



Convegno

Bologna, 20 September 2017

Soluzioni logistiche e sostenibilità nella
costruzione di grandi infrastrutture nei centri
urbani: focus sulle esperienze in Emilia-Romagna
Anna Giarandoni – Eleonora TU



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 633338.



3 sedi operative Bologna, Ravenna e Piacenza.

ATTIVAZIONE DI UN NETWORK STABILE

composto da: Regione Emilia-Romagna, Comuni, Città metropolitana di Bologna Università e Autorità portuale di Ravenna

Cooperazione con un vasto **NETWORK** di industrie, centri di ricerca, società di consulenza, e esperti di settore, enti attivi nel settore della mobilità passeggeri e merci

The image features a close-up, slightly wrinkled texture of the European Union flag, showing the blue fabric and the golden-yellow stars. Overlaid on the right side of the flag are three abstract, overlapping lines in red, green, and cyan. The text '100 progetti in 10 anni' is centered in white, sans-serif font.

100 progetti in 10 anni

Esperienze e consolidate competenze sulla City logistics



H2020

- SUCCESS
- NOVELOG
- ECOSTARS
- C-LIEGE



Others

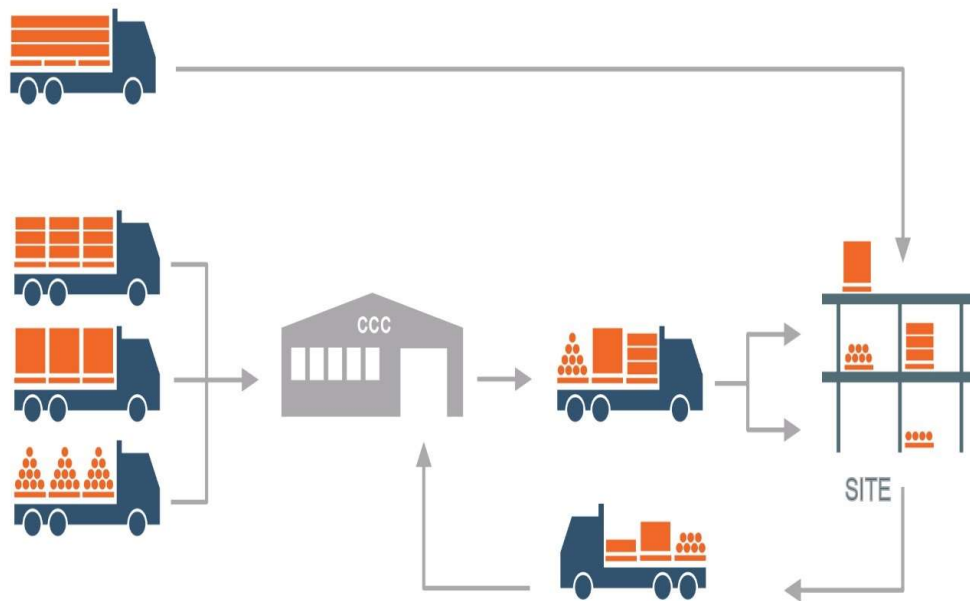
- OPEN ENLoCC



INTERREG Transnational

- SUGAR
- SoNorA
- SULPiTER
- SMILE

Il progetto SUCCESS: Centro di consolidamento per il settore delle costruzioni



- Concetto guida di tutto il progetto
- Applicazione di una misura di ottimizzazione logistica in ambito urbano ad un settore specifico che è tra i primi produttori e consumatori della risorsa «trasporto» merci in ambito urbano
- Settore molto frammentato con un numero elevato di fornitori e distributori per diversi cantieri all'interno di un'area urbana



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Il progetto SUCCESS: i cantieri pilota



Luxembourg (Luxembourg)

- 11 400 m²
- 21 M €
- Restauro e costruzione appartamenti, negozi, uffici

Paris (France)

- 55 475 m²
- 230 M €
- Uffici del Primo Ministro, Auditorium



Valencia (Spain)

