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Digital Communication for safety of water pipelines - Case Study German Harzwasserwerke GmbH on the use of the BIL-Portal for pipeline enquiries

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Abstract

How the BIL-portal delivers significant value to an infrastructure-network carrier in efficiently processing planning and construction enquiries from third parties.

A portal connection and communication process without media discontinuity leads to lower enquiry volume with simultaneously increasing number of relevant enquiries and allows digital processes, which built upon existing systems.

Harzwasserwerke is the largest pipeline operator in northern Germany on water transmission from its resources in the mid of Germany to the large cities in the region. The integration project delivers direct value after start of the COVID19 -pandemic allowing external access to data used in an enquiry process.

1. BASELINE: INCREASING CONSTRUCTION ENQUIRIES AND RESOURCE-INTENSIVE PROCESSING

Company and problem definition:

Harzwasserwerke GmbH (HWW) operates 530 km long-distance water pipelines connecting customers and suppliers in Lower Saxony and Bremen in northern Germany. As a pre-supplier, HWW supplies around 70 towns, municipalities and water associations in the geographical triangle Göttingen-Wolfsburg-Bremen, which then transport the drinking water to the consumer. From the headquarters in Hildesheim and at 20 other locations in Lower Saxony, around 250 employees do their utmost every day to ensure that water flows through the interconnected system. Large parts of Lower Saxony and Bremen thus receive high-quality, soft drinking water, most of which comes from the reservoirs in the Harz Mountains and is treated in the company's own waterworks. The infrastructure is thus a central hub of the northern German water supply and requires particularly high safety standards.

As a transmission system operator, Harzwasserwerke GmbH receives a large number of planning and construction enquiries from third parties. In 2016, there were more than 1,200. In previous years, the volume of enquiries increased by around 10-15% year on year (see also Figure 1). The increase resulted from the density of enquiries in the overall market, which has risen continuously.

Pipeline safety and supply security is a top priority for the transmission system operator. Preventive measures, such as line information to avoid damage caused by third parties, therefore play a key role. The increased number of enquiries and the need to respond manually, especially those that are not relevant (so-called zero notices (Nullbescheide) - share approx. 70-80%), resulted in very personnel-intensive and time-consuming processing. Since 2015, as a first optimisation approach, a specialised process developed by the IT service provider EnergieSystemeNord GmbH (ESN) has been used to process the enquiries in a central information system with the help of BPM technologies and the specialised application LISnovus. This specialised process controls the processing and archiving of the enquiries. Through the specialised process, the processing of zero notices could be significantly simplified, but it is still an effort, especially in the context of the documentation of the information process.

2. SOLUTION: PORTAL CONNECTION AND COMMUNICATION PROCESS WITHOUT MEDIA DISCONTINUITY

Against this background, Harzwasserwerke GmbH continuously examines the existing process and system workflows and looks for optimisation potential. For example, in the age of digitalisation, to identify and implement optimal and media-interruption-free communication channels. Particularly with the high number of line information requests and their very different qualities and sources, there is considerable potential here for increasing the effectiveness of the response process.

Since joining the BIL-portal in 2020, the HWW has only received standardised, complete enquiries through this source and only those that concern it according to the areas of responsibility it has defined. Only one technical question had to be clarified: whether the processing and answering of the enquiries in the BIL-portal should be carried out autonomously and manually within the portal with the functionalities available there or whether the specialist

