Management of Vienna's urban road construction works

1. Introduction

The requirements to be met by the Viennese network of streets and roads, especially those posed by the increasingly heftier traffic burden, have rocketed in recent years. In implementing road construction measures, consideration thus is given not just to the purely technical framework conditions but increasingly also to the capacity of the network as well as to the concerns of residents and users. A road construction project will touch upon the interests not just of actual traffic participants (car drivers, pedestrians, cyclists, public transport), but also of businesses (pubs/inns/restaurants with outside seating, loading/unloading area, etc.) and other individuals and facilities (schools, hotels, cultural institutions, etc.). Popular acceptance and, consequently, an obstruction-free construction period crucially depend on whether it is possible to take into account the many wishes, needs and requirements posed by all parties concerned already during the preparatory phase, because this is the only time when it will be possible to achieve broad acceptance and thus ensure smooth project completion. Information and communication are becoming ever more important. The crux of the matter thus is in sound preparatory work since this will ensure optimal and efficient construction management while giving due regard to the requirements and needs of traffic participants and residents alike.

2. Options open to construction management

Many of Vienna's chief roads have already reached the limits of their capacity, especially in the densely settled areas of the city. Any interference with the flow of traffic due to road construction works will of necessity cause large-scale traffic obstruction. In order to keep disturbances caused by road works to a minimum, efforts are made already during the planning stage to reach consensus solutions together with all parties involved, from the municipal offices and construction companies involved to representatives of local residents (local politicians as representatives of the resident population and business representatives), organisations representing the disabled, automobile clubs, cyclists organisations, traffic safety experts, etc.

After clarifying "what" is to be done in a street/road and which accompanying works need to be carried out in the course of such works (renewal of installations, illumination, traffic lights, etc.), "when" and "how" are defined together with the police, traffic experts, municipal offices, lobbies, etc. before works are started.

Time and space coordination

As a rule, projects involving priority roads are coordinated in terms of space and time with other works projects. For this purpose, each municipal office intending to dig up road sections develops a list of projects for priority roads for the upcoming year already in autumn, listing not just the duration and scope but also the desirable start of each project and its urgency.

In joint meetings with the traffic authority, a decision is then made, with due regard to network capacities, which projects are to be carried out when and which may, if necessary, be postponed.

This procedure avoids a collusion of works between departments and companies working on adjacent road sections and ensures that no road works will be carried out at possible detours and alternative routes or – worst of all – on the diversion route itself.

In the case of a major project, a traffic study is first made to clarify whether the capacity of the road section itself may be increased, e.g. by a change in the traffic light patterns or by a ban on turning off. The same applies to diversion routes.



Fig. 1: Traffic load at Margaretengürtel, peak hour stock



Fig. 2: Capacity utilisation at Margaretengürtel next to traffic lights

Coordinating the roadworks sites in terms of both time and space adds the further bonus of achieving better capacity utilisation in construction companies. Nevertheless, a large part of the roadworks is carried out during low-traffic holiday periods.

In implementing a roadworks project, several options are available to the construction management, such as:

- night work, which cuts down on the construction time required but comes with a high degree of noise pollution and higher costs;
- closing the road section and diverting traffic to a high-performance alternative route;
- scheduling works at low-traffic holiday periods (July, August, Easter week).

Night work:

Traffic participants enervated by bottlenecks keep reiterating the argument that roadworks could be completed more quickly if work continued throughout the night. Yet there are a few things to be noted:

Under the law, night work is to be limited to important and reasonable exceptional cases due to the attendant noise emission.

Where small-scale roadworks are concerned that can be completed in two or three nights (without working during the day), night work obviously offers the advantage of keeping traffic obstructions to a minimum (e.g. for surfacing works: first night: milling off the surface; second night: applying the asphalt layers; third night: road marking works).

Priority road crossings generally pose a special challenge because any longer-term closure or restricted use of two high-frequency roads is almost impossible in view of the overall traffic network capacity. In such a situation there will frequently remain only the option of working round the clock on weekends (in shifts as provided by the applicable working hours regulations) in order to avoid major congestions. Furthermore, such work is usually carried out in sections so that at least the main traffic relations can be maintained.

