

INNOVATIVE ACTIONS 2024



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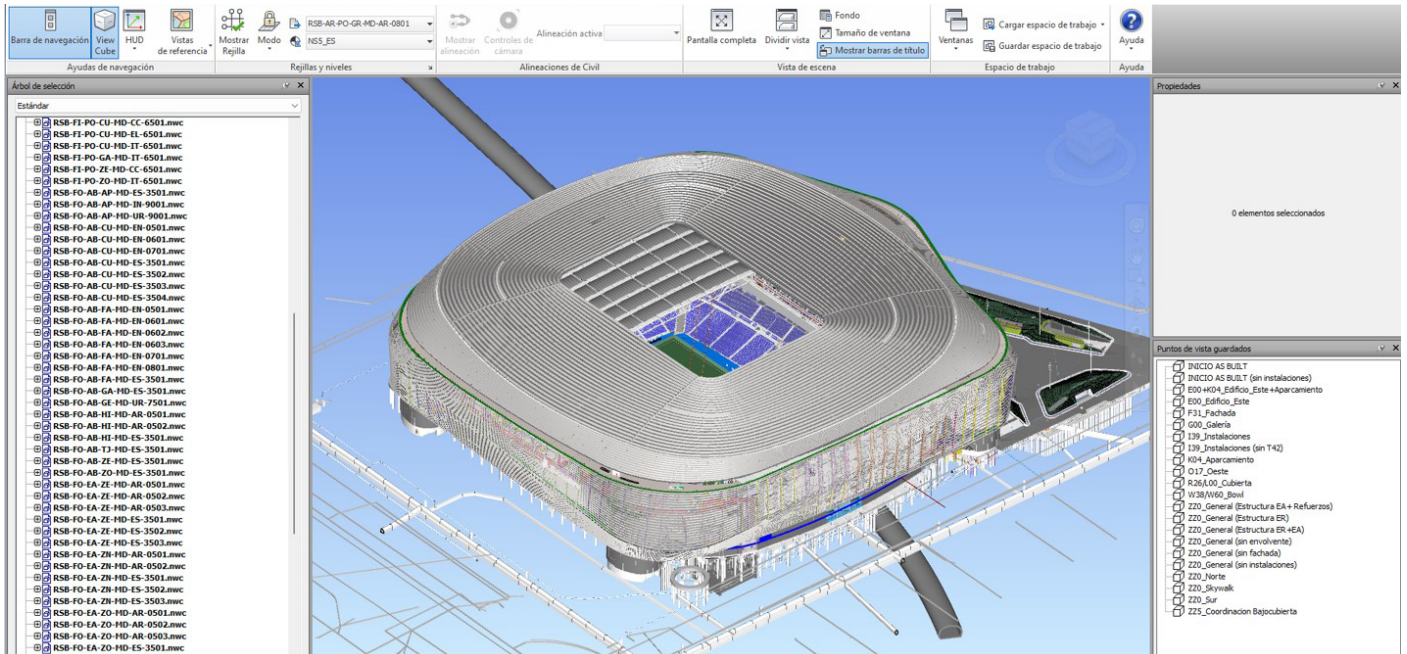
During 2024, innovative actions have been carried out with the aim of improving certain work processes.

The R&D&I Department would like to acknowledge and highlight the importance of some of these actions and the effort made by the teams involved in them. Their contribution has been fundamental in promoting a culture of continuous improvement within the organization, optimizing work processes and encouraging innovation.

***Sustainability and Innovation Directorate
(National R&D&I Department)***

Seguimiento de obra con metodología BIM

BIM



Title of the Action

Work monitoring with BIM methodology

Related Work Centers

Santiago Bernabéu Stadium remodeling

Summary of the Innovation:

Digitalización de las planillas facilitadas por el proveedor.

Creation of a federated Navisworks model that integrates both the stadium redevelopment and pre-existing models, ensuring consistent and interactive workflows throughout all phases of the project.

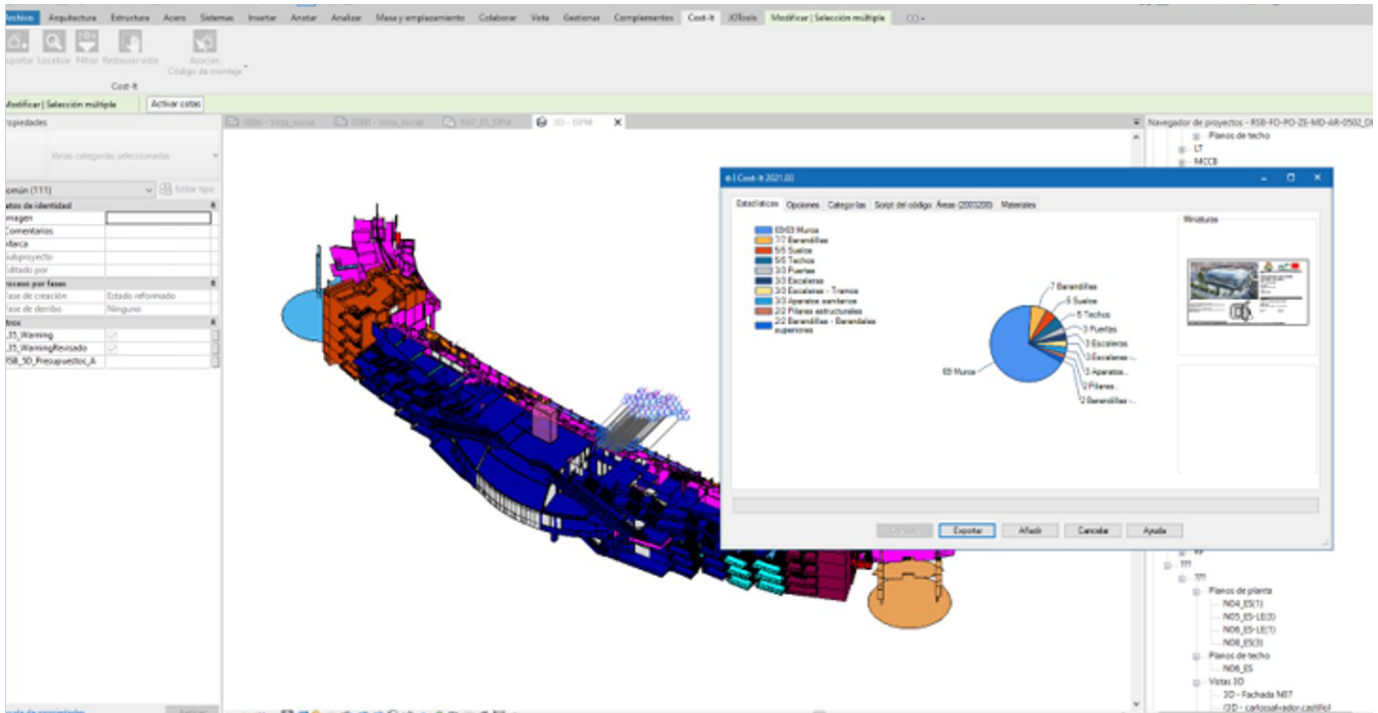
The goal of the federated BIM model, was used for:

- Coordination between all the intervening companies in charge of developing each of them a part or a subproject.
- Coordination between the detailed design phase and the manufacturing and assembly phase.
- Coordination between design and construction. As it was a Fast-Track project, where there was simultaneity between demolition, design and construction, for example, the