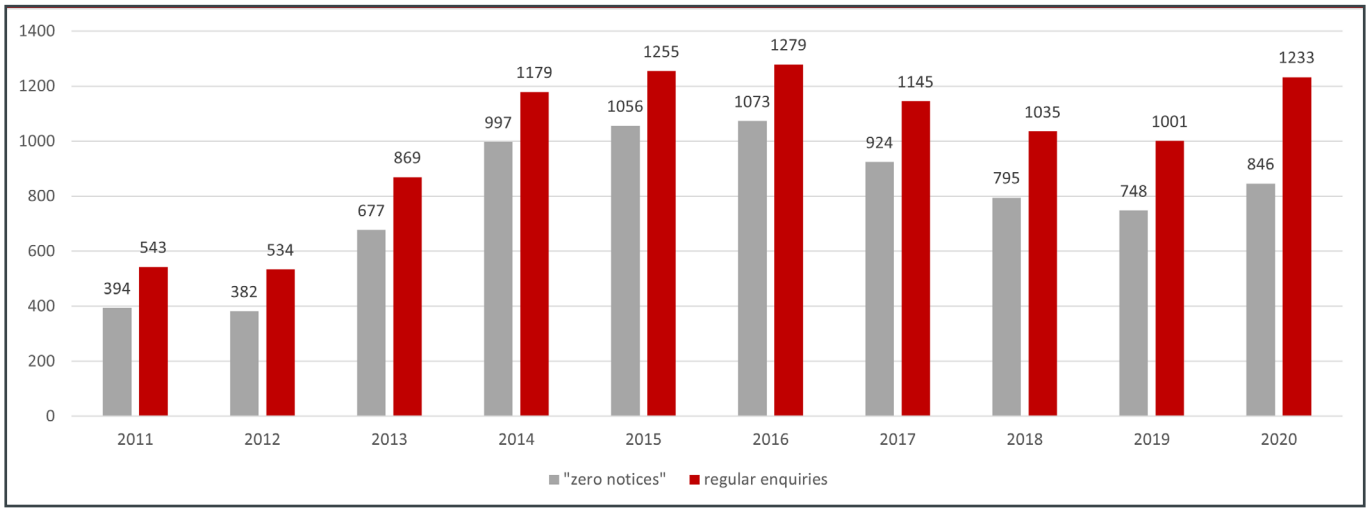

Figure 1: Enquiry volume of Harzwasserwerke GmbH in the period 2011 to 2020 (Source: Harzwasserwerke GmbH)

process with web-GIS coupling in use at the HWW should be fully connected via the standard BIL interface.

The existing specialist process "building enquiries" is mapped in the WEB application LISnovus for controlling the statements within the framework of the information process in the company. Through the further connection with the document management system (ELO) used in the company, the notices and workflows are now also documented centrally.

With the requirement that the business processes at Harzwasserwerke GmbH should be carried out as efficiently and standardised as possible, the decision was obvious: construction requests submitted to the BIL-portal are automatically integrated into the established process in LISnovus. Both IT systems are optimally networked with each other digitally and without media discontinuity. The option that alternative processing is possible at any time within the BIL-portal is nevertheless considered very positive by Harzwasserwerke and is kept as a potential backup option. With regard to today's need for digitisation, the approach described above has more than proven itself. The consistent storage of the data on the enquiry, the process steps and the contents of the response on a neutral and secure server also enables freedom from contradictions and legally secure verifiability in the event of a claim. For those seeking information who are not yet able to join the digital process, the request option directly to Harzwasserwerke GmbH remains available in parallel.

3. IMPLEMENTATION: LOW EFFORT AND PROBLEM-FREE INTEGRATION IN THE ONGOING OPERATIONAL BUSINESS

In coordination with the IT service provider EnergieSystemeNord (ESN), the standard interface of BIL was adapted to the needs of HWW and seamlessly integrated into the existing processing workflow. The expenses and costs for the customisation and implementation of the BIL-interface were extremely moderate in view of the expected benefits for the overall process and its optimisation potential and were quickly compensated for by the high increase in efficiency.

The complete implementation of the interface took only a few weeks and was available in time for the productive start. The internal effort at HWW was low and could be covered without any problems in the ongoing operational business.

4. RESULTS: LOWER ENQUIRY VOLUME WITH SIMULTANEOUSLY INCREASING NUMBER OF RELEVANT ENQUIRIES

The desired process-related improvements were achieved as soon as the system went live. Since then, enquiries that reach the HWW automatically via the BIL-portal can be processed directly in a quality-assured manner, without the need for time-consuming manual localisation and recording in the HWW's own web GIS system. At the same time,

