



Best Practice: Guidelines for Sustainable Construction Site Management

REPORT UPDATED: APRIL 27, 2010

CITY: VIENNA

**POLICY AREAS: CITY PLANNING; ENVIRONMENT;
PUBLIC-PRIVATE PARTNERSHIPS**

BEST PRACTICE

In 2001, the city of Vienna developed a regulatory framework for sustainable construction site management entitled, "Guidelines for Sustainable Construction Site Management," referred to as RUMBA, the acronym for the German name of the framework (Richtlinien für umweltfreundliche Baustellenabwicklung). Within the framework of the European Union's LIFE program, experts from Vienna's municipal departments studied ways to manage construction sites on a more sustainable and ecologically-friendly basis for future projects.

ISSUE

Over the past few years, an average of 5,000 apartments have been built every year in Vienna. This amounts to 300,000 heavy goods vehicle (HGV) trips totaling 14 million kilometers per year. Two thirds of the quantitative goods transport (in tons) is building material. Of building site traffic, 99% is truck traffic. Of the nitrogen oxide (NOx) and particle emissions from traffic, 7 to 10% is due to building site traffic.

The construction industry accounts for about 30% of raw material turnover, including energy costs. The building of a single dwelling necessitates approximately 60 truck trips (2,500 – 3,000 kilometers). Similar situations can be expected for other cities.

It was in the development of the RUMBA program that Vienna measured construction pollution and chose to mitigate the harmful effects caused by construction proactively.

GOALS AND OBJECTIVES

Under the RUMBA project, the city of Vienna aims to develop a regulatory framework for sustainable construction site management in cooperation with all major parties in the building industry.

This framework includes legislation, standards, guidelines and regulations, calls for tender, contracts, subsidies, issues pertaining to the location of building logistics centers as well as questions of efficiency, costs, technology and organization. The demonstration projects conducted by the project partners are designed to provide practical experience and proof of feasibility.

The primary project result is to be a set of "Guidelines for Sustainable Construction Site Management."

Objectives

- To reduce HGV traffic in the construction industry by enhancing the role of rail transport;
- To improve the aesthetic incorporation of construction sites into the cityscape, and to cut down on traffic obstructions and dust emissions caused by construction sites;
- To encourage pre-sorting of residual building materials directly on the building site;
- To develop an institutional regulatory framework for environment-oriented building site logistics;
- To develop checklists for building projects and construction sites in order to reduce their negative environmental impact;
- To draw up a set of guidelines for sustainable construction site management.

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IMPLEMENTATION

In 2001, the city of Vienna and three partner companies initiated the public-private partnership RUMBA or Guidelines for Sustainable Construction Site Management with additional funding by the European Union LIFE environmental program. LIFE is the EU's financial instrument supporting environmental and nature conservation projects throughout the European Union, as well as in some countries that are currently EU candidates.

In three demonstration projects (eight building sites of different types), measures for sustainable building site management were implemented:

- Shift of excavation and pre-fabricated part transportation from truck to railway
- Waste separation at the building site, dust reduction, reduction of disposal trips
- Integrated planning of a sustainable building site management in the context of a competition procedure (conditions of works, housing with approximately 500 dwellings) to evaluate chances and limitations of environmental friendly construction site management

The RUMBA guidelines were written for planners, building contractors, and public authorities. The three-part document presents measures, activities and potential controls for various types of construction sites, from large to small scale structural and civil engineering projects. A few examples include:

- Linking sustainable construction logistics with land use and zoning plans, such as agreements on efficient transport management or pre-sorting of residual building materials and waste at the construction site.
- Adding sustainable construction site logistics criteria to calls for tender in the field of architecture and urban development.
- Making sustainable construction logistics a criterion for public subsidies and grants.
- Ensuring that sustainable construction methods are already taken into account at the planning stage, for instance use of sustainable building materials, energy efficiency in construction design, ease of disassembly, and use of recyclable components.
- Making transport logistics planning compulsory to ensure ecological and efficient transport as well as full communication with owners of adjacent buildings; giving precedence to rail/water transport over road transport.
- Ensuring that material excavated on the site is reused on site and that pre-sorting facilities are set up allowing construction waste to be separately collected.
- Introducing measures for reducing noise and dust pollution.
- Appointing an environmental coordinator for the construction site.