- 7 772 m²
- 16 M €
- Restauro di edifici storici e costruzione di nuovi edifici

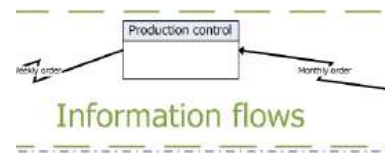
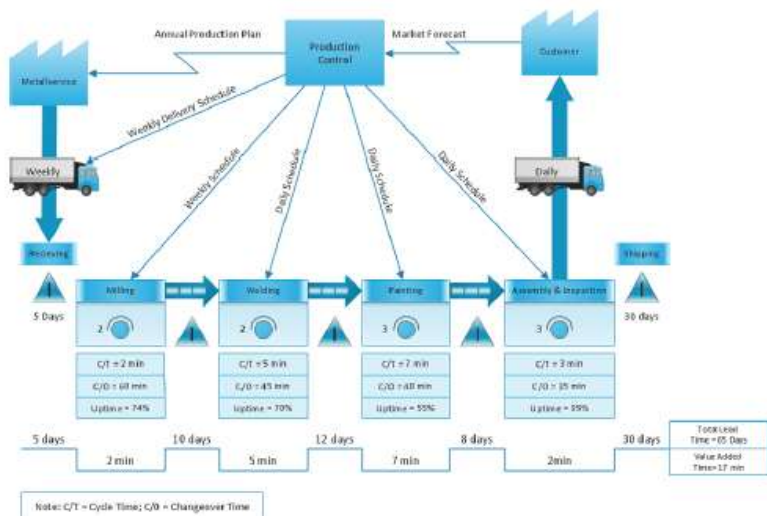
Verona (Italy)

- 83 914 m²
- 126 M €
- Ampliamento e ristrutturazione di 2 ospedali

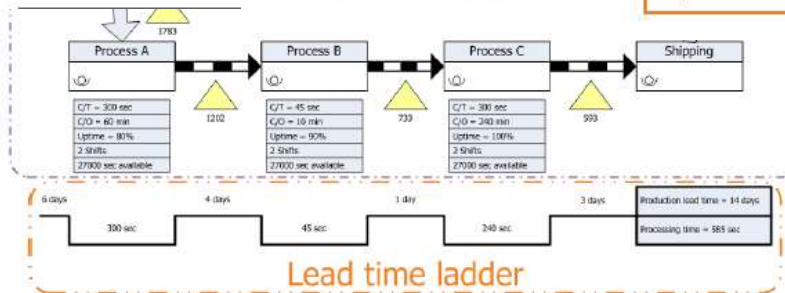


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Definizione di metodologie e strumenti



