. "TANGO is preparing us for a future of new interactive services. The glass fiber network is indispensable in realizing this. After Cogas started a second pilot of 1850 connections involving a new solution in the distribution cabinets, the project was scaled up to 80 000 connections in response to competitive pressure. This was not only a major challenge in terms of installing the glass fibers, but also for the development of new services and all corresponding marketing communication."

Reducing time-to-market

For a number of years now, Cogas has been monitoring the trend in which digital media continues to personalize and that content and services need to be aligned to this. On the basis of a long-term vision and a survey into the needs and wishes of clients, the management decided to install an open glass fiber network. This is a network that is independent of service providers. "Although we have been the network operator in this region for decades, our competitors consider this area a potential region for market expansion," ten Velde continues. "That is why we decided to accelerate the installation of fiber optic cables, thereby reducing our time-to-market. An important hub in fiber networks is the so-called POP (Point Of Presence), where all district connections merge. It is a small concrete building in which all glass fibers are connected to routers, which subsequently ensures that the requested services are delivered to the correct clients. Acting on the recommendation of GM Products (R&M distributor partner in the Netherlands), we implemented an R&M passive optical fiber infrastructure in our POPs. Thanks to the high density R&M ODF (Optical Distribution Frame), we can now fit 3456 connections in every POP instead of 2500, saving both space and time. In consultation with R&M, we also arranged for these ODFs to be fitted at the manufacturer of the POP hub, as a result of which our contractor only needs to install modules in the ODF frames and can start optical fiber splicing thereafter.

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"Since the modernization and preservation of our infrastructure and service offer are strategic spearheads for Cogas, we fully intend to work with the same partners in the long term."

Ivar ten Velde, Program Manager


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Working on the digital future

Operating from a socially involved perspective and mission with the optical fiber project, Cogas aims to create an open, low-threshold and accessible network which is prepared for the fast-changing digital future for all current and future applications of national, regional and local service providers. One of the ways in which this openness is expressed is in the manner in which all services are incorporated into the network for both private and business clients. "Our competitors accommodate all equipment and connections for both client groups in physically separate sections of the POP, whereas we use Cisco routers to achieve this," Project Coordinator Erik Sanders explains. "Imagine a healthcare institution or a school with the desire to purchase a personalized package of services in the future. We are able to make this customized delivery simply and securely by using a VLAN. Thanks to the selected equipment, passive components and POP setup, our network is both extremely compatible with new applications and flexibly scalable for future expansions. In addition to the space-saving properties of R&M ODFs, I have found that our contractors are having no trouble connecting fibers to them, making the systems organized and neat. This is partly thanks to a combi-module assembled especially for us, in which the patch inserts with connectors have the same fiber coding as the optical fiber cables to be installed. This type of detail further simplifies the installation work and prevents errors."

"In addition to the space-saving properties of R&M ODFs, I have found that our contractors are having no trouble connecting fibers to them, making the systems organized and neat."

Erik Sanders, Project Coordinator

Working together on the basis of trust

The TANGO program has a major impact on the Cogas organization and all suppliers involved. In a short period of time, new infrastructures must be installed and entirely new services developed, as television and telephony become more and more interwoven with the Internet. "As a Program Manager, my best experiences have come from working together on a trust basis with professionals in their own fields of expertise," Ivar ten Velde says. "For Cogas and this project, they are Marcel Eppink, who designed the new POP concept, and Erik Sanders, who manages and supervises the implementation. Together they opted for the R&M configuration and, in mutual consultation, refined the total solution in detail. To me it was important that, when coming face to face with staff of both R&M and GM Products, I was given the impression that they were genuinely involved, able to respond quickly and produce solutions, even in the face of setbacks. Since the modernization and preservation of our infrastructure and service offer are strategic spearheads for Cogas, we fully intend to work with the same partners in the long term. Now that we are in the middle of the accelerated implementation phase, we know beyond any doubt that we have indeed teamed up with the right partners." ■


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Communication Technology: Enriching People's Lives

The development of new technologies has always played a role in human development. Communication technology especially has changed the world drastically, extending opportunities and benefits for people in various fields as well as in their daily lives. From education to business to interpersonal communication, and even crisis management, communication technology has an impact on our daily lives as well as on how our society behaves.

The Internet and e-mail are just a few examples of how communication technology has made our lives easier by enabling people to communicate and access information as never seen before. The younger generations, in fact, cannot even imagine life without e-mail, SMS, Facebook, or Google. Most do not even know what it's like to write a letter and physically mail it.

> Communication technology advances have connected us in a way that has transformed the world into a global city.

Communication technology advances have also connected us in a way that has transformed the world into a global city. We can now instantly follow the latest happenings around the world as well as do business without physically being in the same place. Sellers can find buyers. Classes are taught by teachers sitting on the other side of the globe. 24-hour customer support lines are managed by centers around the world. Physicians access patient histories and update them remotely. Experts now use video conferencing for faster client responses and to resolve technical issues without traveling to the site. News channels and websites give us 24-hour media coverage from all over the world in real time. This is all thanks to the wide range of communication technology developed for mankind.

Microsoft's Bill Gates is quoted as saying, "We will have infinite bandwidth in a decade's time." If we look into present and future demands, commercial information transfer will consist of low-speed and high-speed bandwidths. Applications will use voice, video, and data. Examples of low bandwidth data applications include building automation, alarm, and security systems; telecom central office connectivity and data centers require high bandwidth. Several industry authorities have specified a series of standards to follow based on various applications.

Communication networks can be implemented by various transportation mediums such as copper, fiber, or microwave, with each having their own advantages and disadvantages. Each however plays their own role depending on the application layer, quality, etc.

> R&M makes sure it offers Swiss engineered quality solutions to the communication industry worldwide.

The quality of communication infrastructure, however, is of the utmost importance, with an unlimited high-quality network especially fundamental for defense, healthcare, telecom, etc. It is essential to have a long-term vision when investing in a communication infrastructure network and its quality so that the entire community enjoys its benefits for a long time.

Just as the Swiss manufacturing industry is known for delivering high-quality products and solutions, renowned cabling solutions provider Reichle & DeMassari (R&M) makes sure it offers Swiss engineered quality solutions to the communication industry worldwide.

R&M's success comes from its global customer base. For over 48 years, R&M has deployed a multitude of future-proof communication infrastructure networks for a range of vertical markets such as telecom, petrochemical, utility, data centers, and government authorities.

R&M has two strong divisions for connectivity, one being fiber and the other copper. R&M's cutting-edge product design also ensures that it develops and delivers products which exceed industry standards and specifications for all transport layer applications. ■

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Scalable Investment Costs

The Colombian Ministry for Information Technology and Communication (MINTIC) is responsible for nationwide electronic media and telecommunications in the South American country. When the decision was taken to install new office cabling in the offices of the Ministry in Bogota, a complete solution from R&M was selected.

Four years ago, at the start of a long and exhaustive evaluation phase, the first contact was made between R&M Latin America and the project managers at the Ministry. The actual project was launched in 2010. In accordance with customer specifications, the technicians from R&M Iberia worked with MINTIC to develop a tailor-made solution. The role of the QPP quality assurance program and the end user training conducted during the course of 2011 is not to be underestimated in the decision to bring R&M on-board. Once again, these sales instruments proved to be of vital importance. As a result, the installation went ahead without a hitch.

The solution for the 1400 connection points consisted of Cat. 6_A office cabling and an FO backbone. Security is provided through level 1 of the R&M Security System. Thanks to the binding project and the support of the R&M technicians on site, costs remained transparent and scalable throughout.

