

# Application for optimizing stock monitoring and measurements in Tenaris Silcotub company

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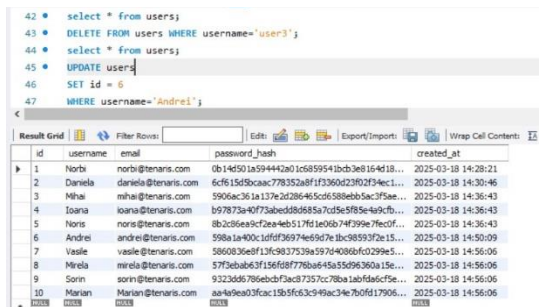
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**Abstract**—This paper shows the changes made in various operational activities. Automation, the use of Power BI reports and their publication on a website, contributed to shortening the execution time of processes and activities carried out within the company Tenaris Silcotub, while also providing assistance to employees. Data quality has increased, allowing for more efficient management of resources and better-founded decisions.

**Keywords**—website, QR Code, PowerBI, reports, measurements, stock

## I. INTRODUCTION

A database is a way of storing information and data on an external medium (a storage device), with the possibility of easy expansion and quick retrieval. Usually a database is stored in one or more files. Databases are manipulated with the help of database management systems as you can see in Fig. 1.



```
42 • select * from users;
43 • DELETE FROM users WHERE username='user3';
44 • select * from users;
45 • UPDATE users
46   SET id = 6
47   WHERE username='Andrei';
```

id	username	email	password_hash	created_at
1	Norbi	norbi@tenaris.com	6b14d501a594442a01c6859541bcb3e8164d18...	2025-03-18 14:28:21
2	Daniela	daniela@tenaris.com	6cfe15d5bcaac778352a8f1f3360d23f2f34ec1...	2025-03-18 14:30:46
3	Miha	miha@tenaris.com	5906ac361a137e2d286465cd6588ebb5ac3f5ae...	2025-03-18 14:36:43
4	Ioana	ioana@tenaris.com	b97873a40f73abed8d8d85a7cd5e5f85e4a9cb...	2025-03-18 14:36:43
5	Nora	nora@tenaris.com	8b2c86eac9c2ea4eb517f1a0b074f399e7fec0f...	2025-03-18 14:36:43
6	Andrei	andrei@tenaris.com	598a1a400c1d0f36974e61907e1c3959332e15...	2025-03-18 14:50:09
7	Vasile	vasile@tenaris.com	5860836e9f13fc9837539a597d408b6fd0299e5...	2025-03-18 14:56:06
8	Mirela	mirela@tenaris.com	57f5ebab63f156f68778ba645a55d96360a15e...	2025-03-18 14:56:06
9	Sorin	sorin@tenaris.com	9323dab6786ebcf3ac87357cc78ba1abfdafcf5e...	2025-03-18 14:56:06
10	Marian	Marian@tenaris.com	aa4a9ea03fcac13b5f63c949ac34e7b0f617905...	2025-03-18 14:56:06

Fig. 1. Database of users

A website is a collection of related web pages and content that is hosted on a web server and accessible via the internet. Websites are typically identified by a domain name and can serve a variety of purposes, such as providing information, enabling communication, conducting transactions, or entertainment.

My project includes databases management interfaces integrated within a website. In Excel, a database is usually represented as an organized data table, where:

Each row represents a record (eg, a customer, a transaction, a product), each column represents a field (eg name, date, value) and cells contain values associated with each field and record.

## II. THEORETICAL FOUNDATION

### BENEFITS OF USING POWER BI

A. Data-driven decisions: Power BI helps companies analyze trends, identify opportunities, and solve problems by quickly accessing information [1].

B. Low cost: Compared to other BI solutions, Power BI is affordable, offering advanced functionality at a competitive cost [2].

C. Scalability: Both small businesses and large organizations can use Power BI, due to its flexibility in integration and use [3].

D. Integration with the Microsoft ecosystem: As part of the Microsoft suite, Power BI integrates seamlessly with other applications such as Excel, SharePoint, and Dynamics 365 [3].

TABLE. 1. Application qualities

Functionality	Features
Publish to Microsoft Teams	Better communication
Automate reports	Short time
Interactivity and filtering	Ease of use

The importance of the application and its qualities are illustrated in TABLE. 1.