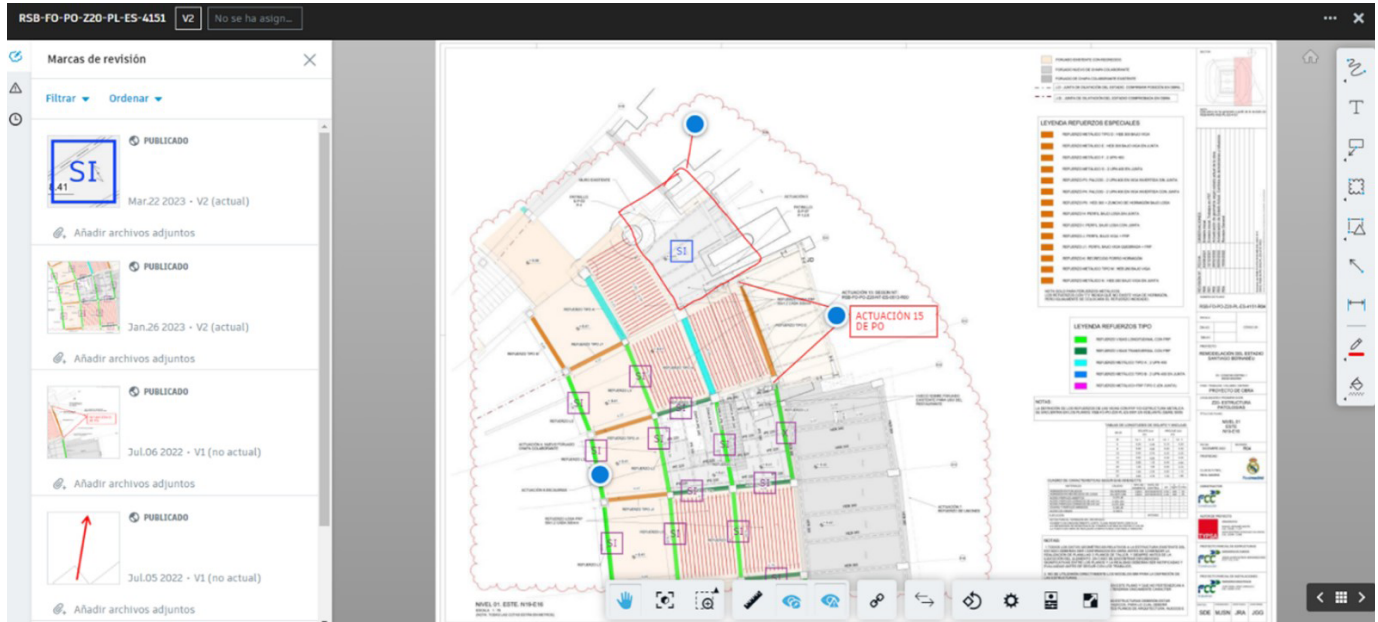
For coordination tasks between different companies and disciplines, BIM models and BIMcollab were used as a platform for issue and interference management. The workflow started with the creation of the issues in Revit, with the BIMcollab plugin, and the issue referenced to the geometry was created, with the same plugin it could be exported to Navis, and visualized in context. In addition, it allowed the export in BCF format.

Foto	N. A.	Título	Asignado a	Zona	Fase	Vencimiento	Etiquetas	Aprobación	Prioridad	Tipo	Estado
	601	Demoliciones N01-SUR- S17		ZS - Zona Sur	Undecided		Estructura (ES)		Grave	Incidencia	Activo
	602	Demoliciones N01-SUR- S13-S11		ZS - Zona Sur	Undecided		Estructura (ES)		Grave	Incidencia	Cerrado
	603	Demoliciones N01-SUR- S13-S99		ZS - Zona Sur	Undecided		Estructura (ES)		Grave	Incidencia	Activo
	604	Modelado estructura N01-SUR_ W22-W24		ZS - Zona Sur	Undecided		Estructura (ES)		Normal	Incidencia	Activo
	605	Modelado estructura N01-SUR_ S17-S13		ZS - Zona Sur	Undecided		Estructura (ES)		Normal	Incidencia	Activo
	606	Demoliciones N00-SUR_ S15-S13		ZS - Zona Sur	Undecided		Estructura (ES)		Normal	Incidencia	Activo
	607	Modelado estructura N01-SUR_ S11-S07		ZS - Zona Sur	Undecided		Estructura (ES)		Normal	Incidencia	Activo
	608	Modelado estructura N01-SUR_ S08-S10		ZS - Zona Sur	Undecided		Estructura (ES)		Normal	Incidencia	Activo
	609	2º Anfiteatro W02-W01_ Actuación 2.5		GR - Grada	Undecided		Estructura (ES)		Grave	Incidencia	Resuelto

The on-site design team used Revit to check measurements and filter elements by subproject, supporting the budgeting department. The information was exported through Cost It to be included in Presto.



During the construction phase, BIM360 Field Management was used to manage the quality of the models, creating notes and issues. The objective was to ensure consistency between the BIM models, the drawings and the executed work. Discrepancies were noted, centralized and corrected, updating the models and drawings accordingly.



Important conclusions from this action include:

Navisworks Federated Model: The creation of a federated model that integrates both the remodeling and pre-existing models ensures interactive and consistent workflows during all phases of the project.

Integrated Coordination: The federated BIM model is used to coordinate between the different companies involved, as well as between the design, fabrication, erection and construction phases, especially in a Fast-Track project such as the Bernabeu.

Incident Management: BIM models and the BIMcollab platform are used to manage incidents and interferences, starting with the creation of incidents in Revit and their export to Navisworks for visualization in context.

Support to the Estimating Department: The on-site design team uses Revit to check measurements and filter elements by subproject, exporting the information to Presto using Cost It.

Quality Management: During the construction phase, BIM360 Field Management is used to manage the quality of the models, ensuring consistency between BIM models, drawings and the executed work, and correcting discrepancies.

Efficiency: Referral Program

EFFICIENCY:
EMPOWERING
OUR PEOPLE
TO GROW

FCC Canada – HR Team

rosta

Title of the Action

Efficiency: Referral Program

Related Work Centers

FCCCO Canadá

Summary of the Innovation:

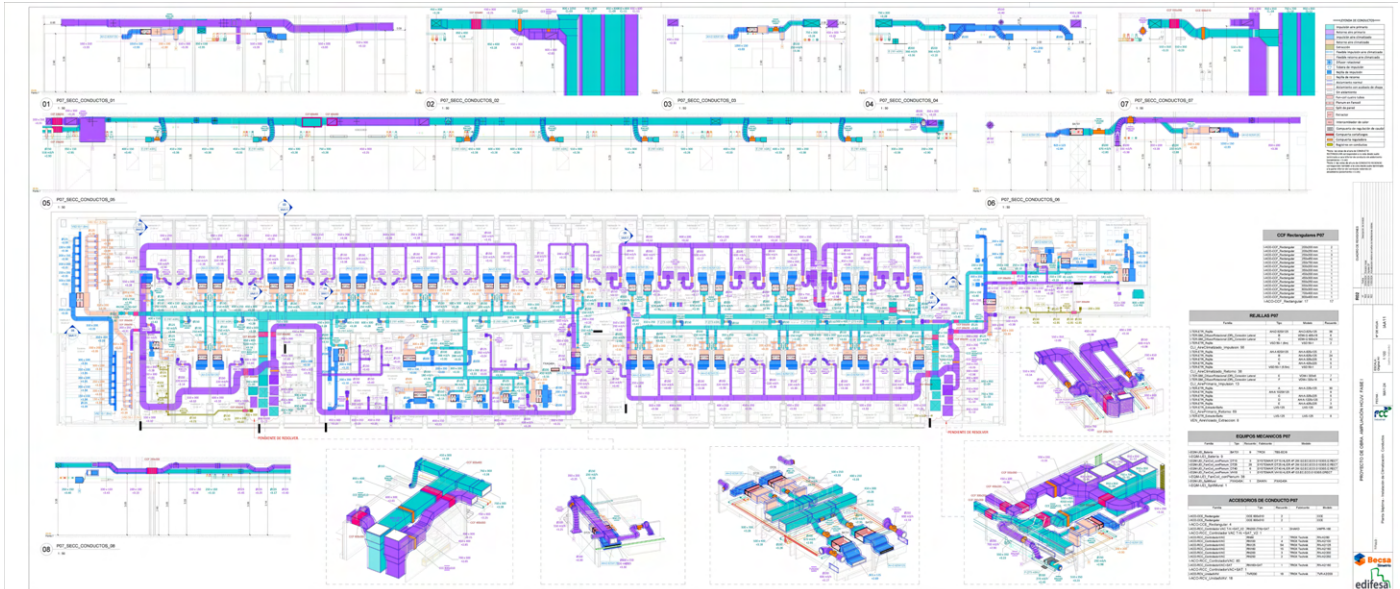
This program seeks to incentivize employees to recommend candidates for vacancies, aligning new employees with the organization's culture and values to improve retention. They discovered that 30% of their current staff comes from referrals, but they did not have a formal program for this. "Efficiency" will launch in Q1 2025 in Canada and will operate through a SharePoint platform where employees will be able to view vacancies and make referrals.