> "There was never a moment of trouble during our cooperation with R&M and the distributor Cofitel Andino."
>
> Alejandro Caballero M.,
> Systems Engineer, IT Coordinator
> Eduardo Enrique Vanegas I.,
> Systems Engineer, IT Database Specialist
> Fernando Alrio Contreras S.,
> Systems Engineer, IT Data Transmission and Communications Specialist
> MINTIC

The customer was most impressed with the cooperation and the end result.

"There was never a moment of trouble during our cooperation with R&M and the distributor Cofitel Andino. We were in excellent hands, from the consultancy phase through the training to the commissioning. The project partners provided expert support. We were very pleased with the highly-professional and technically-oriented R&M QPP training courses organized by Juan-Pablo Muñoz," explained the MINTIC project managers. Plans are already being discussed with a view to introducing the uniPhy network management software. For more information, see page 15. ■

WHY R&M?

- **Assistance and support**
- **Product quality**
- **Technology**
- **Training**
- **Support throughout the entire project and execution phase**


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Rooya Group's new undertaking "Telal Al Alamein", two and a half hours from Cairo, on Egypt's North Coast is built over an area of one million square meters.

Founded in 2007, the Rooya Group is one of Egypt's fastest growing real estate development and tourism investment companies with an outstanding track record in delivering luxurious state-of-the-art residential facilities. The company, which has invested more than USD 2 billion in real estate development, prides itself on building strong trust-based relationships with its property owners. Providing residents with the latest and highest quality facilities plays a large role in building this level of trust. Which is why, when selecting a cabling vendor to implement the project, R&M stood out as the company of choice.

The cabling project which was carried out well within the six month time frame involved the installation of R&M's Cat. 6 cabling infrastructure for the complete connectivity for more than 900 villas. The aim of the project was to provide residents with excellent connectivity thereby permitting the availability of highly reliable and secure high-speed Internet and HDTV services.

Swiss quality and local support

With over 48 years of specialized focus in the structured cabling industry, R&M is world renowned for unprecedented quality with an unmatched level of flexibility. This Swiss quality has made the cabling specialist one of the top three cabling vendors in the Middle East. When considering potential vendors, Mohamed Salah, IT Director of the Rooya Group, and his team undertook a careful evaluation of local and global players. This meticulous process, which took over six months, ultimately led to the selection of R&M as the Swiss vendor met all the criteria set by Mr. Salah and his team.

Mohamed Salah, IT Director of the Rooya Group, pointed out that there were two significant factors behind his decision to go with R&M. The first was R&M MEA's local presence in Egypt which provided timely and skilled support. R&M MEA's mission has been to invest "in the region, for the region" which is why the company has seen rapid growth in its staff strength even during the Arab Spring. This investment has meant the ready availability of support throughout the project implementation leading to speedy deployment and on-time delivery.

The second key factor was the 25-year systems warranty that R&M offers on its cabling solution and implementations. This warranty is a testament to the company's faith in the quality of its products and implementation. As a leading real estate development company, the Rooya Group ensures that the products and material used in its projects are of top quality. This assured quality gives its customers peace of mind concerning the long term security of their investment.

For the massive cabling project, R&M's industry leading Cat. 6 cabling infrastructure was used for ultra high performance connectivity. The high-quality twisted pair cables which support Gigabit Ethernet were suggested by R&M as they met the present requirements while accommodating future needs as well. These cables which are suitable for transmission of voice, video and data ensure maximum performance and connectivity throughout the network by enabling faster broadband transmission speeds.

Training for success

In addition to providing high-quality easy-to-install cables for the Telal Al Alamein project, R&M also ensured that the in-

High Speed Cabling Infrastructure for Rooya Group's "Telal Al Alamein" Residential Complex

R&M Middle East and Africa successfully completed the implementation of a large scale cabling project for the Rooya Group, a prominent real estate development company in Egypt.

stallation companies for the project received the best possible training through R&M's flagship Qualified Partner Program (QPP). The program involved hands-on sessions to recreate real-world scenarios and provided the engineers with all the training necessary to smoothly and efficiently carry out the installation process.

"R&M through its local support always strives to deliver the high-quality solutions that our customers have come to expect from us. Right from project study during the design phase to selection of the right product and providing assistance to the installation team through the implementation process, customer satisfaction is our prime aim," said Mohamed Allam, R&M Sales Manager, Egypt.

> "R&M through its local support always strives to deliver the high-quality solutions that our customers have come to expect from us."
>
> Mohamed Allam, R&M Sales Manager, Egypt

Customization – the aesthetic appeal

Apart from providing an extensive product portfolio of over 5000 copper and fiber optic cabling products, R&M specializes in the customization of its products to meet individual customer requirements. With the ability to tailor products according to each customer's needs, R&M provides complete cabling solutions instead of just "selling a box". For the Telal Al Alamein project this meant matching the decorative faceplates of the connector boxes as per the architect's specification.

Mohamed Salah looks forward to a long lasting mutually beneficial relationship with R&M and has already awarded the cabling specialist with the contract for the Rooya Group's next project which is already underway.

Alfred Tharwat, Area Sales Manager for Africa: "We are very happy with the outcome of the Telal Al Alamein project. This is not just a successful project implementation but the first step in what promises to be a rewarding long-term relationship." ■


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Everything under Control in the Data Center

Total control over everything that happens in the data center. That would be a dream come true for administrators as they have to guarantee interruption-free operation. For active devices, they are already using tried and tested monitoring and management systems. Now, there are solutions for the passive infrastructure. AIM is the new buzz word in the data center.

The systems for managing complex infrastructures in modern data centers and large building cabling systems are called AIM = Automated Infrastructure Management systems. Management systems to centrally monitor and control the active network equipment have been available for quite some time. But these network management systems (NMS) provide only limited insight into the physical infrastructure (Layer 1). The transitions between AIM and NMS are seamless (Fig. 1).

Automation instead of notes

In many installations, the physical infrastructure is managed with "on-board tools" such as Excel spreadsheets and Visio graphics. Even paper, pencil and Post-it® notes are used. You quickly reach your limits though if you try to apply these methods to large data centers or complex building cabling systems. Incorrect, out-of-date and unreliable documentation make changes to the infrastructure something like walking a tightrope without a safety net. Sensible expansion plans and risk analysis are simply impossible. This is exactly where AIM comes in.

> In an AIM system, the entire infrastructure is represented in a consistent database, a single "source of truth".

In an AIM system, the entire infrastructure is represented in a consistent database, a single "source of truth". This database provides precise and up-to-date information on the current state and future requirements of the data center (Fig. 2).