Material flows



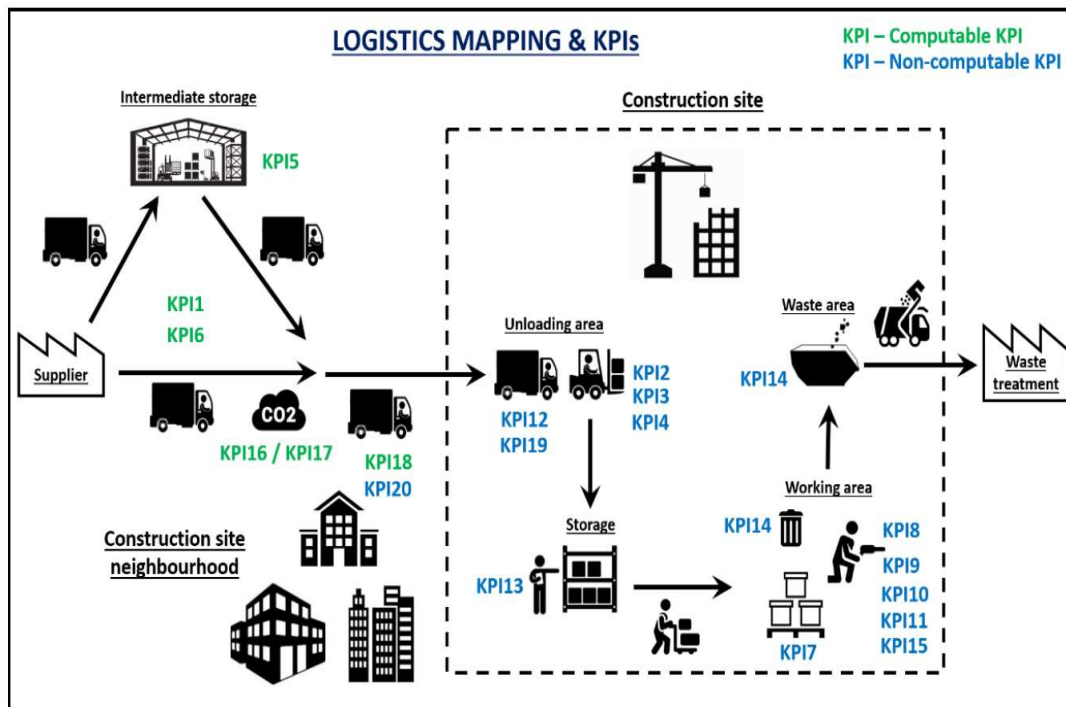
Lead time ladder

Distribution Network Processes	Construction Site Processes	Reverse Logistics Processes
1) Sourcing	4) Material Reception and Expedition	8) Waste Management
2) Ordering	5) Inventory and Storage Management	9) Return Management
3) Delivery	6) Material Handling and Equipment Management	
	7) Housekeeping	
Support Processes		
10) Planning and scheduling Resources		
11) Complaint Management		
12) Entrance and exit management		



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Mappatura della catena logistica



Category	Code	KPI designation	Unit
Economic / haulier journey time	KPI1	Travel time (outside and in the city centre)	hour
	KPI2	Truck waiting time (outside and inside the site)	hour
	KPI3	Construction site punctuality	hour
	KPI4	Loading / unloading time	hour
Economic / haulier route	KPI5	Number of intermediate storage	number
	KPI6	Distance from the suppliers to the construction site	km
Economic / material waste	KPI7	Material waste	€
	KPI8	Rework in connection with material issue	hour
Economic / workforce productivity	KPI9	Waiting time for the workforce	hour
	KPI10	Looking for material / equipment	hour
	KPI11	Several handling time	number
	KPI12	Truck punctuality	hour
Economic / supply chain management effort	KPI13	Time dedicated to logistic activities	hour
Economic / waste management costs	KPI14	Costs of unsorted bins	€
Social / safety on construction site	KPI15	Number of accidents and related causes	number
Environmental	KPI16	CO ₂ equivalent	gram
	KPI17	PPM	gram
Social / wellbeing for residents	KPI18	Number of deliveries	number
	KPI19	Congestion on construction site	m ² h
	KPI20	Rate of obstructing vehicles	%



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Sviluppo di Business Model per CCC



Definizione di Business Model:

Obiettivi del CCC

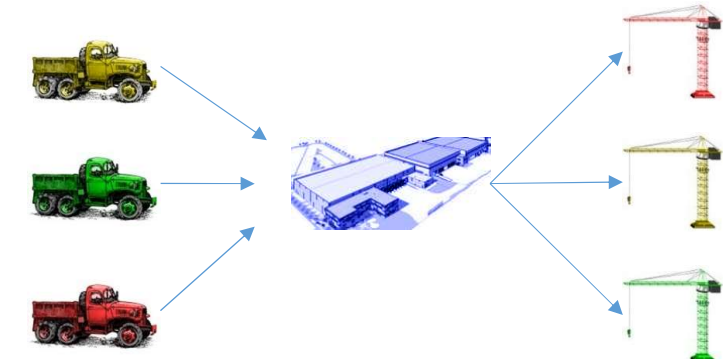
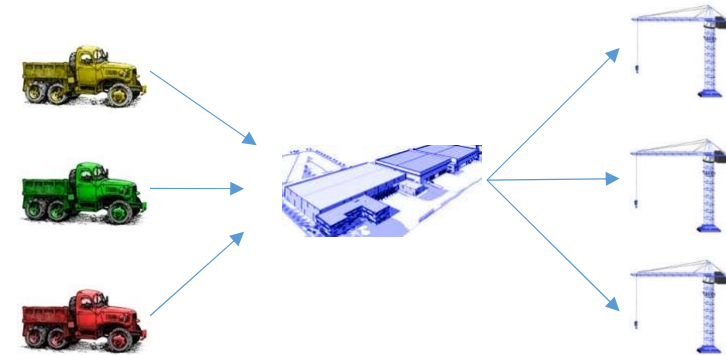
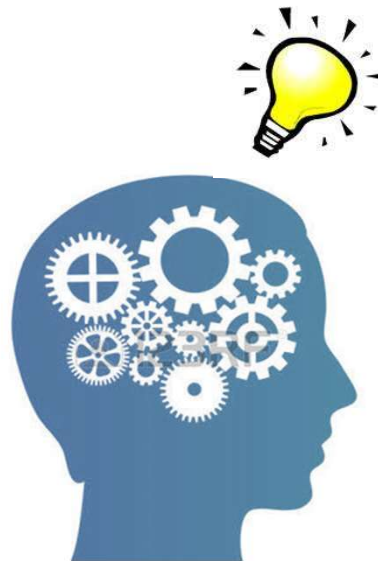
Assetto proprietario CCC