The program allows candidates' progress to be evaluated and tracked, sending automatic notifications to employees on the status of their referrals. After six months, employees accumulate points redeemable for rewards. There will be ambassadors to promote the program inside and outside Canada. This program reduces recruitment time by 50% and is more economical than using external agencies, costing only 3.5% of the candidate's annual salary. In the future, there are plans to expand the program to other FCC regions, allowing both local and international referrals through a unified platform.

Important conclusions from this action include:

- **Tracking and Notifications:** The program allows evaluating and tracking the progress of candidates by sending automatic notifications to employees on the status of their referrals.
 - **Employee Incentives:** Employees accumulate points redeemable for rewards after six months of the referred candidate's employment.
 - **Program Promotion:** There will be ambassadors to promote the program both inside and outside Canada.
 - **Hiring Efficiency:** The program reduces recruitment time by 50%.
 - **Reduced Costs:** The investment cost per candidate is significantly lower than that of external agencies, representing only 3.5% of the candidate's annual salary.
 - **Future Expansion:** There are plans to expand the program to other FCC regions, allowing both local and international referrals through a unified platform.
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University Hospital Clinic of Valencia



Title of the Action

Digitalization of the refurbishment and expansion of the Hospital Clínic Universitari de València.

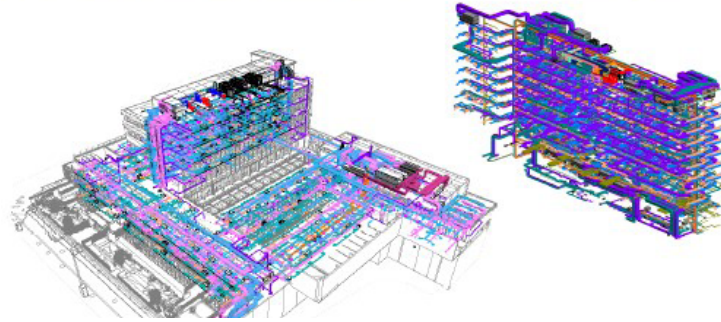
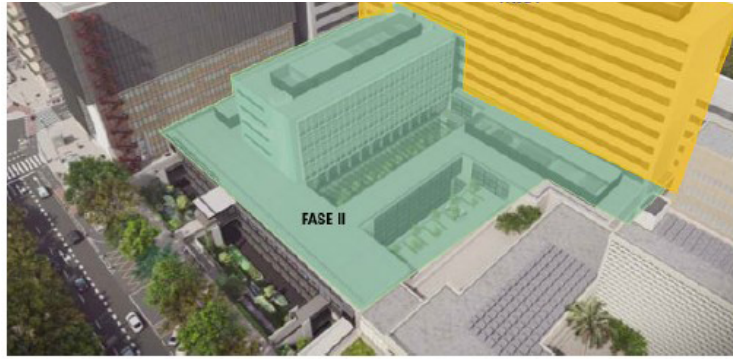
Related Work Centers

Offices Barcelona and Madrid/Production - Construction site and office Valencia

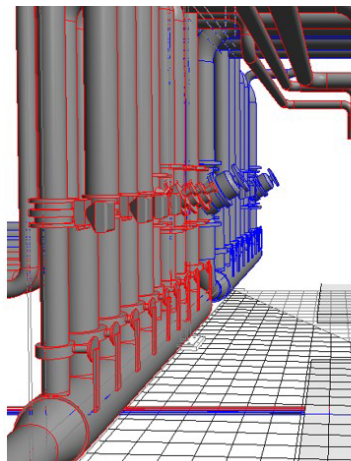
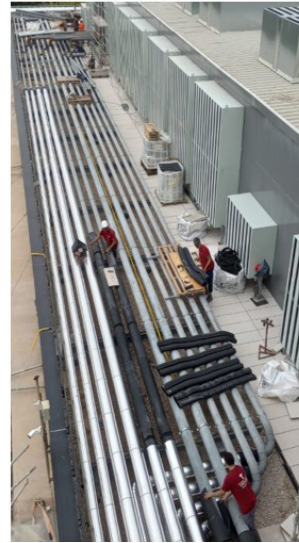
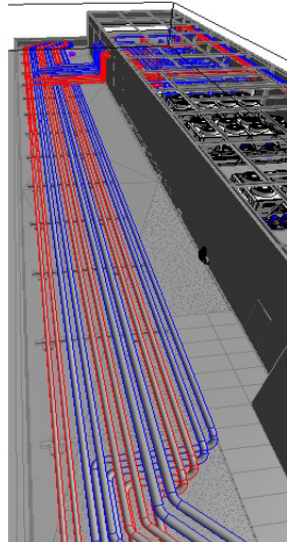
Summary of the Innovation:

The work at the Hospital Clínic Universitario de Valencia was structured in two phases, with FCC Industrial in charge of the air conditioning installation. The first phase was executed using a traditional methodology based on 2D AutoCAD drawings. However, for the second phase, it was decided to adopt a digital approach using a BIM model, which allowed optimizing the coordination between disciplines and reducing the execution time of the work.

- The digital procedures applied in the second phase included:
- Use of CDE BIM360 for a collaborative environment.
- Creation of a BIM model for site production.
- Interdisciplinary 3D coordination to solve collisions.
- Generation of quality drawings integrating multiple views and tables.



- Accurate measurements with a minimum error margin of 1%.
- Visualization of the 3D model on site by means of tablets or cell phones.



- Training and resources available on a digital portal



Important conclusions from this action include:

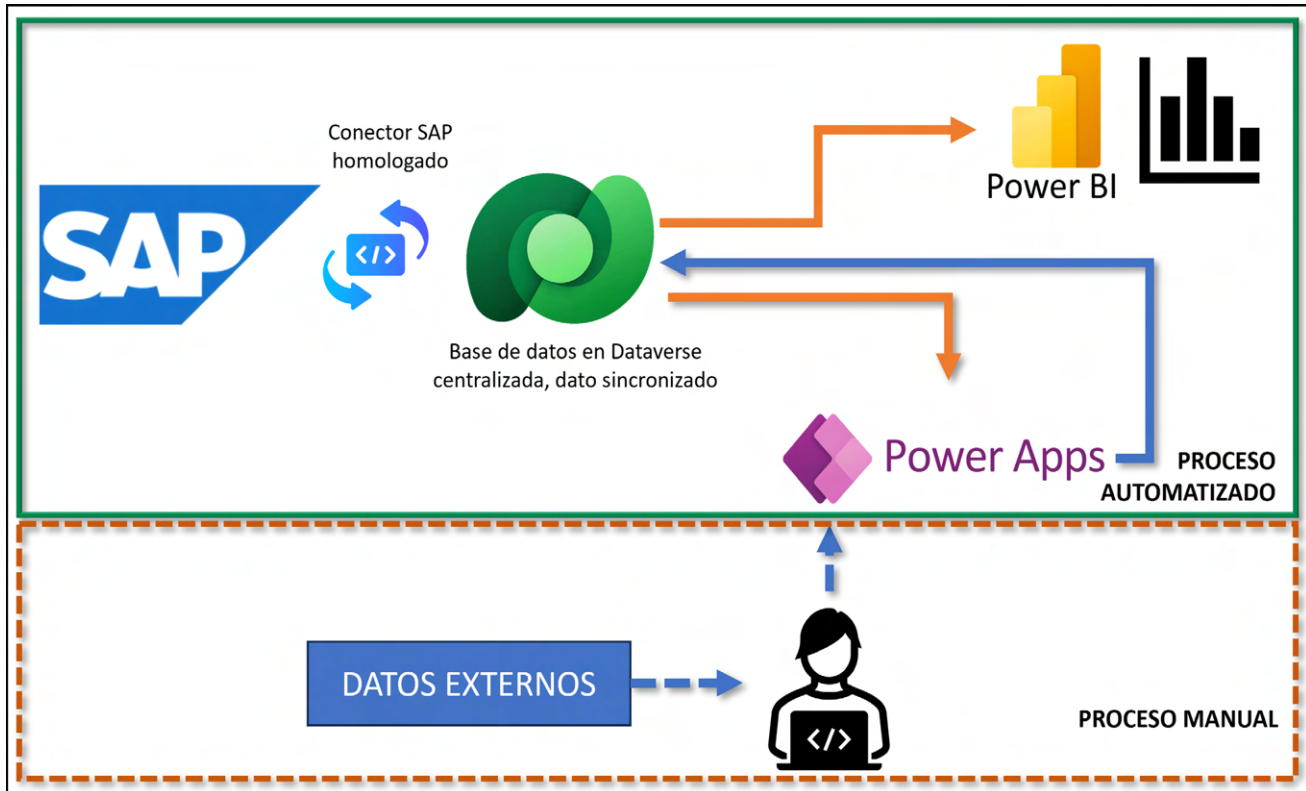
Improved Coordination and Execution: The use of BIM optimized coordination between disciplines and reduced execution time.

