

Zemic strain gages used in development of the exoskeleton

ZEMIC 应变计在外骨骼研发中的应用

Giving back full mobility to people with a Spinal Cord Injury to fully participate in daily activities and in this way contribute to their quality of life. That is what Project MARCH is about. They work this out by designing and building an exoskeleton for people with a spinal cord injury.

使脊髓损伤患者重新获得充分自由的行动能力，正常参与日常活动，从而提高他们的生活质量，这就是“Project MARCH”想要通过为脊髓损伤患者研发制造外骨骼所实现的目的。

The exoskeleton is a motoric harness, developed with the newest technique and robotics, which enables people with a Spinal Cord Injury to stand up and walk again. In this advanced project, initiated and carried out by students from the Technical University (TU) in Delft, a new team of students commit to the development of the ultimate exoskeleton every year. Each year the students develop this further, with improvements and optimization of the prototype from the previous year.

外骨骼是一种结合最新技术与机器人技术共同研发的动力带，它能使患有脊髓损伤的人重新站立行走。这个创新项目主要由代尔夫特理工大学（TU Delft）的学生发起实施，每年都有新的学生团队参与进外骨骼的最终研发。每年，学生们的研发都会进一步，并在前一年的原型上进行改进和优化。

During the development of the exoskeleton, the forces on the frame are also examined whilst the pilot controls it. These forces are measured using strain gages. With more than 35 years of experience in the field of weighing and force measurement, Zemic is happy to help its customers with all challenges where forces need to be measured. Zemic Europe was therefore very enthusiastic to be able to think along in this project and to advise the developers in the field of force measurement with strain gages. The ultimate goal of the project team is to make the exoskeleton accessible and available to everyone who thereby regains mobility. Our slogan is "We believe we make you stronger!". This fits very well with the purpose of Project MARCH and we wish them every success in achieving this goal.

在外骨骼的研发过程中，当使用者控制外骨骼时，也需要检测框架上的力。这些力是通过应变计测量的。Zemic 在称重和测力领域拥有超过 35 年的经验，非常乐意帮助客户解决所有需要进行力测量的难题。因此，Zemic 欧洲公司非常热衷于这个项目，与研发人员一同探讨并在应变计测力领域提供建议。项目团队的最终目标是让每位患者都能轻松自如的使用外骨骼，从而恢复行动能力。我们的口号是“我们相信我们让你更强！”。这与 Project MARCH 的宗旨十分吻合，我们祝愿他们在这一项目上取得圆满成功。

● Zemic & Project MARCH

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- ① Focus on innovation in Spinal Cord Injury
注重脊髓损伤恢复的革新。
- ② Unique construction
特殊的结构。
- ③ Continuous development
可持续发展。
- ④ Experience in the field of force measurement
在力测量领域中的经验。
- ⑤ Knowledge of strain gages
应变计的相关知识。



● The Exoskeleton of Project MARCH

Project MARCH 研发的外骨骼

The exoskeleton is a motoric harness which enables people with a Spinal Cord Injury to stand up and walk again. Project MARCH focuses on the target audience of people with complete paraplegia, meaning the damage is permanent and thereby incurable.

外骨骼是一种机械动力带，它能使脊髓损伤患者重新站立行走。Project MARCH 的目标受众是完全性截瘫的人，这意味着这些患者遭受的损伤是永久性的，因而无法得到治愈。

The team is currently working on the development of the fourth version; the MARCH IV. The various innovations that are being worked on this year will only be announced at a later stage. The design of the predecessor, the MARCH III (in 2017-2018) was mainly focused on daily usability and user-friendliness. Therefore, different innovations have been made to this suit, such as: an active ankle, the first basis for the balance mechanism, and a variable step size. For more information about the MARCH III: <https://www.projectmarch.nl/en/exoskeletmarch-iii/>

该团队目前正在研发第四个版本；MARCH IV。今年正在进行的各项创新研发工作将在后期公布。上一代产品 MARCH III（2017-2018 年）的设计主要集中在日常使用性和用户友好性上。因此，这套动力带做了不同的创新，比如：平衡装置的首要基础——活动脚踝，以及可变的步幅等。关于 MARCH III 的更多信息详见：<https://www.projectmarch.nl/en/exoskeletmarch-iii/>。



- **Zemic custom-made strain gages**

ZEMIC 定制应变计

Zemic produces a high quality and wide variety of strain gages. Zemic Europe takes care of the sales, marketing and distribution within Europe. All Zemic strain gages are in accordance with the needs for sophisticated stress analysis and high-precision strain gage sensors, like load cells. With professional and reliable technology Zemic is able to produce an annual quantity of over 50 million stable, reliable and first-class quality strain gages. These are divided in more than a dozen series and over a thousand different specifications. In addition custom-made strain gages can be designed.

Zemic 生产高质量和种类繁多的应变计。Zemic Europe 主要负责在欧洲市场进行销售。所有的 Zemic 应变计都是根据复杂的应力分析需求和高精度的应变式传感器（如称重传感器）的需求而生产的。凭借专业可靠的技术，Zemic 每年能够生产超过 5000 万个稳定、可靠、质量一流的应变计。这些产品分为十几个系列，千余种规格。此外，Zemic 还可以为客户定制应变计。