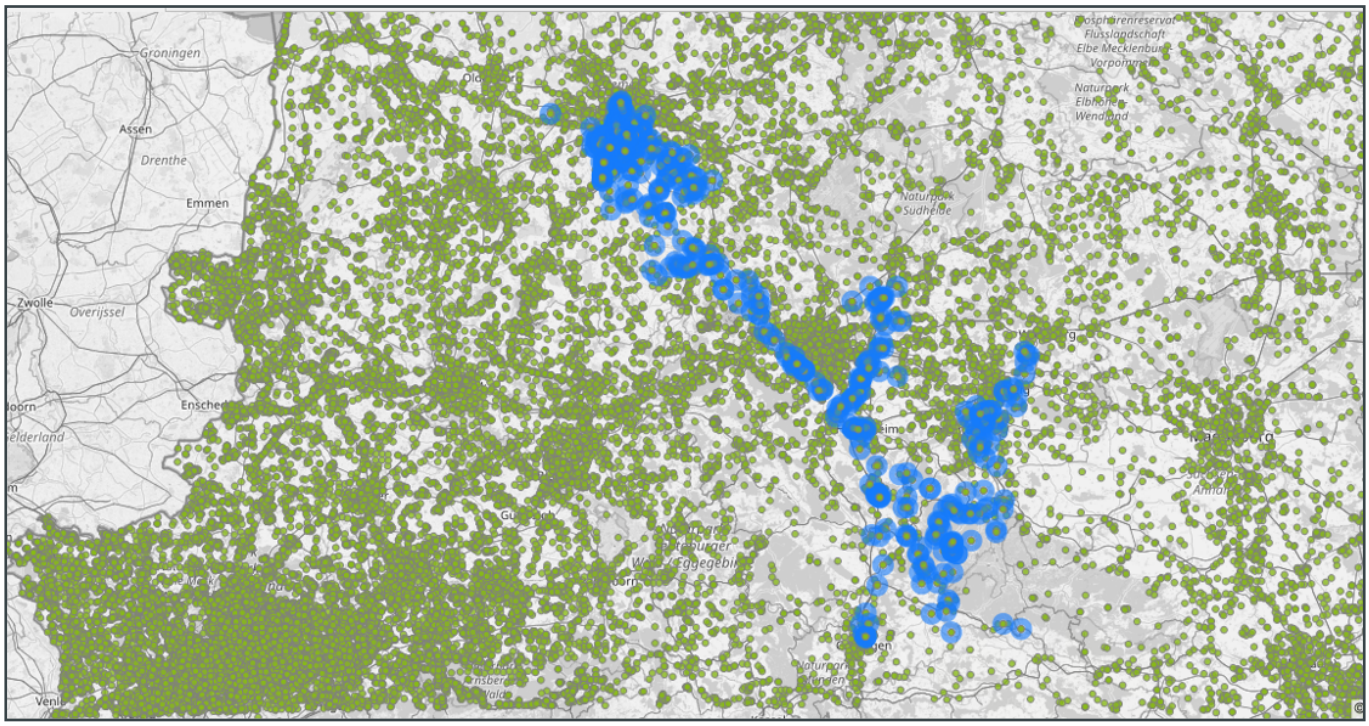

Figure 2: Requests received by Harzwasserwerke GmbH via the BIL-portal (blue dots) vs. requests received in the BIL-portal (green dots) for the years 2020 and 2021. (Source: ©OpenStreetMap, Harzwasserwerke GmbH, BIL eG 9/2021)

the enquiry volume is reduced to the requests coloured blue in Figure 2.

The results in detail:

a) Fewer construction enquiries are received by Harzwasserwerke GmbH. With the connection of the BIL-portal, the number of construction enquiries received by the HWW decreased significantly. This applies in particular to the previously received, non-relevant enquiries, which had to be answered manually with a zero notice, which required considerable resources. These are now automatically generated by the BIL-portal. This reduced the total volume of enquiries received by the HWW from 2020 by around 30 percent (Figure 2).

b) The number of relevant building enquiries is increasing. In turn, the HWW now receives a significantly increasing number of relevant hits as a result of incoming enquiries via the BIL-portal (Figure 3).

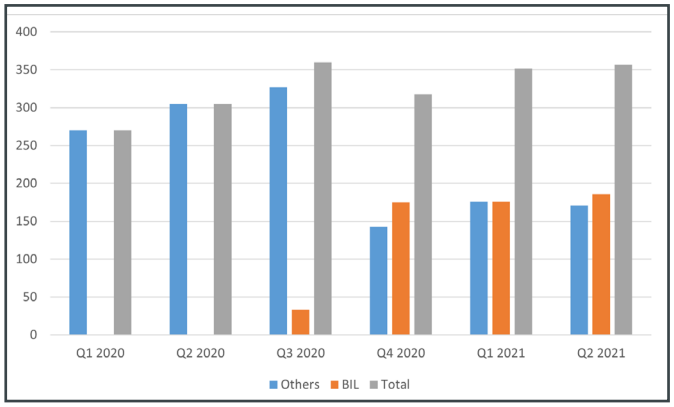

Figure 3: Development of enquiries and their qualification before and after connection of the enquiry process to the BIL-portal after Q3/2020 (Source: Harzwasserwerke GmbH)

This is where the advantages of the BIL-portal become obvious. Because many "critical hits" that could threaten the pipeline network of Harzwasserwerke GmbH now reach HWW, where they were previously "overlooked". These can now be identified immediately and answered in a quality-assured manner, so that the effectiveness of this preventive measure is directly noticeable for both the HWW and construction workers. The volume of enquiries changes in favour of an increase in safety-relevant affected enquiries with automatic elimination of non-relevant enquiries by the BIL-portal.

With the connection to the portal, a number of positive effects have thus been achieved immediately. Due to the decrease in unaffected, irrelevant enquiries (Figure 4) and the simultaneous increase in relevant enquiries for Harzwasserwerke GmbH, the employees can now concentrate more on the essential core tasks, such as the prompt and qualified examination and response to affected and standardised enquiries.