Measurement Accuracy: Automations allowed for accurate and reliable measurements.

Site Team Involvement: The team was actively involved in the use of BIM, improving project efficiency.

Site Visualization: 3D visualization facilitated the understanding of the facilities.

End-to-end digitization through SAP's connection to the Power Platform



Title of the Action

End-to-end digitization through SAP's connection to the Power Platform

Related Work Centers

MEGAPLAS

Summary of the Innovation:

FCC's business information is centralized in SAP, but currently data is uploaded and exported manually, which causes errors and low efficiency. The proposed solution is a comprehensive digitization system that connects SAP with Power Platform to automatically capture and visualize data in Dashboards. Power Platform includes Power BI for data analysis, Power Apps to capture data with custom applications and Power Automate to automate workflows. The prototype has been implemented at the Megaplas factory in Madrid and is planned to be scaled to other FCC businesses.

Important conclusions from this action include:

Integral Digitization: The proposed solution digitizes data capture and visualization, improving efficiency and reducing errors.

Use of Power Platform: The integration with Power Platform allows building applications, automating workflows and analyzing data efficiently.

Prototype in Madrid: The prototype has been implemented in the Megaplas factory and is planned to be scaled to other FCC businesses.

Improved Decision Making: The automation and visualization of data in Dashboards facilitates more informed and faster decision making.

Metro Porto: GIS, BIM and Reality Capture for managing sustainable construction works in New Rubi Porto's Metro Line.



Title of the Action

GIS, BIM and Reality Capture for managing sustainable construction works in New Rubi Porto's Metro Line.

Related Work Centers

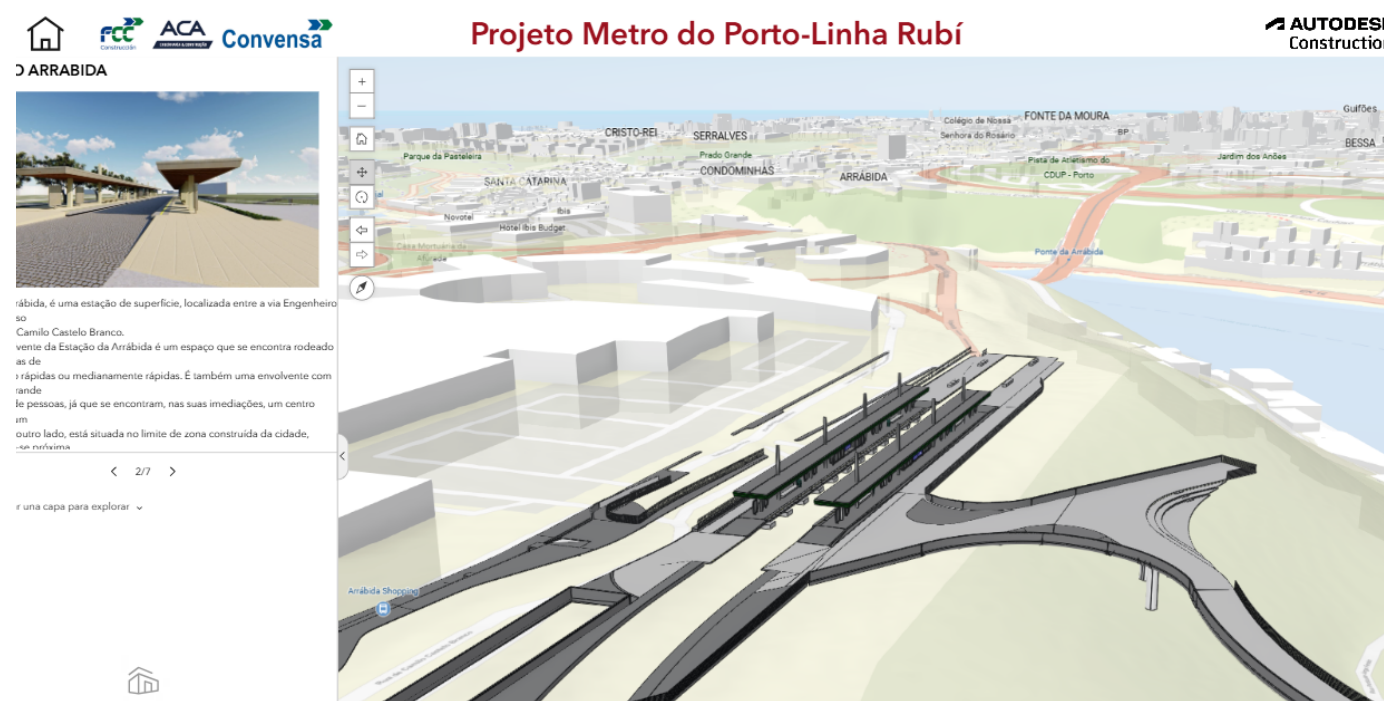
Metro Porto –Linha Rubi. (Convensa/FCC Portugal)

Summary of the Innovation:

FCC Construcción and Convensa, leaders in the digitization of construction processes, are improving and expanding process automation using GIS with ESRI technology. The first project in Portugal to use GIS-BIM technology is the Rubí Line project, the metro line construction project with the largest budget in the country.



In the Arc GIS environment, BIM data integration will be available to all project stakeholders. Processes are being created to combine environmental, waste management and archaeological data, ensuring traceability and sharing this information with all project stakeholders.



The project uses reality capture technology, combining lidar data collected by drones and 360-degree photos to accelerate the evaluation, documentation and economic assessment of the work. The tunnel construction process is monitored with laser scanning technology, which collects geological data simultaneously. An auscultation and movement tracking system will be implemented within the GIS framework, displaying this data graphically in three dimensions to assess and predict risks related to movements caused by the metro development. The Leica and Sigtun platforms will connect their observations to the model displayed in the GIS environment via FTP.

Important conclusions from this action include:

Pioneer Project: The Ruby Line project in Portugal is the first project in the country to use GIS-BIM technology.