Operatori del CCC

Dimensione del CCC

Tipo di CCC

- Multi/Single project
- Multi/Single client



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Simulazioni

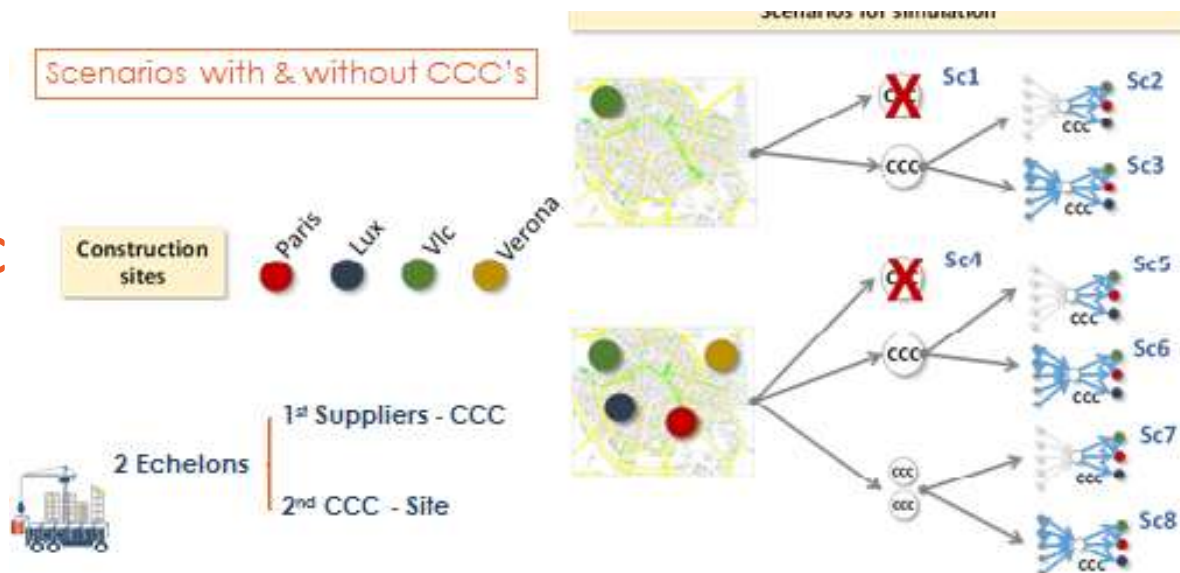


➤ Sono state effettuate simulazioni partendo dalla situazione esistente

▪ Simulazioni di scenari di ottimizzazione con & senza CCC

➤ Analisi delle emissioni

➤ Analisi economica della Construction Supply Chain



Construction Company

Material Supplier

Public Authority



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http://www.success-urbanlogistics.eu/



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- Success pilots
- Transfer Programme
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Luxembourgish Pilot



French Pilot



Spanish Pilot



Italian Pilot



Project presentation

Sustainable Urban Consolidation Centres for construction Project

The development of urban centres is becoming an essential need for the growing population of European Cities, calling for a continuous rise in construction material freight logistics. However, this development leads to several economic and environmental challenges.



Cost Benefit Analysis of a CCC implementation



CBA Tool for CCC implementation

Try the SUCCESS CBA tool to see the benefits of the implementation of a CCC

START

received funding from the European Union's Horizon and innovation programme under grant agreement No.