## III. IMPLEMENTATION

A. Knowledge of the basic notions within the two departments within the Tenaris company.

The first stage consists of understanding the processes and workflows within the two departments involved. This step is essential in order to be able to correctly structure the data and ensure optimal integration of the technological solutions used.

### B. Analysis of CSV files

Once familiar with the specifics of the departments, we moved on to the analysis of CSV files. This stage involves checking the data, filtering and preprocessing it to provide a concise data collection, which will be used further in Power BI.

### C. Managing skills in Excel.

Since the data will initially be manipulated in Excel, it is necessary to improve the skills of using this tool. This includes working with advanced formulas, using Pivot Tables, calculation formulas, retrieving data from other files using Vlookup, using macros and creating links between tables.

D. Connecting the Power BI application with the Excel database.

Once the data is structured correctly, the connection between Power BI and Excel will be made to facilitate their visual analysis. Links between data sources will be configured and relationships between tables will be established to allow for clear and efficient interpretation.

E. Creating the PowerBI report in the clearest, most readable and optimal way possible.

This stage involves creating an interactive report, with intuitive visualizations, to highlight trends and key indicators. Charts, dynamic tables and filters will be used to optimize the presentation of information.

#### F. Improving Web Developer skills

In order to give remote access to the reports, I developed a web application. Given that the Power BI report will be integrated into a website, it is necessary to develop web programming skills. This involves working with HTML, CSS, JavaScript and other relevant technologies.

##### F.1. Creating a login page

To secure access to the platform, a login page will be created to allow user authentication.

F.2. Creating a main page and making connections between pages

A main page will be developed that will provide an intuitive interface for navigation and access to different sections of the application.

F.3. Creating the pages necessary to integrate Power BI reports

Finally, dedicated pages will be created for integrating Power BI reports, ensuring an optimized interface for users. This step involves implementing a responsive and easy-to-use solution.

##### F.4. Creating a database for the login page

I decided to create a database using SQL for the login page. Therefore, only users defined within the database will have access to the website. At the same time, their passwords will be secured using SHA-256. I used Java and PHP to define specific functions.

##### F.5. Dividing user roles

Users have specific roles: admin, users in the Hot Rolling Mill department and users in the Warehouse. Thus, users who are part of the Hot Rolling Mill department will have access to the report created for the Laminor section and will be able to view, filter and check the measurements taken, but will be restricted and will not have access to the page that includes the activity within the warehouse. Users who are part of the Warehouse department will only be responsible for the situation within the warehouse. Admins have full access and can view both reports.

##### F.6. Creating a discussion page

For efficient communication within the company, we have also created a chat page to be able to report problems, set up meetings and discuss the next activities.

G. Generating QR codes to be able to view reports on the phone/tablet

In My Workspace there is the possibility to generate QR codes for published reports, and if the Power BI application is installed on the phone/tablet, the QR codes can be scanned and both the material stock and measurement reports can be viewed.

## IV. EXPERIMENTAL RESULTS

The website, created using HTML, CSS, Javascript, PHP, Java and SQL, contains the two reports visible in Fig.2. and Fig.3. In addition, I generated a QR code, illustrated in Fig.4. so that they could also be visible on the phone/tablet.

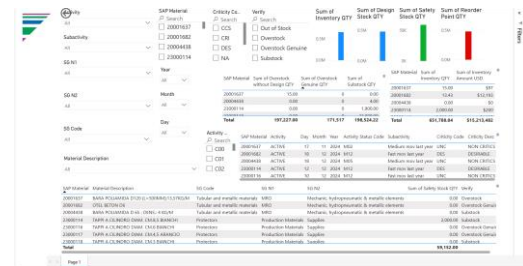


Fig. 2. Stock monitoring report



Fig. 3. Measurements report



Fig. 4. QR code for viewing reports

## V. CONCLUSIONS

In the context of technological development, the introduction of digital solutions in operational processes can generate considerable improvements in the efficiency and accuracy of activities. Data quality has increased, allowing for more efficient resource management and better-founded decisions. These changes highlight the need to implement contemporary technologies to streamline operational activities.

## REFERENCES

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