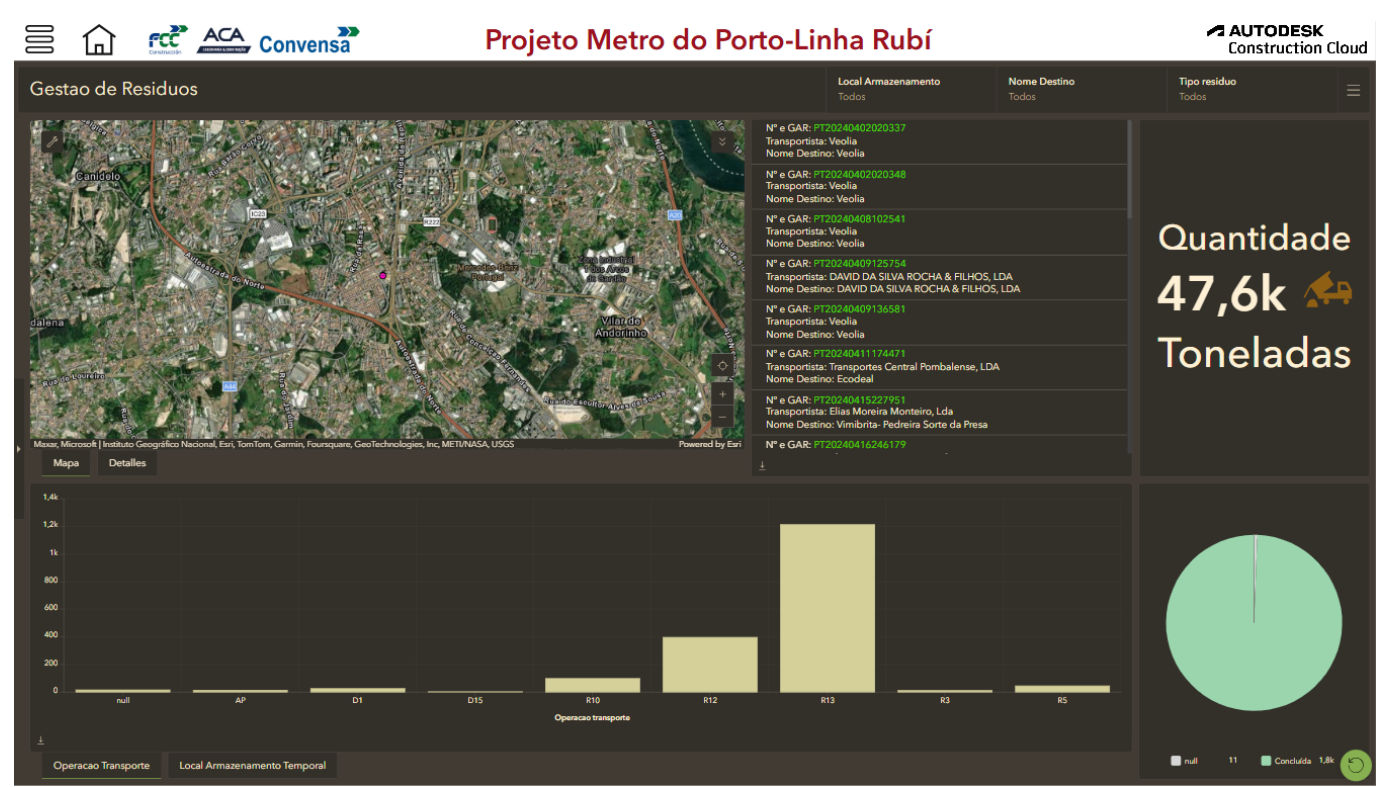
Data Integration: The integration of BIM data into the Arc GIS environment enables effective collaboration between all project stakeholders.

Traceability and Information Sharing: Traceability of environmental, waste management and archaeological data is ensured by sharing this information with all project participants.

Reality Capture Technology: The use of reality capture technology, such as lidar data and 360-degree photos, improves the evaluation and documentation of the work.

Advanced Monitoring: Tunnel construction is monitored with laser scanning technology and a motion tracking system is implemented to assess and predict risks.

Platform Connection: Leica and Sigtun platforms connect your observations to the GIS model, facilitating integrated visualization and analysis.



MIGRATION AND ITS BENEFITS FOR THE FCC GROUP



Title of the Action

Migration and its benefits for the FCC Group.

Related Work Centers

FV GUILLENA REUNION

Summary of the Innovation:

The project aims to cover the lack of personnel in all its business areas by hiring migrant workers trained in NGO programs, who have an adequate level of Spanish and skills in trades such as photovoltaic installations, electricity and security. The initiative seeks to reduce hiring time from two and a half months to fifteen working days, generating a 70% time savings.



The pilot project was carried out at the work center of Fotovoltaica de Guillena, Seville, in collaboration with CEAR (Spanish Committee for Refugee Aid). In this pilot project, two workers were hired in 15 days, filling vacancies that had not been filled for a long time. The key to success was the coordination between the HR staff of the FCC Group, CEAR and other parties involved, such as Security, Training, Administration and Site.



The necessary resources to implement this project in all business areas are already available within the FCC Group and NGOs, which facilitates its implementation without the need for additional resources. Implementation costs are minimal and do not pose any operational difficulties. In addition, the project has generated great satisfaction among all parties involved due to the high motivation and training of the participants.

Important conclusions from this action include:

Reduced Time to Hire: The project significantly reduces recruitment time from two and a half months to fifteen working days, saving 70% of the time.

Collaboration with NGOs: Collaboration with NGOs such as CEAR provides access to a pool of trained and motivated workers.

Solution to the Lack of Personnel: The project effectively addresses the lack of qualified personnel in the current market.

Low Cost and Ease of Implementation: The implementation of the project is simple and does not require additional resources as it utilizes existing staff and resources.

Coordination and Collaboration: Coordination between HR, CEAR and other involved parties is crucial to the success of the project.

Stakeholder Satisfaction: The project generates great satisfaction among all parties involved due to the high motivation and training of the participants.

PowerBi – NEOM



Title of the Action

Implementation of a scorecard in Power BI for the control of work progress.

Related Work Centers

Neom tunnels

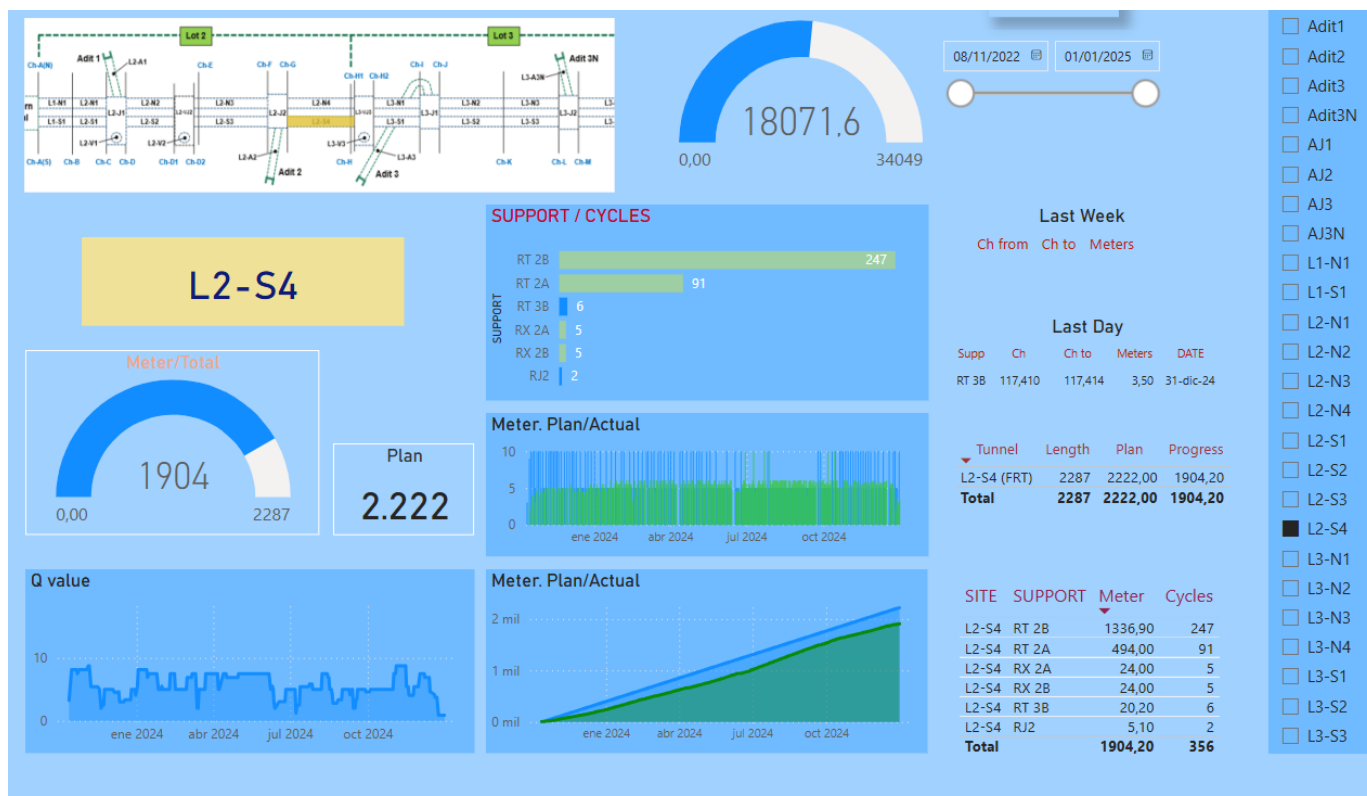
Summary of the Innovation:

Implementation of a scorecard in Power BI for the control of work progress.