Analisi costi benefici per implementazione CCC



Construction Consolidation Center Results Scenario 1 & 2 – Economic Savings

Annual Labor force savings

€/year

Annual savings of materials wasted, damaged and stolen

€/year

Annual savings due to unsorted bins

€/year

Annual savings due to other performance improvements on site

€/year



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Construction Consolidation Center Results Scenario 2 - Dimensioning



Facility Dimensioning

- Storage Surface Needed in the CCC [m2]
- Facility Surface Needed [m2]



Fleet Dimensioning

- Number of 2 axes trucks (7.5 tones)
- Number of vans (3.5 tones)
- Number of 3 axes trucks (15 tones)
- Number of articulated trucks (40 tones)



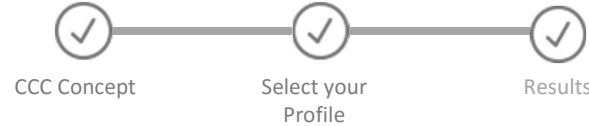
Labor force and Machinery Dimensioning

- Manager
- Operators
- Drivers
- Other Personnel
- Forklifts
- Pallet transporter

Note: This results have been obtained based on assumptions. Please, use this results as a reference.



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Construction Consolidation Center Results Scenario 2 – CBA Analysis

Year	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 1. CURRENT SITUATION	ALTERNATIVE 2. Using CCC											TOTAL BENEFITS ALTERNATIVE 2 INSTEAD OF ALTERNATIVE 1 (EUROS)
	No CCC	CCC		Additional Cost of CCC					Savings			CCC Summary			
	INVESTMENTS (EUROS)	INVESTMENTS (EUROS)		Facility Rent Costs (€)	Workforce Costs (€)	General expenses CCC (€)	Transport Costs (€)	Maintenance Costs (€)	Labor Force Savings (€/year)	Material Savings (€/year)	Performance Savings (€/year)	TOTAL ANNUAL COSTS	TOTAL ANNUAL SAVINGS	BENEFITS	
1	0	757.816	0 €	151.200	730.643	37.800	40.625	8.280	708.522 €	474.715 €	144.913 €	968.548 €	1.328.150 €	359.602 €	-398.214
2	0	0	0 €	154.224	745.255	38.556	41.438	8.446	722.692 €	484.209 €	147.811 €	987.919 €	1.354.713 €	366.794 €	366.794
3	0	0	0 €	157.308	760.160	39.327	42.267	8.615	737.146 €	493.893 €	150.767 €	1.007.677 €	1.381.807 €	374.130 €	374.130
4	0	0	0 €	160.455	775.364	40.114	43.112	8.787	751.889 €	503.771 €	153.783 €	1.027.831 €	1.409.443 €	381.613 €	381.613
5	0	0	0 €	163.664	790.871	40.916	43.974	8.963	766.927 €	513.847 €	156.858 €	1.048.387 €	1.437.632 €	389.245 €	389.245
6	0	10.800	0 €	166.937	806.688	41.734	44.854	9.142	782.266 €	524.124 €	159.996 €	1.069.355 €	1.466.385 €	397.030 €	386.230
7	0	0	0 €	170.276	822.822	42.569	45.751	9.325	797.911 €	534.606 €	163.196 €	1.090.742 €	1.495.713 €	404.970 €	404.970
8	0	0	0 €	173.681	839.279	43.420	46.666	9.511	813.869 €	545.298 €	166.459 €	1.112.557 €	1.525.627 €	413.070 €	413.070
9	0	0	0 €	177.155	856.064	44.289	47.599	9.701	830.146 €	556.204 €	169.789 €	1.134.808 €	1.556.139 €	421.331 €	421.331
10	0	-23.285	0 €	180.698	873.185	45.174	48.551	9.895	846.749 €	567.328 €	173.184 €	1.157.504 €	1.587.262 €	429.758 €	453.043

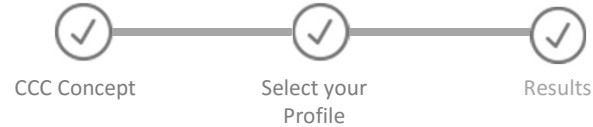
NPV	2.300.887 €
IRR	93,7%

[Click here to download the complete analysis](#)

Next >

Note: This results have been obtained based on assumptions. Please, use this results as a reference.





Construction Consolidation Center

Results and benefits for Public Authorities

Total kilometers avoided inside the city

km/year

Congestion avoided inside the city due to construction activity

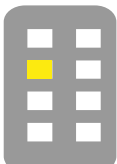
%

Total Emissions and Pollutants avoided inside the city

CO₂ t/year NO_x t/year PM t/year

Economic value of the emissions and pollutants savings

€/year



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SUCCESSFUL Road Map



Which kind of logistics profile is your construction project ?