Inquiries about resources such as server ports, available cabinet space as well as energy requirements and cooling capacity are quickly and easily answered with this database. Improved capacity utilization of the existing infrastructure as well as the simple and exact planning

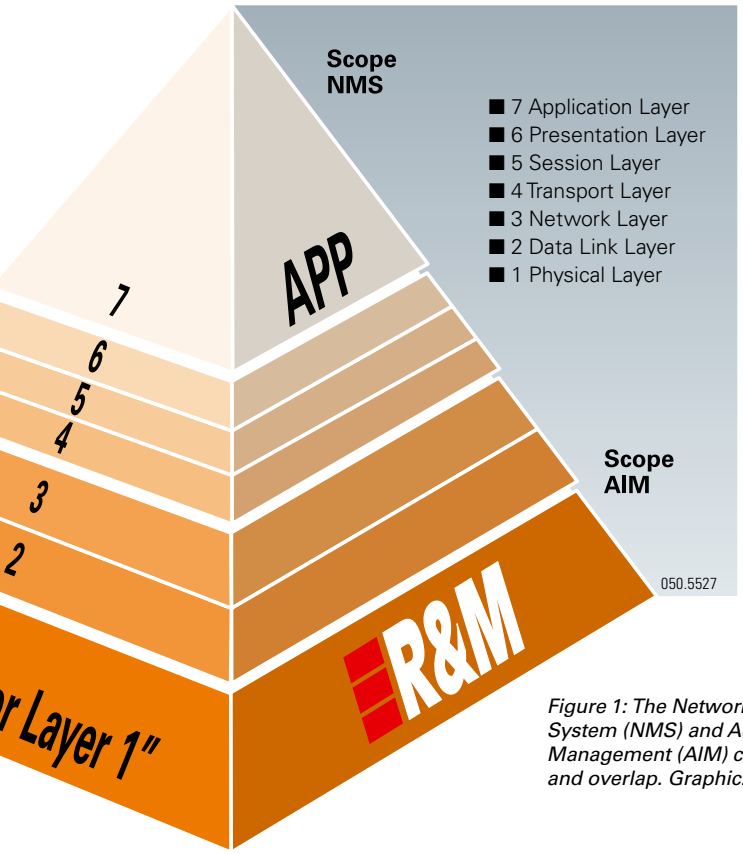

Figure 1: The Network Management System (NMS) and Automated Infrastructure Management (AIM) cover several layers and overlap. Graphic: R&M

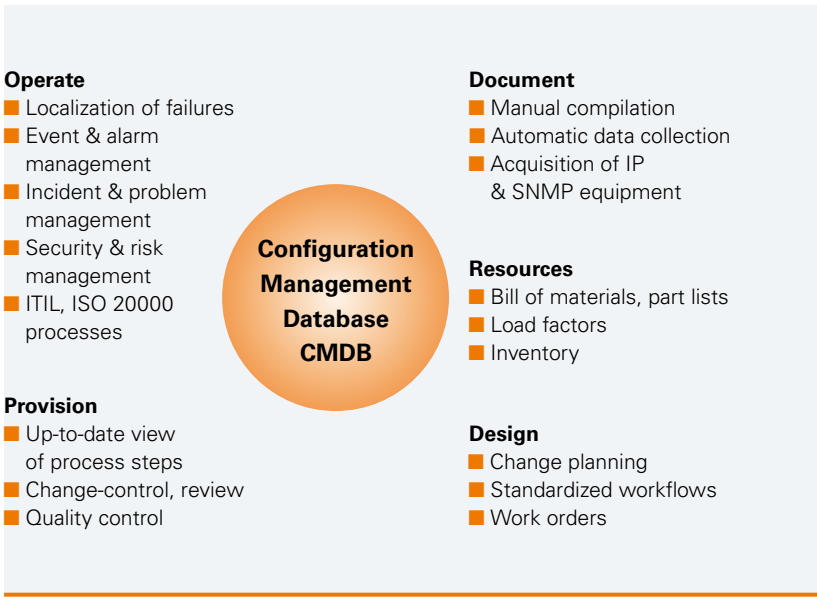

Figure 2: AIM provides a varied database for the management, security and further development of a data center. Graphic: R&M

of changes and expansions are immediate advantages of AIM systems.

AIM enables controlled modifications to the infrastructure. The system generates work orders for the installation staff and monitors their execution. If AIM hardware is installed in the field, the installation engineers are given direct support in their work. LEDs for example show which ports have to be patched. AIM thus accelerates patching and helps avoid errors and mix-ups.

Goal: greater availability

AIM monitors the installation and detects any disruptions to operations. The system can warn staff and provide precise descriptions of the errors. This reduces repair times and also increases the availability of the system. Further functions of AIM are risk analysis and protection against disasters. AIM systems can be used to enact scenarios and plan emergency measures.

As all changes are made under control of the AIM system, the central database is always up-to-date. The automated capture of all relevant information in real time gives the administrator greater peace of mind, security and a greater capacity to act. IT managers can fall back on the latest complete documentation at all times. AIM makes it possible to prove that all standards for data center operations have been adhered to.

Standardization starts now

In February 2012, the standardization committee ISO/IEC JTC 1/SC25 started processing a work item entitled "Automated Infrastructure Management System" (AIM). The standardization of AIM is to be developed as an appendix to ISO/IEC 14763-2. The aim is to describe the basic functions of AIM: documentation, inventory, support in error recovery, automatic detection of switches and end devices.

Several other standards that indirectly make AIM necessary are also relevant. These are standards dealing with the secure operation of data centers and risk management and include the ITIL (IT Infrastructure Library), ISO/IEC 20000, ISO/IEC 27001, Basel III and SOX (Sarbanes Oxley Act). ■

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Creating a High-Performance Cabling System for a Tobacco Manufacturing Plant in China

The "Eleventh Five-Year Plan" for the technological transformation project carried out by the Hangzhou manufacturing plant of Zhejiang China Tobacco Industry Co Ltd is a key construction project of China's State Tobacco Monopoly Administration and the city of Hangzhou, Zhejiang province.

It is also the first domestic engineering project to apply the BIM (Building Information Modeling) design. The project is located in the regions of Zhuantang and Fushan, within the West Lake Technological Economic Industrial Park in Hangzhou, owning a construction area of around 666 667 square meters as well as a built-up area of 624 400 square meters.

The project comprises two phases. The first phase encompasses a built-up area of 298 349 square meters and a total investment of RMB 2.059 billion. It includes the construction of shared workshops, power centers, manufacturing stations, recreation centers, quality control centers, central laboratories, a processing line with a total capacity of 12 000 kg/h (based on 3 lines with 4000 kg/h capacity each), a product logistics system, a shared power unit, and the information system for the entire plant.

Assessment and recommendations

Based on the overall cabling requirements of the respective functional areas, three important criteria were identified: first of all, the ability to support a range of computer network equipment, telecommunication systems, monitoring systems etc; secondly, the system must be advanced, reliable, interchangeable and expandable; and last but not least the cabling systems submitted by tenders must be mature products with proven track records and capable of a smooth transition in the event of a possible switch or an expansion, and the incorporation of new technology into the network architecture in the future. After

several rounds of discussions, the team decided the best approach would be an overall project design, step-by-step implementation, gradual installation of equipment and consolidation of resources, as well as operations and application.

> Thanks to standard-compliant implementation and the technical support from R&M, the project was successfully completed.

The intelligent system focuses on ensuring the stability and reliability of fundamental facilities, such as efficiency and safety of the communication network, as well as on immediate feedback from the information service. The design of every sub-system took into account the technical synchronization of the entire system. Any conflict between sub-systems had to be resolved based on the requirements of the overall synchronization in order to achieve optimization.

Implementation

The manufacturing plant's cabling system utilizes the conventional star-shaped topological structure. This project involves various sub-systems of the cabling system such as work location, horizontal cabling, administration, backbone, equipment room and campus sub-systems. There are 5000 information points in the building design, of which 3000 are Cat. 6 unshielded data jacks, while the remaining 2000 are Cat. 6 shielded data jacks. The horizontal sub-system utilized a combination of R&M's Cat. 6 unshielded and Cat. 6 shielded cabling systems based on different requirements. The system can satisfy any access layer applications. In addition, R&M cables possess high residual capacities which make them more than capable of handling further applications in the future. The analog backbone is made up of R&M's 100-, 50- and 25-pair cables. All backbone cables are Low Smoke Zero Halogen (LSOH), thus ensuring the safety of staff during operation.