Features:

- Daily update
- Posted in Teams
- Browser accessible, mobile, Teams
- Progress control containing:
 - Tunnels
 - Dates
 - Type of support
 - Q Value

- Cycle times
- Kilometer points
- Filters by criteria
- Exportable



Benefits:

- Savings in data transmission
- Availability at all times
- Creation of “team environment
- Easily available filters and analysis
- Easy data export
- Uniformity of information for the whole project

Important conclusions from this action include:**Improved Data Management Efficiency:**

- Daily update and accessibility from browser, mobile and Teams.
- Ability to export data.

Optimization of Progress Control:

- Key metrics: tunnels, dates, type of support, Q Value, cycle times and kilometer points.
- Filtering by specific criteria.

Promotion of Collaboration and Transparency:

- Publication in Teams and accessibility for all team members.
- Uniformity of information.

Time and resource savings:

- Elimination of the need to submit data manually.
 - Ease of data export and analysis.
-

RUTAFAST



Title of the Action

RUTAFAST - Inspection Routes Planner

Related Work Centers

Work 3R96

Summary of the Innovation:

Within the conservation works carried out in the maintenance contract of the public lighting of the Madrid City Council, the inspections of all the inventoried elements have a great relevance. In order to create optimized routes that save time and fuel, the following Web platform was developed that allows us to take advantage of a powerful route planning algorithm.

Important conclusions from this action include:

- Reduction of fuel consumption.
- Reduced planning and inspection costs.
- Reduced environmental impact. Reduced fuel use. It has a lower carbon footprint compared to traditional methods by making routes in an efficient way.

MACHINE CONTROL WORKFLOW

- Remote Machine Control Workflow

The screenshot displays the Xsite MANAGE software interface. On the left is a dark sidebar with navigation options: Home, My Workspaces, Workspaces (Sotra Link_Bildeg), Data Management (selected), Machines, Users, Support Requests, and Settings. The main area is titled 'Data Management' and shows a table of machine data. The table has columns for local ID, Code, x, y, and z. The data is filtered to 'Asbuilt' and shows 1 of 411 rows. To the right of the table is a 3D map of a construction site with blue and pink markers representing machine locations. The map includes labels for 'Bildergården' and 'Sotra Link_Bildeg'.

Local ID	Code	x	y	z
L	TERRENG	1262292.061	78467.128	42.187
L	TEST	1262574.866	78460.904	13.771
L	FJELL UNDER FUND	1262543.129	78453.586	10.389
L	22400	1262392.874	78112.472	22.891
L	2101	1267500.154	98398.402	65.429
L	AS_BUILT_PNT	1262042.152	77826.701	9.409
L	2101	1262265.794	77887.095	9.496
L	FJELL	1262547.778	78418.576	17.917
L	1100	1262325.912	77983.192	5.377

Title of the Action

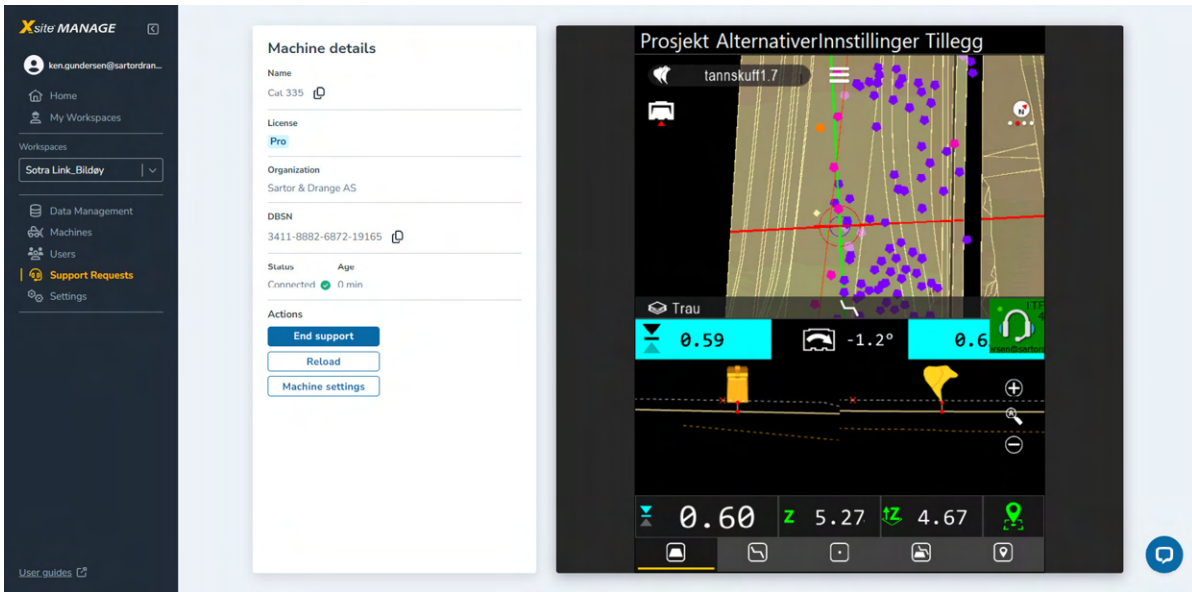
MACHINE CONTROL WORKFLOW - Remote Machine Control Workflow

Related Work Centers

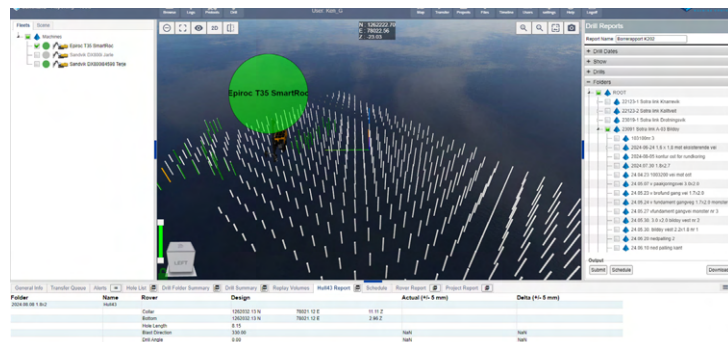
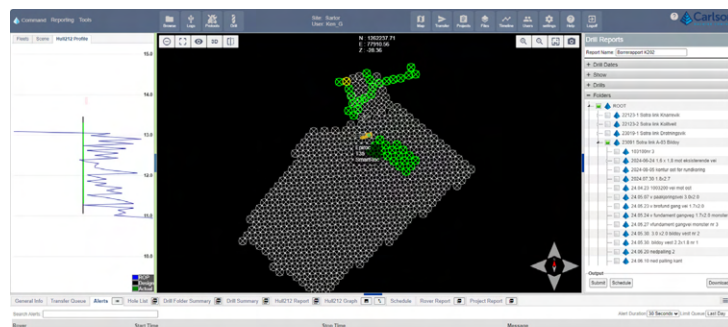
RV555 Sotrasambandet

Summary of the Innovation:

The BIM construction workflow transforms digital models into information usable by on-site machines. Although the IFC format is useful for sharing data, it is not always compatible with machines and does not always provide the required accuracy. Therefore, other formats such as DMI/DMR and LandXML are used to validate the design and ensure correct interpretation.