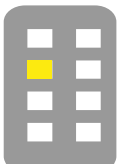
The test provides both local authorities and construction companies a framework for making the construction logistics and supply chain more efficient.

It is designed to assess the logistics complexity of a construction project and explore solutions adapted to your profile among **75 solutions** to address the logistics challenges.

Follow the 4 step approach



Take the test





Logistics profile

High priority

Hamilius is an **extremely constraint** construction site taking place in a **very constraint** city.

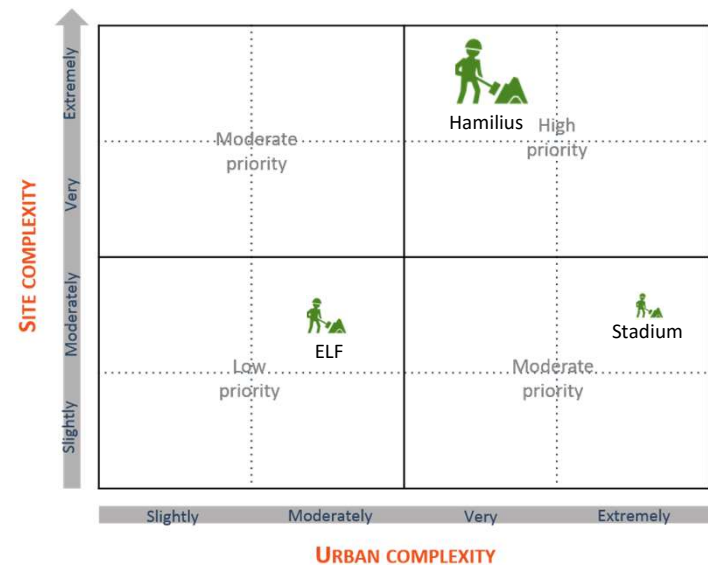
Moderate priority

ELF is a **moderately constraint** construction site taking place in a **moderately constraint** city.

Low priority

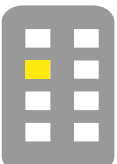
ELF a **moderately constraint** construction site taking place in an **extremely constraint** city.

Receive your results by email



Plan your actions

Add a site





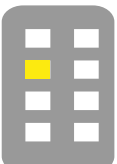
Please rank your objectives in order of preference.

Drag and drop the objectives within the frame starting with the highest ranking item.

- Logistic efficiency
- Reduce dust pollution
- Reduce waste material
- Reduce congestion surrounding the constru

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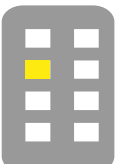




Solutions

A list of solutions adapted to your context

	Cost	Time	Difficulty	Resources	Pre-requisite	Follow-up	Control
Framework agreement ▼	★☆☆	★★★★	★★★★	★★☆☆	★★☆☆	★★★★	★★★★
Delivery area booking system ▼	★★★☆☆	★★★★	★★★★	★★★☆☆	★★☆☆	★★★★	★★★★
Logistics team ▲ A specific team dedicated to the improvement of the support actions on site and requiring the collaboration among different stakeholders, such as the coordination of material flows for all the sub-contractors. See Good Practice LO1 - Logistics team in deliverable D6.1 for further details and examples. 	★★★☆☆	★★★☆☆	★★★☆☆	★★★★	★★★★	★★☆☆	★★★★
Truck tarpaulin ▼	★★☆☆	★★★☆☆	★★★☆☆	★★☆☆	★★★★	★★★☆☆	★★☆☆





Il ruolo di ITL in SUCCESS



**RACCOLTA
BUONE PRATICHE**



**REPLICABILITA'
OLTRE SUCCESS**



**PIANI DI
INTERVENTO
E ROADMAP
IN ALTRE CITTA'**



**ETP: PROGRAMMA DI
TRASFERIMENTO
IN EUROPA**



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Le Buone pratiche

Durante le attività di progetto sono state raccolte ed analizzate 22 Buone pratiche che coprono 4 aree specifiche di ottimizzazione:

- Operazioni logistiche nei cantieri
- Politiche e indirizzi pubblici
- Information Technology
- Integrazione nella Supply Chain

Ogni buona pratica è stata valutata in termini di costi, tempo, e difficoltà di implementazione



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Sustainable Urban Construction Centre
for construction

Best practice "Pilot"

Logistics Team
Location: Port

Processes addressed

1. Delivery
4. Material Reception and Expedition
4. Material Handling and Equipment Management
5. Waste Management
6. Subm Management
10. Entrance and Exit Management

Problems occurred

- Availability of the storage zone is not known because the time of storage is not defined.