Conclusion

Thanks to standard-compliant implementation and the technical support from R&M, the project was successfully completed. After evaluating a large number of tenders submitted by renowned brands, the client was glad to have chosen the right cabling specialist, who demonstrated a high level of professionalism throughout the entire project. ■

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For RJ45 connectors, the standards require high-frequency parameters to be measured solely for the purpose of proving Cat. 6_A characteristics. These measurements take place in the frequency domain and are basically sufficient to ensure successful 10GbE transmission. However, statements made about signal quality based on this method cannot hope to be truly reliable.

Only additional measurements in the time domain such as time domain reflectometry or the evaluation of eye diagrams show further aspects of signal integrity and provide information on where, and particularly how, interference occurs. Verifying signal integrity is thus not a normative requirement but a task required of engineering. Thus, as a user one is not forced to devote one's attention to this topic. But it is nevertheless interesting to know what happens to signals on transmission paths.

The fundamentals of signal integrity

Any periodic signal shape, e.g. the square shape of a binary signal, can be seen as an overlay of sinusoidal oscillations as described by Fourier. The steeper the edge of a square pulse, the higher the frequencies contained in the spectrum. If this pulse passes through a transmission path with limited bandwidth, the high frequency parts are attenuated and the pulse distorted (Fig. 1).

Laying several such distorted pulses over each other appropriately results in an eye diagram (Fig. 2). A closed eye represents symbol crosstalk. In this case, the receiver has difficulty deciding on the right level. The wider the eye is opened, the higher the signal integrity. Eye narrowing not only occurs with bandwidth limitation, however, but also because of jitter – in other words phase fluctuation –, dispersion – the different propagation speed of the frequency parts – and due to system or coupled noise and crosstalk. Using statistical methods, it is possible to calculate the bit error ratio (BER*) to be expected – the actual measure of transmission quality – directly from the eye diagram.

The relation between edge incline and frequency range indicates that specifying the high-frequency parameters is sufficient to ensure a specific BER. This is the reason why the normative speci-

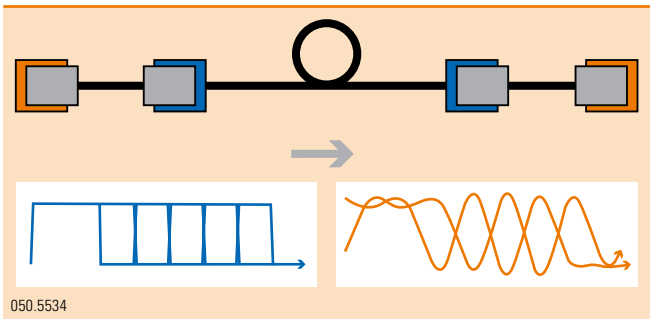
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Fig. 1: Distortion of a simple square signal over a twisted-pair path. The fact that 10 Gigabit Ethernet works with a quinary signal (base-5) does not change the principle.

- *The original data signal of 1.25 ns pulse duration corresponding to the symbol duration with 10 Gigabit Ethernet*
- *The calculated signal sequence after band limitation*

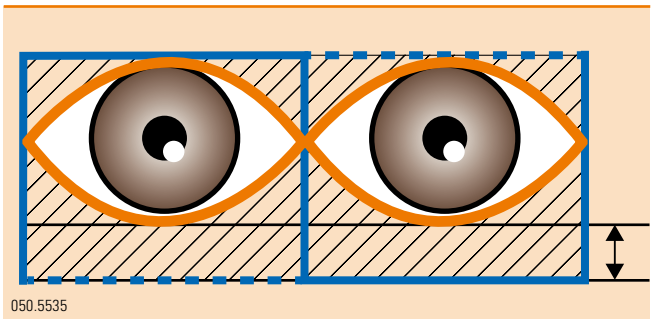
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Fig. 2: Eye diagram.

- *The envelope of a number of pulses.*

The offset (arrow) of the eye opening leads to asymmetry and can reconvert itself into differential crosstalk.

Eyes Wide Open

Signal integrity is the real key to error-free data transmission. The eye diagram shows this at a glance (flash of an eye). But it is based on a large number of sophisticated metrological and mathematical methods.

fications for 10GBase-T imply a BER of 10^{-12} for the entire transmission system, although do not demand it as a direct measurement in the time domain even though this is possible with field measurement devices.

Practical use

Figure 3 shows the simulated eye diagrams for a data signal corresponding to 10GbE that has passed through a Cat. 6, a Cat. 6_A and a Cat. 7_A module. In the case of the Cat. 6_A module with 500 MHz bandwidth, the eye is wide open, whereas the signal sequence with Cat. 6 shows that 250 MHz systems are not suitable for 10GbE. On the other hand, increasing bandwidth from 500 MHz to 1000 MHz shows no noticeable improvement in eye opening (Fig. 3). Cat. 7_A systems thus also only support 10GbE.

Particularly in the case of signal transmission over copper on circuit boards (FR4 substrate), asymmetric signals can occur (Fig. 2) leading to decreased signal integrity. This is why measuring asymmetry (TCL**) is so important. R&M uses its own balunless measuring technology to ensure the quality of the transmission system at the very highest level (see "Measuring without Baluns" in CONNECTIONS 42).

It should be mentioned that 10GBase-T signal transmission is much more complicated than this article would suggest. In addition to the improvement of the signal quality on the passive transmission path (channel), chaotic signals with low determinism can also be reconstructed with complex digital signal processing using an a-priori estimate.

Summary

Signal integrity is thus a typical criterion for Layer 1. The attainable data rate depends directly on the signal integrity. This is true for all applications with fast signals such as PCI, USB, Infiniband, Ethernet etc. – and in equal measure for transmission via copper and optical fibers. Ever more sophisticated computer-aided simulation tools are becoming necessary in development to master the complex phenomena. ■

** BER, Bit Error Ratio, ratio of incorrectly transmitted bits to the total number of transmitted bits. BER = 10^{-12} means: 1 of 1 billion bits can be transmitted incorrectly.*

*** TCL, Transverse Conversion Loss, loss of the common mode part converted into differential voltage at the close end of the same line.*

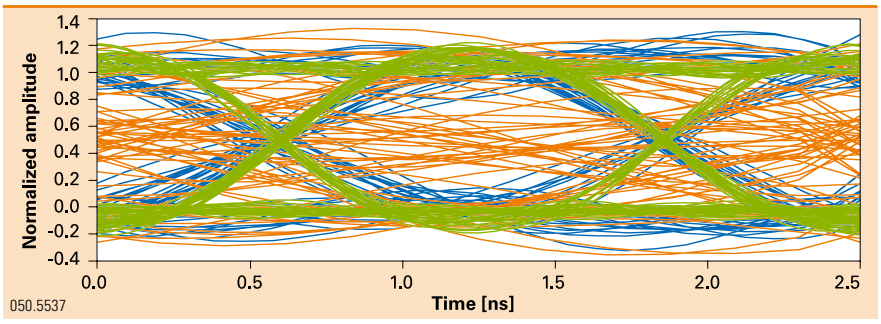

Fig. 3:

- *Limitation of a data signal of 1.25 ns pulse duration to 250 MHz bandwidth (Cat. 6): The eye has collapsed; 10 Gigabit Ethernet data transmission is not possible.*
- *Limitation to 500 MHz bandwidth (Cat. 6_A): The eye is open; 10 Gigabit Ethernet is no problem.*
- *Limitation to 1000 MHz bandwidth (Cat. 7_A).*

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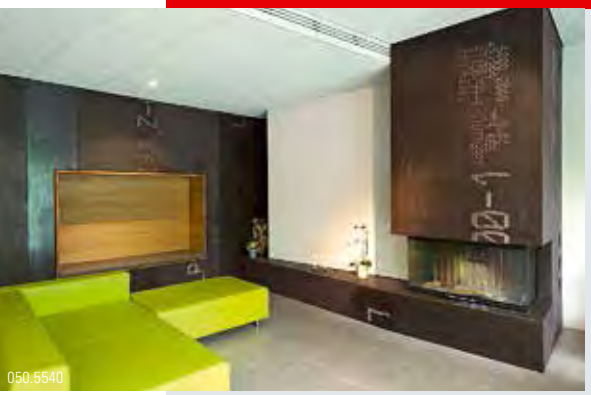

Top Quality for the Top of Europe Region

One of the most impressive experiences you can have in Switzerland is to take a trip to the high alpine world they call "Top of Europe" 3454 meters above sea level. The world famous tourist destination Interlaken in the Bernese Oberland is the starting point for a trip that will be unforgettable. The "Jungfrau region" now features a further attraction since the opening of the new youth hostel at the Bahnhof Ost station. The new hostel is an attractive place to stay with spacious architecture, modern design and an IT infrastructure from R&M.