In earthmoving, Xsite Manage software is used on machinery equipped with control systems. This software processes topographic data in DMI/DMR formats to guide excavators. The process includes reading design data, excavating in real time and generating new surfaces when reaching the rock. For drilling tasks, Carlson Machine Control software is used with geometric design data in LandXML format, ensuring that tasks are carried out as planned.



The operator controls the alignment of the drill rig remotely, adjusting the position in real time to match planned drill points. The software monitors drilling depth, speed and angle, adjusting any deviation in real time. Drilling data is transmitted to the Infobric - Blasting Manager system for accurate blasting calculation.



Important conclusions from this action include:

- Format Compatibility:** The IFC format is not always compatible with on-site machines, so specific formats such as DMI/DMR and LandXML are used to ensure accuracy and correct interpretation.
- Use of Specialized Software:** Xsite Manage and Carlson Machine Control software are essential to process topographic and geometric data, guiding the machines in their tasks.
- Real-Time Monitoring:** Excavation and drilling are monitored in real time, allowing precise adjustments and ensuring that tasks are performed as planned.
- Surface and As-built Model Generation:** Data collected during excavation and drilling is used to generate new surfaces and As-built models, crucial for planning subsequent steps such as controlled blasting.
- Accurate Blasting Calculation:** The Infobric - Blasting Manager system interprets drilling data to accurately calculate blasting, including material and sequence requirements.

Automation project and evolution of bids from the bidding phase on site

Título	ABIERTA	TELEFONO FIJO	EMAIL	COMUNIDAD AUTONOMA	PROVINCIA	OBRA	TIPO OBRA	TIPO DE ...	MADURE...
ASCENSORES COSECAN	SI			CANARIAS	SC DE TENERIFE	EDIFICACION	EDIFICIO	Suministro y montaje	
ASCENSORES KONE	SI			CANARIAS	SC DE TENERIFE	EDIFICACION	EDIFICIO	Suministro y montaje	
ASCENSORES OTIS	SI			CANARIAS	SC DE TENERIFE	EDIFICACION	EDIFICIO	Suministro y montaje	
ASCENSORES SCHINDLER	SI			CANARIAS	SC DE TENERIFE	EDIFICACION	EDIFICIO	Suministro y montaje	
ASCENSORES THYSSENKRUPP	SI			CANARIAS	SC DE TENERIFE	EDIFICACION	EDIFICIO	Suministro y montaje	
ASCENSORES OMEGA CANARIAS	SI			CANARIAS	SC DE TENERIFE	EDIFICACION	EDIFICIO	Suministro y montaje	
ASFALTO CONSTRUCCIONES DARIAS	SI			CANARIAS	SC DE TENERIFE	OBRA CIVIL	CARRETERAS	Suministro y extensi	
ASFALTO LOPESAN	SI			CANARIAS	SC DE TENERIFE	OBRA CIVIL	CARRETERAS	Suministro y extensi	

Title of the Action

Project Automation and evolution of bids from bidding phase to construction site (SAP Inventory)

Related Work Centers

Bidding studies. Quintanaortuño-Montorio E.T.U.

Summary of the Innovation:

The action arises from the need to efficiently manage the development of activities derived from works bidding studies. Therefore, a system designed to improve the activities related to works bidding studies is developed. This system allows speeding up and optimizing the selection of suppliers, reducing the time and costs associated with their management, making informed decisions and obtaining better results in the negotiation of contracts.

The process begins with the classification and updating of suppliers using Microsoft Lists. The data is categorized in the Presto file and exported to Access. Then, in PowerBi, these files are linked to generate interactive reports that facilitate supplier selection and task automation using Power Automate.

				CanTotP...	Ud	Pres	TotPres	Resumen2
4	11.03.04	Clasificación de residuos inertes, excluido volumen de material pétreo y ...	113.505,82	t	5,36	608.391,20	608.391,20	Gestor de Residuos
5	02.01.05	Sangrado entre pantallas	104.560,95	m3	3,53	369.100,15	369.100,15	Movimiento de Tierras
6	02.01.02	Excavación entre pantallas bajo cubierto en cualquier terreno	104.560,95	m3	18,14	1.896.735,63	1.896.735,63	Movimiento de Tierras
7	06.09	Acero B500SD en barras para armado, elaborado, montado y colocado.	31.405,62	kg	1,54	48.364,65	48.364,65	Suministro de Acero Corrugado

ESTUDIO DE OBRAS

COMUNIDAD AUTONOMA
 CANARIAS
 CASTILLA Y LEÓN
 EXTREMADURA

PROVINCIA
 BURGOS
 CASTELLÓN
 TENERIFE

EMPRESAS
 ORGANIZACIONES SOCIALES VINICIAS
 IMPLANTACIONES HERRINGGOLD ALFARIZ
 PCL_018 LUIS GARCIA
 PCL_018A MARIA JESUS
 PCL_018B JESUS GARCIA
 PCL_018C JESUS GARCIA
 PCL_018D RODRIGUEZ
 PCL_018E FERNANDEZ/CLAYTON
 PCL_018F CARLOS SICO
 PCL_018G MARTINEZ GIMENEZ
 PCL_018H ALBAZ
 MOVIMIENTO DE TIERRAS EN EL VENTRO
 MOVIMIENTO DE TIERRAS CUBANILLA
 MOVIMIENTO DE TIERRAS DEL LAS LULLU
 MOVIMIENTO DE TIERRAS RODONDO

ABIERTA	COMUNIDAD AUTONOMA	PROVINCIA	EMPRESAS	TIPO DE ACTIVIDAD	CONTACTO
SI	CANARIAS	TENERIFE	PCL_018D RODRIGUEZ	Movimiento de Tierras	
SI	EXTREMADURA	CACERES	PCL_018E FERNANDEZ/CLAYTON	Movimiento de Tierras	JESUS GARCIA SICO
SI	CASTILLA Y LEÓN	BURGOS	PCL_018G MARTINEZ GIMENEZ	Movimiento de Tierras	MARIA JESUS MARTINEZ GIMENEZ

Código	Resumen	Descripción de la partida	Can1	Ud	Real0%	Resumen2
02.01.21	Excavación a cielo abierto en cualquier tipo de terreno	Excavación a cielo abierto en cualquier tipo de terreno y por cualquier medio, entre perfiles o desde la superficie, incluso cualquier tipo de agua, enterrado en caso necesario y carga de material. Está incluido el transporte a gestor de residuos autorizados, no están incluidos los tesoros (si los hay).	434,75	m3	10,00	Movimiento de Tierras
02.01.21	Excavación a cielo abierto en cualquier tipo de terreno	Excavación a cielo abierto en cualquier tipo de terreno y por cualquier medio, entre perfiles o desde la superficie, incluso cualquier tipo de agua, enterrado en caso necesario y carga de material. Está incluido el transporte a gestor de residuos autorizados, no están incluidos los tesoros (si los hay).	637,15	m3	10,00	Movimiento de Tierras
02.01.21	Excavación a cielo abierto en cualquier tipo de terreno	Excavación a cielo abierto en cualquier tipo de terreno y por cualquier medio, entre perfiles o desde la superficie, incluso cualquier tipo de agua, enterrado en caso necesario y carga de material. Está incluido el transporte a gestor de residuos autorizados, no están incluidos los tesoros (si los hay).	408,36	m3	10,00	Movimiento de Tierras
02.01.21	Excavación a cielo abierto en cualquier tipo de terreno	Excavación a cielo abierto en cualquier tipo de terreno y por cualquier medio, entre perfiles o desde la superficie, incluso cualquier tipo de agua, enterrado en caso necesario y carga de material. Está incluido el transporte a gestor de residuos autorizados, no están incluidos los tesoros (si los hay).	642,39	m3	10,00	Movimiento de Tierras

▶ ENVIAR CORREO

▶ CREAR CARPETAS



Rodriguez Abreu, Cristo Angel compartió la carpeta "Estudios de obras" contigo.