Critical success factors

- The main contractor
- The contract

Lessons learned

- Such initiative costs a lot of money
- Difficult to do total construction

Transferability

- A logistics team when the contractor is sensitive to cost

Main objectives of the practice

A construction logistics team aims at improving the operations on site when it comes to coordinate material flow for all the sub-contractors.

Best practice description

Context

Logistics activities are usually included in the daily activities of the construction staff; however, due to the size and complexity of the site, Vinci appointed at the beginning of the project a dedicated logistics team to fulfil the support functions on the website and improve the collaboration between different stakeholders.

Implementation

Two logistics management teams working for Vinci coordinate the logistics team composed of two logistics contractors: one responsible for managing deliveries and the other one responsible for the waste management.

Management team

The logistics managers have the following responsibilities:

- Managing the delivery requests**

The logistics managers review each delivery request posted on the delivery area booking system to identify potential inconsistencies. They approve whether a delivery or pick-up is possible and generate the daily delivery schedule.

- Managing storage areas**

The logistics managers ensure the good use of the storage areas. Different storage areas are located on the site. The buffer stock zone is used to store materials which have just been delivered. Time storage on these zones should not exceed 24 hours. The delivery stock zone is used to store materials until they are used. The waste stock zone is used to place the bins. Depending on the work progress, there are mostly on each floor 11 buffer stock zones, 20 delivery stock zones and 3 waste stock zones. Considering the 7 floor of the building and the ground floor, the construction site has 88 buffer stock zones, 26 delivery stock zones and 24 waste stock zones.



Operazioni logistiche nei cantieri



Id	Buona Pratica	Focus
LO1	Logistics Team	Un team dedicato alla logistica all'interno del cantiere
LO2	Access planning & management	Traffic management per accedere al sito di costruzione e che tracci gli accessi al site
LO3	Waste Management	Creazione di un'area dedicata ai rifiuti che si occupi inoltre di reverse logistics
LO4	Secure areas	Creazione di aree sicure per ridurre furti e danni
LO5	Scaffolding tower	Magazzinaggio temporaneo al piano
LO6	Construction & Demolition Waste Manual	Guida agli stakeholder del settore edilizio (e del personale) nella gestione dei rifiuti di costruzione e demolizione



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LO1-Logistics Team



Obiettivo: un team dedicato al miglioramento delle logistica e delle operation nel cantiere attraverso il coordinamento dei flussi di materiali di tutti i sub-contractor

Benefits

	Aumentare la percentuale di consegne pianificate Migliorare la puntualità delle consegne al cantiere
	Riduzione di: Tempo di attesa dei camion, carico/scarico, rifiuti, tempo dedicato alle attività logistiche, congestione nel cantiere,

Cost



Time



Difficulty



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LO2 – Gestione degli accessi



Obiettivo: Evitare incidenti e diminuire la congestione nei cantieri e nelle aree urbane, agevolando l'entrata e l'uscita di mezzi pesanti.

Benefits



Reduzione di:

- Tempo di attesa dei camion in consegna (dentro & fuori i cantieri),
- Numero di incidenti,
- Congestione nei cantieri e nelle aree urbane
- Percentuale di veicoli in ostacolo alle operazioni di cantiere

Cost



Time



Difficulty



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LO6 – Manuale di costruzione, demolizione e gestione dei rifiuti



Obiettivo: Sviluppo di un piano di gestione dei rifiuti per la costruzione e la demolizione di cantiere. Utilizzato nei grandi cantieri di NY il principale obiettivo è di contenere al massimo, attraverso la pianificazione professionale, i rifiuti di cantiere.

Critical success factors

Un vasto piano sulla gestione dei rifiuti richiede attenzione e collaborazione di tutti gli attori nella definizione dei processi di cantiere. Ogni gruppo ha delle specifiche responsabilità per contenere la produzione di rifiuti, incoraggiare il riuso dei materiali.