The Swiss youth hostel organization, www.youthhostel.ch/de, has a network of 52 hostels ranging from romantic castle hostels and magnificent villas through cozy country hostels and vibrant city hostels to a hostel of a totally new dimension, the Youthpalace. Gone are the days when youth hostels had lots of beds in dormitories: Most now offer both double rooms and rooms for four. Cotton sleeping bags are also a thing of the past. Nowadays you nearly always have quilts instead. Youth hostels have no age restrictions, either in Switzerland or internationally, and no longer demand "hands on" participation, making them a trendy place for an overnight stay for people of all ages – partly, it must be said, because they are quite simply excellent value for money. "Our top priority is to keep our services reasonably priced. But we nevertheless want to keep pace with increasing quality demands," says Walter Lutz, Divisional Head of Projects and the man in charge of the new building in Interlaken. "We pay particular attention to straightforward structures, a personal style of management and a pleasant atmosphere."

> "We pay particular attention to straightforward structures, a personal style of management and a pleasant atmosphere."
>
> Walter Lutz, Divisional Head of Projects

Interlaken with a state-of-the-art youth hostel and trendy restaurant

The new hostel has 220 beds and is an attractive place to stay with spacious architecture and modern design. Alongside the building materials wood, concrete and steel, near natural colors exude a sense of warmth and coziness. The project also entailed a new catering concept called "3a – Restaurant bar Lounge". An impressive new building was created in just 26 months – from the very first contact up to the grand opening – next to the Bahnhof Ost station in Interlaken to replace a former youth hostel in the region. Almost 13 million Swiss francs were invested in the project. The youth hostel in Interlaken is the first in Switzerland to be built in accordance with the Minergie-P-ECO standard. Swiss youth hostels have been trailblazers in environmentally friendly tourism for years now and are thus making a clear statement – also to their guests. The operators are estimating that there will be 44 000 overnight stays at the new hostel per year.

THE R&M SOLUTION

- **Cable: STP 750MHZ light**
- **Module: Cat. 6 Real10**
- **Global Panel 3U**
- **Racks 42U**

Top communication infrastructure

In the new youth hostel, people meet up in the spaciously designed lounge in the


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Planners:
www.hanimann.ch
Installation:
www.brunnerimboden.ch
Minergie:
www.minergie.ch
Youth Hostels:
www.youthhostel.ch/en
Jungfrau region Top of Europe:
www.jungfrau.ch

lobby. You can sit round the open fire there, check your e-mails with free use of the WiFi and even have a game of billiards. The top-flight communication infrastructure is the result of meticulous planning by the partner companies Hanimann AG, Zweisimmen and Brunner + Imboden AG in Thun.

The youth hostel association had already realized other projects with R&M products. The cooperation for this project came about as both the planning company and the installation engineers had had good experience of working with R&M before and the parties involved quickly found an acceptable price for all sides. "The products, customer service and the transfer of know-how in the QPP training sessions met our high requirements," says Urs Berger, Head of the Industrial Building Department at installation partner Brunner + Imboden AG. "The importance of the price factor is increasing dramatically in projects. For companies like ours and R&M, it is a major challenge to be able to guarantee high quality standards under the given conditions. Thanks to perfect planning and coordination, we once again managed to meet this challenge in the project in Interlaken." Burger cited a further criterion for customer satisfaction – the logistics: "The quality of delivery was outstanding and the system behind it worked perfectly!"

Surprising challenges

As both a railroad station and the base station of the Harder mountain railway are in the immediate vicinity of the new youth hostel, planners and installation engineers were confronted with a further challenge: direct current and alternating current. As the ground bonding of direct current requires a large terrestrial field, a copper ring with ribbon cable had to be laid right round the building to realize the ground bonding of the building. An additional challenge for the ground bonding was the Minergie standard for which a base plate had to be installed under the whole building. Due to the groundwater, the entire basement also had to be sealed with a kind of tank. ■


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Modal Noise – a Performance Killer Often Overlooked

Modal noise is a phenomenon that can seriously impair transmission via multimode fibers. It can, however, be minimized by using top-quality connectors.

Multimode optical fibers can transport several hundred modes. Mathematically speaking, these modes correspond to the solutions of the Maxwell equations. Practically speaking, these are the different propagation possibilities or "paths" that light in the fiber can follow.

In a perfect FO system, the light energy coupled into a mode is retained in that mode and cannot pass into another mode of the same fiber. But in reality, an optical channel can demonstrate imperfections. If, for example, a connector is misaligned, some of the modes leave the fiber core entirely and continue to move in the sheath where they are highly attenuated. Others transmit either part or all of their energy into other modes.

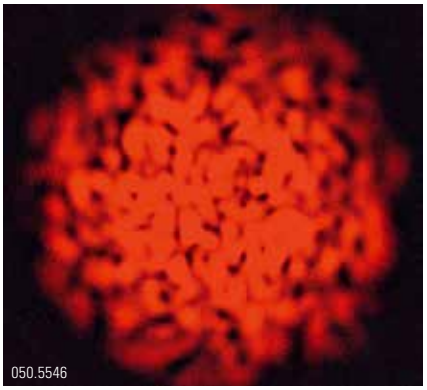
Laser or LED

The problem occurs almost exclusively when laser sources such as VCSELs or DFB lasers with narrow linewidth and considerable coherence length are used. LEDs, however, are high-grade incoherent sources of light with wide

Fig. 1: Typical LED light spot with homogeneous illumination.

Fig 2: Speckle pattern of a VCSEL. This picture shows the energy pattern that occurs at the end of a multimode fiber. It is due to interference of a range of coherent wave fronts.

Picture source: Vadim Makarov, www.vad1.com



spectra that illuminate the fiber evenly (Figure 1).

If the light from a VCSEL is coupled into a multimode optical fiber, it is usually initially transported in four to ten of the possible modes. After the light has traveled a certain distance in the fiber, it still has the same wavelength in all these modes. Different nominal velocities of propagation result in phase shifts, however. This in itself does not cause a problem as every mode ultimately hits a different point of the receiver diode. The only factor that is of relevance here is the total number of incoming photons.

Risk: interference

However, mode coupling effects can result in light from different modes merging in a single mode. The phase differences then result in interference and consequently loss which in the worst-case scenario – same amplitude, 180 degree phase shift – can lead to complete obliteration.

If the signals are absolutely in-phase, all the energy is naturally coupled into the new mode. The resulting energy pattern at the interface of a multimode optical fiber is referred to as the speckle pattern (Figure 2).

Attenuation leads to noise

In mode coupling and the resulting speckle pattern, the result is not pure noise itself nor is it a direct noise source. A speckle pattern is simply the result of light being transported through a multimode optical fiber.