Rodriguez Abreu, Cristo Angel
Para: Martínez Gimenez, Maria Jesus
lu, 05/06/2023 10:54

Si hay problemas con el modo en que se muestra este mensaje, haz clic aquí para verlo en un explorador web.

Rodriguez Abreu, Cristo Angel compartió una carpeta contigo

en la carpeta 03. Puedes estar el archivo de la obra de Málaga.

Estudios de obras

Este vínculo solo funciona para los destinatarios directos de este mensaje.

Abrir

Declaración de actividad



ESTUDIO DE OBRA " LÍNEA 2 DEL METRO DE MÁLAGA AL HOSPITAL CIVIL. TRAMO: GUADALMEDINA – HILERA" en Ca...

Rodriguez Abreu, Cristo Angel
Para: Martínez Gimenez, Maria Jesus
mi, 05/06/2023 7:48

FCC_MJ MARTINEZ GIMENEZ - ATL MARIA JESUS MARTINEZ GIMENEZ

Buenos tardes,

Mediante el presente les solicitamos nos hagan su mejor oferta para el suministro de las unidades de obra descritas en los archivos adjuntos, correspondientes a la obra " LÍNEA 2 DEL METRO DE MÁLAGA AL HOSPITAL CIVIL. TRAMO: GUADALMEDINA – HILERA". Les agradeceríamos su oferta antes del próximo día 2023-06-19T23:00:00.000Z.

Se ruega emplear el Excel que le llegará en el enlace de la carpeta compartida para incluir los precios directamente, o bien enviarnos la oferta en el formato que prefieran. Si hubiera unidades que no fueran de su especialidad, déjenlas en blanco, sin ofertarlas.

Es muy **IMPORTANTE** reenviar el correo con el asunto **OFERTA Canarias-SC DE TNERIFE-5478-XSD-Movimiento de Tierras-FCC_MJ MARTINEZ GIMENEZ**

Los precios ofertados deben incluir el suministro a pie de obra.


Los rogamos que además del presupuesto, envíen la siguiente información complementaria:

- Fichas técnicas de los materiales ofertados;
- Carta de compromiso de ejecución de trabajos a los precios ofertados, según modelo adjunto o similar;

Los ruego su respuesta a esta misma dirección de correo electrónico. Para cualquier duda, o si necesitaran planos o cualquier otra información, pueden contactar conmigo por este mismo medio, o en los teléfonos indicados abajo.

Les agradezco de antemano su interés. Un cordial saludo,


The bids received are analyzed using DAX to identify the most competitive one, which allows generating a target price for the work. Finally, the prices are included in Access and imported into Presto, creating a file with the prices in the target column. The system is flexible and can be easily expanded to other zones with minimal adjustments.



ESTUDIO DE OBRAS

COMPARATIVO DE OFERTAS DE OBRA

Source.Name	Oferta-Movimiento de Tierras-FCC CRISTO RODRIGUEZ.xlsx			Oferta-Movimiento de Tierras-FCC JOSE CARLOS RICO.xlsx			Oferta-Movimiento de Tierras-FCC_MJ MARTINEZ GIMENEZ.xlsx		
CODIGO	CANTIDAD	PRECIO	COSTE	CANTIDAD	PRECIO	COSTE	CANTIDAD	PRECIO	COSTE
02.01.01	41.531.01	627	8.679.981.09	41.531.01	834	11.545.620.78	41.531.01	723	10.008.973.41
02.01.02	313.682.85	99	10.351.534.05	313.682.85	1428	149.313.036.60	313.682.85	1128	117.944.751.60
02.01.03	18.627.30	846	5.252.896.60	18.627.30	498	3.092.131.80	18.627.30	1476	9.164.631.60
02.01.04	1.135.50	249	94.246.50	1.135.50	582	220.287.00	1.135.50	411	155.983.50
02.01.05	313.682.85	1363	132.060.479.85	313.682.85	447	46.738.744.65	313.682.85	132	13.802.045.40
03.01.01.13	16.057.71	1272	6.808.469.04	16.057.71	1314	7.033.276.98	16.057.71	900	4.817.313.00
03.01.01.14	16.144.26	585	3.148.130.70	16.144.26	1395	7.507.080.90	16.144.26	504	2.712.235.68
03.01.01.20	710.61	321	76.035.27	710.61	945	223.842.15	710.61	267	63.244.29
03.02.03.09	1.890.00	399	251.370.00	1.890.00	426	268.380.00	1.890.00	501	315.630.00



PLANIFICADO

CODIGO	PARTIDA	CANTIDAD	PRECIO PLANIFICADO	IMPORTE PLANIFICADO	Valor Minimo
03.01.01.13	"Excavación estéril de pantalla, en cualquier clase de terreno."	5.352.57	300.00 €	1.605.771.00 €	300-Oferta-Movimiento de Tierras-FCC_MJ MARTINEZ GIMENEZ
07.02.10	"Excavación zanjas y pozos, cualquier terreno (sin relleno y compactación) medios mecánicos"	718.48	125.00 €	89.810.00 €	125-Oferta-Movimiento de Tierras-FCC_MJ MARTINEZ GIMENEZ
10.04.01.01.02	"Relleno localizado zanjas con tierras excavación, material seleccionado <35 mm."	162.72	234.00 €	38.076.48 €	234-Oferta-Movimiento de Tierras-FCC_JOSE CARLOS RICO.xlsx
03.01.01.20	Carga y transporte de elementos cortados de hormigón armado.	236.87	89.00 €	21.081.43 €	89-Oferta-Movimiento de Tierras-FCC_MJ MARTINEZ GIMENEZ.xlsx
03.02.03.09	Excav. Zanjas y pozos cualq. Terreno y relleno. M. Mec.	630.00	133.00 €	83.790.00 €	133-Oferta-Movimiento de Tierras-FCC_CRISTO RODRIGUEZ.xlsx
02.01.01	Excavación a cielo abierto en cualquier tipo de terreno	13.843.67	209.00 €	2.893.327.03 €	209-Oferta-Movimiento de Tierras-FCC_CRISTO RODRIGUEZ.xlsx
02.01.04	Excavación de tierra vegetal.	378.50	83.00 €	31.415.50 €	83-Oferta-Movimiento de Tierras-FCC_CRISTO RODRIGUEZ.xlsx
10.01.01.01.01	Excavación de zanjas en toda clase de terrenos.	7.933.23	184.00 €	1.459.714.32 €	184-Oferta-Movimiento de Tierras-FCC_CRISTO RODRIGUEZ.xlsx
02.01.02	Excavación entre pantallas bajo cubierto en cualquier terreno	104.560.95	33.00 €	3.453.311.35 €	33-Oferta-Movimiento de Tierras-FCC_CRISTO RODRIGUEZ.xlsx
02.01.01.14	Relleno de gravilla en excavación estéril de pilotes y pantallas	5.301.42	168.00 €	904.078.56 €	168-Oferta-Movimiento de Tierras-FCC_MJ MARTINEZ GIMENEZ
02.01.03	Relleno localizado con productos de la excavación	6.209.10	166.00 €	1.030.710.60 €	166-Oferta-Movimiento de Tierras-FCC_JOSE CARLOS RICO.xlsx
02.01.05	Sangrado entre pantallas	104.560.95	44.00 €	4.600.681.80 €	44-Oferta-Movimiento de Tierras-FCC_MJ MARTINEZ GIMENEZ.xlsx

In summary, this system improves efficiency and optimization in supplier management, facilitates decision making through automation and detailed analysis, and is easily expandable to other areas.

Important conclusions from this action include:

- **Efficiency and Optimization:** Improves efficiency and optimization in supplier management.
- **Automation and Analysis:** Facilitates decision making through automation and detailed analysis.
- **Flexibility and Expansion:** Flexible and easily expandable to other areas.