Photo of construction waste collection bins where waste can be separated

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COST

- Total Vienna budget: EUR 726,405 (\$953,000 USD)
- EU funding: EUR 369,054 (\$484,000 USD)

RESULTS AND EVALUATION

The most important outcomes from RUMBA are:

- A manual for sustainable building site management;
- Recommendations for the adaptation of laws, regulations, guidelines, standards, contract awards (bidding, conditions of work) and promotions;
- Initiation of additional projects or supporting plans, such as the installation of building logistics centers.

Expected Results

- Construction of 950 dwellings in the south of Vienna (Meidling, Wohnprojekt, Kabelwerk) with trains substituting truck transport of excavation material will avoid 14,000 truck rides.
- According to a life-cycle analysis, the greatest particle emitting process during rail transport chain is found in reloading the material twice with conventional wheeled loaders. Using low pollution wheeled loaders (like the ones used for tunnel construction) would radically reduce these emissions. Train transport of excavation material in combination with low emission wheeled loaders would lead to a 20% reduction (nearest dumpsite) or a 10% reduction (cheapest dumpsite) of the particle emissions in truck transport.
- Project "Thürndlhof" (nine building grounds, eight building contractors, and 900 dwellings in Vienna Simmering) is expected to avoid 170,000 ton kilometers (TKT) of excavation.



Photo of trains substituting truck transport of excavation material

Applicability

- The "Wohnprojekt Kabelwerk" started before RUMBA; RUMBA was successfully applied in a latter state. It included the participation of the neighborhood.
- RUMBA was applied to the project "Thürndlhof" from the beginning and proved its applicability. Currently the second stage of construction will be finished.

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- From a technical point of view all measures as well as all proposals to adapt basic conditions demonstrated can be used on other construction sites. They may not have to be adapted to national and regional demands.
- Rail transport has an economically positive balance if the route that it would take does not exceed 1.5 times (diesel traction) respectively and 3 times (electric traction) the distance that a truck would travel to get to the same destination.

Restrictions / Expectations

For pre-fabricated parts and waste disposal, the costs for rail transport compared to truck transport were more or less the same, while for excavation 50-100% higher transport costs had to be paid under Vienna project conditions.

TIMELINE

2001 to 2004 EU LIFE Environment Program Timeframe
2004 Publication and Application of RUMBA guidelines

LEGISLATION

The public procurement law identifies the scope of services but not how they have to be completed. An additional weighting scheme for sustainable realization could help to support Guidelines for Sustainable Construction Site Management.

LESSONS LEARNED

The implementation of RUMBA for large-scale projects has not been conducted yet as of spring 2010. There are some noticeable extra costs in regarding to larger projects, but there has not been a cost-savings analysis based on indirect costs such as the waste from technical infrastructure. The first step toward implementing RUMBA for larger projects were made by the "Zentralbahnhof" (Central Railway Station) and "Westbahnhof" (Western Railway Station) projects where several RUMBA measures like logistic services and recycling services were implemented.

At Europe's largest urban development project "Aspern" (Vienna's Urban Lakeside – a city within the city), a full implementation of RUMBA is projected.

TRANSFERABILITY

Cities can expect that the following results will be achieved upon implementing a similar program, depending on basic conditions and the type of transport:

- 90% or more avoided truck kilometers (transport of excavation and pre-fabricated parts), reduction of 54 to 67% in NOx-emissions (excavation)
- 10-35% avoided truck kilometers and NOx-emissions regarding waste disposal transport
- It is estimated that dust emissions can be reduced by up to 50%



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