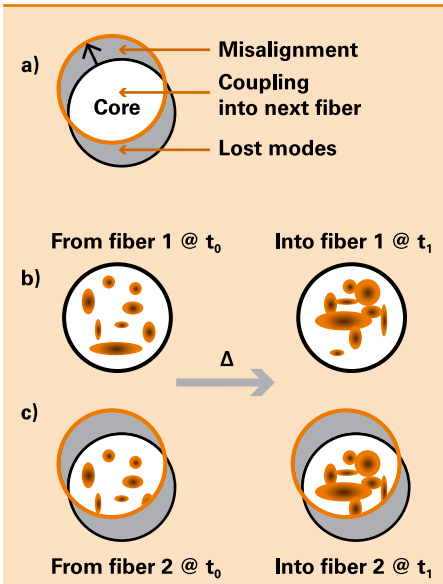
Noise does, however, occur when mode-selective attenuation is introduced to the system – for example because of a misaligned connector. It not only leads to mode coupling but also to a complete loss of certain modes. As a speckle pattern at the interface is only a "snapshot" and mode distribution is constantly changing in terms of time over the cross section, different energy keeps being taken from the connection at random. The result is a noise-like amplitude modulation of the receiver signal, modal noise (diagram).

Modal noise is different from most other kinds of noise in the electronic world as it does not stem from external sources but from the signal interacting with the optical channel itself. In many cases, this has a major impact on the bit error rate of the communication channel and thus on the attainable throughput.

Conclusion

In multimode systems, modal noise is primarily a problem with VCSEL signal sources, regardless of whether OM1, OM2, OM3 or OM4 fibers are used. Modal noise can drastically increase the bit error frequency and limit data throughput. The actual lengths of the individual fibers are less important in comparison.

In the interest of ensuring as little modal noise as possible, misalignment in FO connections should be kept as low as possible by using premium connectors. Perfectly aligned and 100 % tested connectors are a key requirement for maximum operational reliability and full performance of an FO network. R&M has published a number of useful white papers on this important subject. ■



a) Misalignment of two connected fiber cores. The gray areas are regions in which there is no direct connection between the two fiber cores so that modes escaping from fiber 1 are coupled into the sheath of fiber 2 and are ultimately lost.

b) Although the speckle pattern at the output of fiber 1 changes in terms of time, the overall energy is retained in the case of correct alignment.

c) If the two fibers are connected with a poor-quality connector, energy is lost from some modes. Due to the time change of the pattern, the energy transmitted to the subsequent fiber also fluctuates.

Diagram: R&M

Download R&M white paper:
www.rdm.com > Service > Downloads > White Papers

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Linxdatacenter Opened in Warsaw

In a choice location at the heart of Warsaw, one of the most modern data centers in Eastern Europe has been established: the Linxdatacenter in Warsaw. Among other things, it is characterized by its availability level, Tier 3, and particularly easy-to-use patch panels.

For companies that want to operate their servers in a strategically convenient location in Central Europe, there can hardly be a better and faster address. The new Linxdatacenter, which was set up in 2010, stands on the Aleje Jerozolimskie, less than 500 meters from the international LIM Center carrier node in Warsaw. A dual FO line connects the two locations in the very center of the Polish metropolis, and that is why the Linxdatacenter can offer the fastest WAN connections imaginable.

> "The Linxdatacenter in Warsaw is designed to comply with the most demanding technical and ecological requirements."
>
> Jules Delahaije, CEO Linxdatacenter

"With our carrier-neutral high-performance data center in Warsaw, we have created unique basic conditions," says the Linxdatacenter. CEO Jules Delahaije explains that "the Linxdatacenter in Warsaw is designed to comply with the most demanding technical and ecological requirements and satisfies the Tier 3 standard. That means that no interruptions can compromise a customer's day-to-day business operations."

The service provider for Central and Eastern Europe

Founded twelve years ago, Linx Telecommunications BV Amsterdam is an international network, co-location and hosting service provider. Under the trade name Linxdatacenter, the company operates several carrier-neutral data centers in Central and Eastern Europe. It also offers international network services under the trade name Linxtelecom. Thanks to the synergies generated by both branches of the business, the Linxdatacenter can provide seamlessly integrated IT solutions for international private and public customers. The solution provider boasts a total of more than 13000 square meters of data center space in Moscow, St. Petersburg, Tallinn and Warsaw. These sites are among the most modern and secure data centers in Central and Eastern Europe. Linxtelecom also operates a series of network nodes from Scandinavia to the Caucasus.

This is in part thanks to R&M cabling. The Linxdatacenter opted to install the R&M shielded Cat. 6_A solution, the most powerful copper cabling in RJ45 format. This is used in conjunction with OM3/OS2 fiber optic cabling.

Customized global panel

For the special requirements in the highly condensed cabinets, R&M delivered an adapted version of the global patch fields. The customized product makes it possible to produce the entire connectivity on the front of the panel. "That makes it much easier to use," explains R&M Sales Director Maciej Krajewski. Consequently, the Linxdatacenter can equip or retrofit all racks to suit the wishes of its customers in a quick, flexible and uncomplicated procedure.

This efficient handling was one of the most important aspects of the design and product selection. R&M's longstanding good contacts with system integrators, its experience from previous joint ventures, its consistently high performance and unfailing customer assistance, its international market position as a leading provider and the quality of the R&M products also helped tip the decision in favor of the company.

Success through cooperation based on partnership

The Linxdatacenter started construction work in 2010. Together with local system integrators, R&M Poland immediately opened talks. The crossborder cooperation between the R&M market organizations once again proved fruitful in this case, as it was possible to negotiate directly with the Linxdatacenter head office in Amsterdam. The guidelines for the design were immediately defined under the leadership of R&M and individual adjustments appeared in the product range. The efficient approach proved convincing and quickly led to success. The Project was finished at the begining of 2012 and the Linxdatacenter started commercial operation, consolidating its service offer in Central Europe.

> Within only a few months, the Linxdatacenter in Warsaw was fitted with a flexible cabling structure offering top-quality performance which will fully support several IT generations.

Within only a few months, the Linxdatacenter in Warsaw was fitted with a flexible cabling structure offering top-quality performance which will fully support several IT generations and the equipment of the Linxdatacenter customers.

The Linxdatacenter in Warsaw uses a parallel operating procedure. Interruptions to individual cableways cannot disrupt operations. Covering 1400 square meters, the data center offers its customers a co-location solution consisting of pre-terminated rack locations and space for cabinets as well as a range of services, including an uninterruptible power supply, disaster recovery and the shortest route to the international LIM

Custom product for the Linxdatacenter in Warsaw: R&M global patch fields.

Center carrier node in the center of Warsaw. The state-of-the-art infrastructure complies with TIA 942 and ensures a high level of availability compliant with Tier 3. ■

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R&M Has Great Potential

Hans Hess is a profound expert on technical B2B companies and knows all about the Swiss economy thanks to his considerable experience in executive positions in different Swiss industrial companies. In addition, two years ago he became President of the largest industrial association in Switzerland, Swissmem, succeeding Johann Schneider-Ammann, today a member of the Federal Council of Switzerland.

Since 2007, Hans Hess has been Chairman of the R&M Board of Directors. When co-owners Martin and Peter Reichle decided to devote their attention to their tasks on the Board of Directors in the future, he was involved both in the search for a new CEO and in R&M's strategy review process. This gave Hans Hess the opportunity to look more closely into the company. The CONNECTIONS editorial team talked to Hans Hess about how he sees the future development of the company.

R&M: Mr Hess, how do you see the current situation and position of R&M?