References <http://www1.nyc.gov/site/ddc/index.page>



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Politiche & linee guida pubbliche



Id	Practice	Focus	Potential authorities' competence
PO1	Construction Logistics Plan	Strumento di gestione per pianificatori, sviluppatori e imprese di costruzioni focalizzato sulle catene di fornitura e su come ridurre gli impatti sull'infrastruttura stradale	High
PO2	Guidelines for construction site management	Linee guida per le autorità con l'obiettivo di rafforzare in modo sostenibile il management dei cantieri attraverso i contratti di appalto	High
PO3	BREEAM labelling scheme	Programma di accreditamento volontario che include pratiche di edilizia responsabile anche in tema di logistica di cantiere	High
PO4	Road safety (CLOCS)	Standard UK per la Construction Logistics and Community Safety, rivolto a azioni di protezione di pedoni, ciclisti ed altri utenti vulnerabili	High
PO5	Signs for truck manoeuvring	Definizione di gesti standard per la guida dei camionisti durante le manovre nel loro day-to-day nei cantieri	Medium
PO6	Safety, Health and Environmental Program	Piano di salute e sicurezza che include un piano logistico, Piano di protezione della costruzione (CPP) con un piano di controllo della polvere e un piano di mitigazione delle emissioni di gasolio	High



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La replicabilità in Europa – Il programma di trasferimento



Promuovere il trasferimento dei Modelli SUCCESS in Europa



- **ITL sta selezionando** 12 città non partner in 3 aree dell'Europa (Nord, Est e Mediterranea) in cui organizzare dei workshop di approfondimento dei temi del progetto
- **Lo stato dell'arte verrà analizzato con SWOT analysis** (problemi e opportunità) per i cantieri attivi nelle aree urbane
- **L'obiettivo è trasferire** le lesson learned di SUCCESS attraverso l'organizzazione di **3 JTE Internazionali**
 - Coinvolgendo le città non partner e gli altri stakeholder (associazioni di trasporto, aziende settore costruzioni, amministrazioni pubbliche e R&D)
 - I evento a Bologna 20-21 Settembre 2017
 - Il evento a Koper 16-17 ottobre 2017
 - III evento a Bruxelles 14-15 Novembre 2017



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La replicabilità in Europa: Presentazione dei risultati



Evento internazionale a Bruxelles



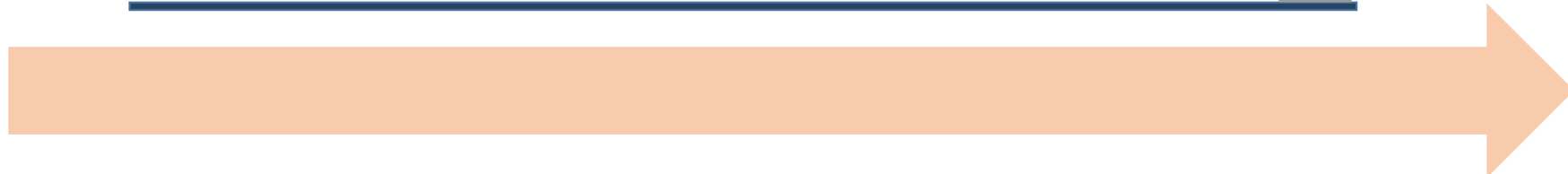
- Organizzazione di un evento internazionale a **Bruxelles**
- Sarà coinvolta la **Federazione Europea dell'Industria delle Costruzioni**
- Sarà dato un **premio** come riconoscimento per l'innovazione in materia di politiche per la logistica dei cantieri di costruzione in contesto urbano
- Il vincitore sarà scelto tra le 12 città coinvolte nel programma di trasferimento delle pratiche in EU



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Evento in Regione Emilia-Romagna

Confronto con autorità pubbliche, esperti di settore, associazioni imprenditoriali e aziende di costruzione sull'esperienza di alcuni grandi cantieri regionali



- Regional Joint Transfer Exercise
- Stimolare un dibattito pubblico su:
 - l'importanza della logistica di cantiere per mitigare l'impatto delle grandi opere nelle città
 - Il ruolo della committenza per una gestione innovativa dei rapporti con le aziende di costruzione, i contesti urbani volti ad una maggiore sostenibilità economica-sociale ed ambientale



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Grazie per l'attenzione!

