

Application Report

Safe and efficient solutions for mobile machines

Bridge inspection: manufacturer BARIN trusts innovative sensors by Baumer for its underbridge platforms

Reliability, intelligence and data security even in harsh environmental conditions: these are the requirements that mobile machine components must meet. This is also true for Italian machine manufacturer BARIN, which produces mobile work platforms for bridge inspection and maintenance. For this, the company relies on innovative sensor solutions from longtime partner Baumer. Designed specifically to meet customer requirements, they significantly increase safety, performance and productivity.



Figure1: Safety first: Mobile machines for bridge inspection need to work under all circumstances. This picture shows viaduct inspection on the A23 highway in Italy with BARIN's AB20S. Photo: BARIN

Inspection of a bridge in Italy: A truck with a working platform moves slowly over a bridge on the A23 highway. The vehicle is stabilized and moves slowly, controlled by personnel on the platform. A work platform is mounted on the structure, but it does not extend upward, but over the bridge parapet downward. The vertical boom supports a working platform under the bridge so that operators can inspect the structure at the bottom. Material and structure are checked for damage and wear – two important elements of the periodic preventive and corrective maintenance measurements defined by the legislator. Operator safety

comes first. Under these working conditions, the technology used must be functioning perfectly without interruption.

BARIN's vehicle superstructures are not only used for the inspection of bridges, but also for their cleaning and repair. For applications like this, not only precise but also robust technology is required regardless of the context of use, capable of delivering consistently reliable results even under extreme environmental conditions. For the production of mobile machines for this application, the mechanical engineering company

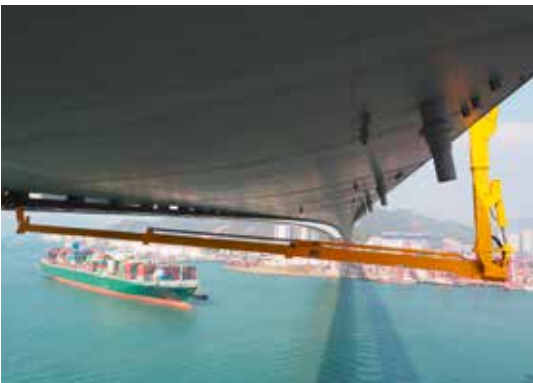


Figure 2: Thanks to very robust and reliable Baumer sensors the functioning of bridge inspection vehicles is always guaranteed, as with this check on the Italian A27 highway viaduct. Photo: BARIN

BARIN in the Veneto city of Cittadella (Italy) therefore relies on solutions from international sensor specialist Baumer. Under the name "Designed for Mobile Machines" Baumer offers its customers a broad portfolio of innovative sensor solutions customized for different requirements.

Precise stability control even in adverse conditions

BARIN's working platforms consist of either a multi-articulated boom with a basket at the end or an actual working platform. In order to operate them, complete monitoring is required. This must exclude positioning that could be a danger to the stability or structure of the machine. Absolute encoders, cable transducers, inclination sensors, or inductive sensors provide data on relevant stability control parameters. Robustness and reliability are a fundamental requirement for BARIN, since its mobile machines are used outdoors, exposed to humidity, saltiness and large temperature fluctuations.



This is especially true for machines designed for bridge inspection. Working platforms operating at height can be recovered manually in the event of hydraulic or electrical failure. With platforms that extend far into the depth, it is not that easy. BARIN, in order to implement functional safety requirements, such as those set by DIN EN 280 or EN ISO 13849, relies on redundant position detection using two sensors each.

Bearingless encoders for unlimited long-term reliability

Baumer also offers sensor solutions whose features are highly advantageous in the harshest environmental conditions – thanks to many years of close cooperation with customers in the mobile machinery industry. These features include an extended range of temperature and supply voltage, a higher protection class, as well as other benefits that lead to a long service life. Such is the case for the MAGRES bearingless absolute encoders. Thanks to their precise magnetic scanning, they are ideal for monitoring the arm rotation of BARIN work platforms. Dust, humidity, saltiness and other factors have no influence on these designs. This is vital as the work platforms can be heavily exposed to spray water and dirt particles, especially when used for bridge cleaning. "The non-contact principle is a gain for robustness and thus reliability. Combined with the tropicalization of the electronics, it was possible to have a device with zero failures on the market," explains Marco Spagnuolo from BARIN's engineering department. The bearingless encoder by Baumer is the optimal solution for this application due to its

Figure 3: BARIN working platforms also enable safe bridge inspection in Hong Kong, here at Stonecutters Bridge. Photo: BARIN



had to immediately optimize BARIN products. Baumer has always been ready and able to implement the innovations we needed." This solution-oriented approach and understanding of needs is winning in the long run: "Thanks to the partnership with Baumer, our bridge inspection machines are continuously being developed. For this reason, Baumer will continue to be our trusted partner in the future."

Further information:
www.baumer.com/a/sensors-material-handling

Figure 4: Designed for mobile machines: Baumer bearingless absolute encoders are ideally suited for rough environments. Photo: Baumer

high degree of protection up to IP 67, high resistance to shock and vibration, in addition to an absolute accuracy of up to $\pm 0.15^\circ$.

Market knowledge allows for effective solutions

The following also applies to other Baumer sensors, such as the inclination sensor GIM140R and GIM500R or the cable transducer GCA3 in BARIN's MEWPs: "The Baumer team understands our needs and always has the ideal solution ready or is willing to develop it," says Marco Spagnuolo. "Since the beginning of our cooperation, there have been several situations where we



Figure 5: Fully equipped with first class components for maximum safety. BARIN's AB235L with Baumer bearingless encoders is ready for bridge inspection all around the globe. Dust, humidity, saltiness and other factors have no influence on this design. Photo: BARIN



AUTOR
Ralf Steinmann
Industry Segment
Manager Mobile
Machines, Baumer