Hans Hess: R&M is a fantastic company with great potential. Up until just a few years ago, our strength lay primarily in Office Cabling. In the last few months we have put a lot of effort into playing an important role in the two growth segments Data Center and Fiber to the Home (FTTH). At the technology level, we have been market leader in copper for a lot of years now. I was surprised to see that our fiber optic solutions are also at an extremely high level. In this area too, we have considerable expertise and have a number of top international specialists working for us.

Why should customers buy solutions from R&M?

We want to be first-choice partner when it comes to innovative, top-quality cabling systems for data transmission in the top and middle sector, basically living up to our slogan "Convincing cabling solutions". The promises we make our customers certainly back that up and are a pivotal part of our strategy:

– Specific solutions with high customer benefit (Get More)
– Systems with innovative functionality (Swiss quality)
– Ultra installation friendliness (installer's best friend)
– High availability and fast delivery readiness (just in time)
– Extensive expertise and customer proximity (expertise to be trusted)
– Protection of our customers' investments (reliable partner). R&M systems are designed to serve at least 20 years.

We offer very modular and particularly also leading quality products and solutions which can be put together to form tailor-made customer solutions.

What are your expectations as Chairman of the R&M Board of Directors of the new CEO Michel Riva?

I expect the new CEO, together with his management colleagues, to make good use of R&M's opportunities and thus ensure fast and profitable growth. Or to put it another way, to take R&M to the next level in corporate development. How exactly he is going to implement that is something he should communicate to customers and employees himself in a few months. I am pleased that we were able to enlist the support of Mr Riva who I am sure will prove to be an accomplished CEO for R&M and who has now taken over all my duties in this area.

Since the middle of November 2010, you have been President of Swissmem, the association of Swiss companies in the mechanical and electrical engineering industries. Where do you see strengths/weaknesses in Swiss industry and how would you assess the country's chances in business terms?

Swiss industry is basically in very good shape. Many of its companies are market leaders on a worldwide scale in their relevant sectors. The strong Swiss franc is, however, causing serious problems for companies that do most of their business abroad. At this point I would like to quote something National Bank President Thomas Jordan said in an interview with the SonntagsZeitung (May 27, 2012): "Together with their employees, entrepreneurs have undertaken great efforts to come to terms with this difficult situation. They deserve great respect for that." I would like to echo these sentiments. R&M is a typical example of one of these companies: proactive, cost-conscious and characterized by typical Swiss understatement and a high sense of quality.

R&M is a typical example of one of these companies: proactive, cost-conscious and characterized by typical Swiss understatement and a high sense of quality.

The advantages Swiss industry has are, on the one hand, our high Swiss quality thinking and reliability and, on the other,

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Information on Hans Hess

Hans Hess, 56, grew up in Trüllikon (CH), studied to become a materials engineer at the Swiss Federal Institute of Technology Zurich and then worked as a development engineer at Sulzer AG in Winterthur. In 1983, he moved to Huber+Suhner in Pfäffikon. After graduating as an MBA from the University of Southern California in Los Angeles, he became Director of what was then Wild Heerbrugg in 1989. In 1993, he became part of the group management of the Leica Group and was CEO of the independent Leica Geosystems AG in Heerbrugg that had its IPO in 2000 between 1996 and 2005. At the end of 2005, Hans Hess stepped down from his position at Leica Geosystems and founded the consulting and private equity firm Hanesco AG. He became a member of various boards in industrial companies and has been Chairman of the Board of Directors of R&M since 2007. Since November 2010, he has been President of Swissmem, the largest industrial association in Switzerland, of which he had been a board member since 1999. Since 2011 he has also been Vice-President of economiesuisse, the Swiss Business Federation. Hans Hess also has positions on a voluntary basis on numerous boards of foundations such as Technorama, Swisscontact and the Vontobel Foundation. Apart from a few breaks, he has lived with his family in Auslikon on Lake Pfäffikon in the Zurich Oberland since 1984. Privately, Hans Hess likes spending time with his family, is interested in music and likes going for long rides on his horse as often as possible round Lake Pfäffikon.

Photo: Philipp Rohner, www.philipprohner.ch

the capacity for innovation demonstrated by our companies. For some years now, Switzerland has been the most innovative country in the world and that's the way it should stay.

And what do you have to say about the current development of the global economy?

The global economy is going through a tough time as a result of the financial crisis in 2008/2009 and the massive debts many countries have. We are probably going to have to accept less growth over the next ten years, particularly in industrialized countries. In emerging markets such as China, India and Brazil, however, we are likely to see new growth opportunities. The efforts that are being put into a more sustainable enterprise in China are a good example of this. State-of-the-art technologies from Switzerland are helping tap new energy sources for example, improve environmental problems in terms of air and water, ensure mobility and an exchange of information, etc. R&M is making a massive contribution to satisfying customers' demands all over the world for an ever better communication infrastructure. And we are very proud of that.

You are a very busy manager with a jam-packed diary. Where can you compensate and find your own life balance with your very hectic business life and with the challenging demands you constantly face?

Well, I haven't found that easy over the last ten months. I have had a working week of seven long days since December 2011. But I love working and I am used to working fast and a lot. But that cannot become a permanent state of affairs. I think 2012 has been one of the most strenuous in my life so far. But it is not my leisure time that is the most important thing for me at the moment. What really matters is that I have been able to make an important contribution to the future development of the company. R&M is currently demonstrating double-digit growth and can once more look at satisfying results. Customers really like our new products, such as the new ODF. It is extremely important to me as a Member of the Board to help steer the company, together with the owner family, to long-term success. That would be true compensation for the long hours I have put in this year and this is where I see my future responsibility.

Mr Hess, thank you very much for the informative interview. ■

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An ODF for Every Occasion

colt
smarter / faster / further

With over 35 000 European customers from the fields of business and public administration, COLT is one of the largest IT and telecommunications service providers in Europe. For its numerous data centers, the company was looking for a solution providing the best possible combination of flexibility and data security – and found it in the ODF from R&M.

COLT has been a major player among international network providers for a number of years. The name stands for City of London Telecommunications – the company was founded in the British capital and is listed on the London Stock Exchange. COLT offers its customers a combination of network and IT infrastructure accompanied by expert know-how in the fields of managed services and network/communications solutions. It operates its own network extending over more than 35 000 kilometers (21 875 miles) and connecting 21 countries. Furthermore, the COLT infrastructure encompasses urban networks in 39 European cities with direct fiber optic connections in 18 000 buildings as well as 19 data centers.

COLT's customers include renowned national and international companies: Aurelius Capital Management, Degussa Bank, Leumi Private Bank, University of Rotterdam, Shurgard Self-Storage, Delticom AG, AOK, Marks & Clerk, Canal Plus, TF1 and many more. More than 1000 COLT customers operate in the financial sector including the 25 biggest banks in the world, 20 European stock exchanges and almost all the leading European hedge funds.

In these sensitive sectors, data security and speed play an extremely important role and it is here that COLT has made its name as a reliable provider, calling on partners who also satisfy this requirement.

Specialist for data centers

COLT's data center services comprise construction, operation and managed services, including monitoring. An optimum distribution of risks is an equally important success factor as speed, quality and stability. Installing a data center generally involves sums in the tens of millions. Investment protection is therefore a particularly important criterion and its choice of partners is of strategic importance to COLT. It is also important to dispose of clearly standardized products offering modular assembly possibilities to achieve every desired solution.