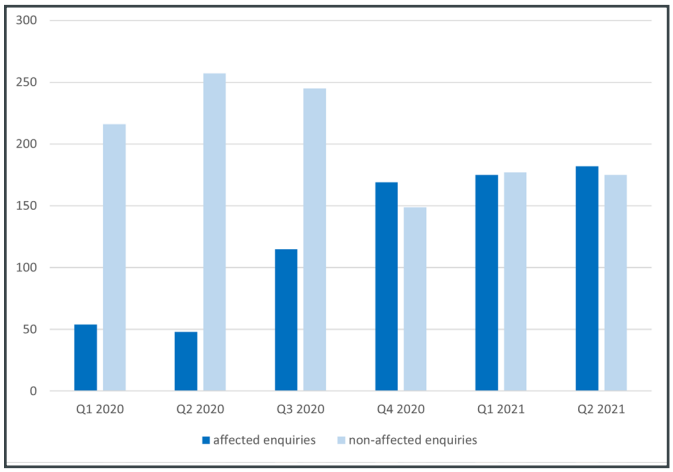

Figure 4: Affected enquiries (dark blue) vs. non-affected enquiries (light blue) of Harzwasserwerke GmbH for the period 2020 to 2021 (Source: Harzwasserwerke GmbH)

A further improvement is expected when the first enquiries from public authorities are forwarded via the BIL-portal and checked for competence. An adaptation of the specialist process is currently being implemented and has gone live at the HWW in autumn 2021.

There are also clear advantages for the building enquirer, as he is immediately informed in the BIL-portal whether or not the HWW is in principle affected by the measure. This speeds up the enquiry process.

The HWW itself also benefits from the advantages of the BIL-portal as an enquirer. This is always the case when, in the course of their own construction or maintenance measures, third-party pipeline investigations have to be carried out and these can now be done conveniently via the BIL-portal and the additional ALIZ research service integrated in the portal.

5. POLICY RECOMMENDATION: PROCEDURE IN THE CONTEXT OF THE REGULATIONS BY MEANS OF DIGITAL COMMUNICATION

The pipeline information process is practised by Harzwasserwerke GmbH in compliance with the relevant regulations. Already at the beginning of the project, the contents of the current version of the working paper on the meta-systematics of pipeline information (DVGW GW115; DVGW is a recognized standardization body for the gas and water industry) have been implemented, which define the recommended parameters for the formulation of a construction request to prove the legitimate interest. The specification allows the HWW to answer without consulting the enquirer.

In the course of selecting a suitable information platform for the HWW, an examination was carried out with regard

to a digital evidence procedure for external information processes (DVGW GW 118 "Transmission risk"). These characteristics result from the use of digital portals, which integrates all market participants for this purpose and represents a higher degree of operational safety security for the water pipeline operator. In the BIL-portal, the individual activities for the information process are automatically and unalterably documented by the system and archived for up to 30 years. The information process via the BIL-portal does not send network information by e-mail, but only informs the person seeking information about the provision of network information in the portal, which the information seeker can download. This system transfers the transmission risk to the person seeking information and recipient of the network information. Accompanying formulations in the terms of use of the portal participant should point out this aspect.

In this way, the BIL-portal ensures in every case that the information reaches the recipient and that this is clearly documented for all parties involved in the information process.

6. PERSPECTIVE: DIGITISATION OF ENQUIRIES COMING FROM PUBLIC AUTHORITIES

Currently, the volume of enquiries via the BIL-portal at Harzwasserwerke GmbH is more than 50 percent of the total enquiry volume. However, the majority of the construction and planning enquiries that still have to be answered conventionally are enquiries from public authorities. These official enquiries account for about one third of the annual enquiries and the processing is very time-consuming. In most cases, there is ultimately no concern. However, with regard to official enquiries, positive effects can be expected in the future as a result of the announced digitisation offensive. The following goals have already been defined in the government programme "Digital Administration 2020":

- The vision of e-government is that information, communication and transaction processes between politics, administration, citizens and the economy can take place from any place, at any time and with any medium, quickly, simply, securely and cost-effectively.
- The goal is to take a look at relevant processes in their complexity from start to finish in order to implement them in a networked way, sharing work with others and using common infrastructures.
- The programme "Digital Administration 2020" aims to use modern information technologies to establish digitalised, end-to-end, media-independent, uniform and public service provision based on collaborative business processes.

In this respect, BIL eG and tetraeder.com GmbH have taken the foresight to cooperate in advance and have systematically coupled the BIL-portal and the Public Planning Information and Participation Server (PB) from tetraeder to hand official planning request from public authorities.. The interface between the two portals went live in July 2020. Since then, the first authority requests have already been forwarded via the BIL-portal and checked for relevance. A promising perspective for the future.

A broad use of the BIL-portal across all pipeline networks means a security benefit for the sensitive infrastructure in Germany and is an important step towards digitalisation and process improvement for pipeline enquiries and a simplification for the enquiring civil engineer.

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Going ahead for Safety

- Internet-Portal for Construction Enquiries
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