Flexibility for a number of years

In 2010, the company therefore assessed numerous products from a wide range of manufacturers in this product sector with a view to identifying a solution that matched COLT's stringent requirements in terms of professionalism, cost-efficiency and flexibility. Rico Cavadini, Senior Manager Service Delivery, visited an R&M trade fair stand and was immediately impressed by the brand-new R&M ODF (Optical Distribution Frame). The product satisfied the vast

"When we attract new customers, we simply install the corresponding patch fields in the modular ODF. This enables us to plan costs progressively and avoid all risks. The flexibility of the system offers a simple means of integrating new modules at any time while facilitating the inclusion of future technologies."

Georg Langlotz, Director Operation, Infrastructure Service Unit, Colt Telecom Services AG

majority of his needs. COLT handles numerous customers with completely different technologies and demands. "We were looking for a flexible solution adapted to all current and future requirements. The R&M ODF offers the possibility of ensuring continuous and scalable expansion – which is exactly what we are looking for. In R&M we have found a partner that knows how to anticipate requirements, recognizes the customer's needs and ensures that the investment involved is protected," explains Cavadini. There are also certain similarities between the two companies' business cultures: Agility, flexibility, environmental awareness and consistent customer focus are important elements of the corporate philosophy at both COLT and R&M as well as the driving force behind innovations.

A partner for future growth

The COLT technicians then presented the R&M proposals to an international committee that selected two systems. For the European mainland, the R&M solution was selected for its technical advantages and scalable investment costs: "When we attract new customers, we simply install the corresponding patch fields in the modular ODF. This enables us to plan costs progressively and avoid all risks. The flexibility of the system offers a simple means of integrating new modules at any time while facilitating the inclusion of future technologies," explains Georg Langlotz, Director Operation, Infrastructure Service Unit at COLT. "That is hugely important because I am convinced that we will witness a huge burst of technological growth over the next ten years." The company is therefore planning to intensify its international deployment of the R&M ODF. Langlotz also felt that the project cooperation was beyond reproach: "R&M provided us with top-quality support throughout the entire project, made suggestions for customer-specific adaptations, produced documentation and our contacts at R&M were always there for us whenever we needed them. We were also very happy with the speed at which the project was implemented." COLT had a host of special requirements which were discussed with the technicians at R&M. "R&M proved to be highly innovative and was able to suggest specific solutions for our needs very quickly indeed," says Langlotz. "The solutions covered areas such as cable guides, transfers and reserves."

Innovative solution for a quick network extension

The R&M ODF can be configured with splice, patch and combined modules and can be installed without tools thanks to the quick assembly technology. The trays can be inserted, removed and turned over like index cards in a flash. Every tray can be assigned to a place, a district or an individual participant. Labeling spaces with interchangeable labels, numbering and color coding facilitate the management of large volumes of fibers. For breakout applications or to connect pre-terminated cables, the patch module is used. In this way, the R&M Optical Distribution Frame and Single Circuit Management ensure quick, simple and safe network expansion. ■

WHY R&M?

- **Up to 2304 fibers**
- **Bending radius of 40 mm**
- **Made from aluminum profiles**
- **Surface areas of 300 x 300, 600 x 300 and 900 x 300 mm**
- **Height: 2.2 m**
- **No front profile rails mean large scope for movement**
- **Hinged splice unit serves as integrated workbench**
- **Up to 48 SC or 24 SE splice trays each with 6 or 24 fibers**
- **Up to 12 inserts each with 12 LC-Duplex, SCRJ or E-2000™-Compact connectors**

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Data to the Fore


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The Austrian transport association eastern region (VOR) is responsible for transporting almost one billion people every year. It also operates two electronic information systems, which can be called up around the clock. R&M implemented the entire network structure for VOR and its data center.

The transport association eastern region (VOR) is the central service provider for local public transport in Eastern Austria (Vienna, Lower Austria and Burgenland). The entire public transport service in this region (train, bus and tram) is planned, ordered and coordinated by VOR. The association is even responsible for quality assurance and revenue sharing. In 2010, VOR transported 908 million people to and from their destinations according to tariff, generating earnings of EUR 558 million (CHF 670 million) in the process.

The very best information

In addition to this core activity, another important service is gaining ground: For more than 10 years, VOR has operated an electronic travel information system which is being used more and more often, especially via mobile devices. The company provides two major electronic information systems which can be used free of charge: the journey planner for the entire eastern region and an intermodal real-time travel information system. Both services are available online and as a mobile app. The number of users is often particularly high outside regular office hours – e.g. on weekends and on Friday and Saturday night. It is therefore essential to guarantee a flawless and uninterrupted service. Consequently, VOR demands a great deal of its data network.

A clear evaluation

While moving the company and almost every server to its new home in BahnhofCity, West Vienna, an important decision had to be made concerning the IT infrastructure. The aim was to implement a modern, uniform and highly available solution, both for the data center and for all users. In addition to this, there was all the cabling for video surveillance, access control and the alarm system. According to the VOR IT manager Gregor Teichmann, the decision was a quick one: "At that time, holding an R&M Cat. 6_A module in our hands, we knew that that was the solution we were looking for." Teichmann explains that the rationale behind this was its uncompromising implementation as well as the high-quality feel, structure and appearance of the product. Even the question of shielding was decided on quickly following a short but intensive evaluation phase.

The fastest possible installation

The certified R&M partner EPS (Electric Power Systems) was responsible for installing the network. The company, based in Lower Austria, impressed the customer with its very fast and high-quality installation as well as its "extremely professional behavior," says Teichmann. ■

THE R&M SOLUTION

- **18 500 meters of S/FTP Cat. 7 data cable**
- **1250 10G Cat. 6_A modules**
- **200 links in the data center**
- **Office cabling for 93 employees**
- **400 data links in the offices**


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Weekend without a Backpack

I recently spent a weekend climbing with a colleague, using my Alpine cabin as a base. We had already had an hour's journey by car to get to the cable car station in the valley when I discovered I had left my backpack with all our provisions at home. As there was only one more cable car going up that night, we decided to forget about the backpack and food and take the cable car. At least it was not difficult to decide what to eat when we arrived at the cabin: All we had was a can of carrots and a few potatoes that we found in the cellar.

Juggling hot potatoes

We were getting really hungry and so tried to take our minds off our rumbling stomachs while we were cooking by juggling both hot and cold potatoes. It was fun. We got to the point where a kind of a game developed between letting go and holding tight. What should you concentrate on: leaving go of the potatoes or holding on to them?

Amazingly, it was easier to juggle the hot potatoes – possibly because in this situation it is actually more important to leave go if you want to be successful.

Feeling good on the granite wall

The next morning we set off on our climbing tour really early as planned: a level 5 climb that was well secured with bolts and corresponded to our capabilities.

Moving up the steep granite cliff face from one bolt to the next also turned out to be a game in which there was a moment of uncertainty after leaving go until the express loop was securely hooked in to the next bolt. We felt a surge of emotions each time we successfully completed a step of the mission. This feeling accompanied us meter for meter. It helped us forget the simple meal we had had the evening before but we also completely lost track of time. We felt at one with the activity and the cliff face and we had an immense "flow" feeling.

Shedding dead weight

Whether juggling our to-do list or wading our way through our projects – we all seem to have our very own everyday backpack that we carry around with us. All too often we allow ourselves to get caught up in everyday worries and get bogged down by established thinking patterns: We even get dragged down sometimes instead of letting go mentally and then continuing unburdened and unhampered.

It is comparable to being in a hot air balloon: Sometimes it can be useful to get rid of some of the dead weight, mentally speaking, from our backpack – at least temporarily – and to see our lives from a different perspective helped by this newly found mental freedom.

Since that trip, I feel far more aware of leaving my mental backpack down in the valley when I go up to my Alpine cabin by cable car on the weekend. ■


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