Nevertheless, when it comes to night work some factors need to be considered:

- when night work is extended beyond 3-4 nights, acceptance by residents declines precipitously due to the high noise emissions;
- the quality of execution is lower (which may necessitate subsequent remedial work);
- night work involves a 45–55% rise in costs; and, lastly,
- permits are required due to the ban on lorry traffic during the night.

Accordingly, night work is carried out in the inner city areas only when no other alternative is available.

Closure of road sections and traffic diversion

Completely closing down an entire road section under construction allows efficient handling and substantially shorter construction periods compared to what is required when the sectional traffic flow is maintained. Yet, complete closures are considered in Vienna only when it is possible to reroute the traffic through a diversion improved in capacity by parking bans, changes in the one-way direction, etc. (lorries and buses may have to be diverted through narrow lanes). Nevertheless, access to the car parks and shops, as well as for fire-fighting and emergency vehicles needs to be maintained during road construction works.



Fig. 3: Traffic management in various construction phases

Traffic studies on the effects of a diversion route on the neighbouring streets also investigate whether a ban on turning or a change in the traffic light pattern can be used to minimise the impact on moving traffic and thus increase the capacity of a diversion route or the lane not affected by the roadworks. Advance notice boards, in some cases (depending on the scale of the roadworks) set up already at the entrance points to the city, may well cause users familiar with the lay of the land to change their chosen route and thus produce large-scale shifting of traffic flows. In our experience, traffic participants take only a few days to accommodate to the new traffic situation and use alternative routes, so that a system which may have collapsed on the first day after a diversion has been introduced will stabilise quite quickly.



Fig. 4: Maximised performance with two lanes



Fig. 5: Closure of feeder streets to Margaretengürtel

Where the construction site suffers from lack of space, the following procedure is normally used with roads of high traffic density:

If by bans on stopping and parking it can be ensured that the unobstructed part of the road (one lane in each direction) has a width of at least 6.5 metres, the half-side option is used where necessary installation works are carried out in the wake of roadworks.

Frequent rerouting of lanes is avoided as much as possible in order to prevent insecurity and errors among users. As access to houses and land needs to be maintained at all times, this results in a – relatively minor – additional input of work compared to the full closure of the road.

Construction during holiday periods

In a historically grown city such as Vienna, the network of roads and streets has problems accommodating today's traffic needs. Particularly in the inner parts of the city, major construction works are attended by some serious interference with the capacity of the overall traffic system. In many heavy-duty inner city streets, the imposition of roadworks would irredeemably obstruct the traffic flow. Works of a larger scope in such bottleneck streets are thus carried out during low-traffic holiday periods.

Especially for large-scale projects, the framework conditions and measures to be considered and taken by the construction management need to be decided in the course of preparatory works prior to the tendering. They must be incorporated in the construction contracts in order to establish clear calculation conditions for the contractors and to ensure smooth progress at the roadworks site.

4. Consideration of the needs of traffic participants and residents

Any urban construction site will:

- obstruct traffic, thus likely causing clogging and loss of time;
- be a nuisance to residents due to noise, dust and vibrations;
- affect businesses by the loss of parking space, outdoor seating and impeded access resulting in loss of business.

Responding to the requirements and wishes of the various groups of affected people will greatly help the construction management:

- congestion avoided or reduced to a few days only;
- no noise and dust (least of all during night hours);
- unobstructed delivery during business hours.

In view of scarce financial resources and the sheer number of works required to be carried out each year, some obstruction and nuisance is unavoidable.

With roadworks carried out mostly in built-up areas where there are few options available to avoid impediments it thus follows:

Necessary works will be a nuisance and annoyance to everybody.

The important factor is to use all-comprising communication and information before the roadworks site is set up and while it is operating, and to continuously fine-tune progress planning. In this way it is not only possible to optimise construction management but also to improve the acceptance of those afflicted by roadworks.

Using open communication and intense public relations works has worked well for the Municipal Department 28. Accordingly, preparations increasingly include meetings with affected residents where construction schedules are jointly developed which optimally consider both the road builders and the residents. Information leaflets and fliers informing residents of the "hard" facts of the project, key stages and diversion routes have become a standard practice. Information events are organised already during the planning phase to register citizens' concerns, usually in collaboration with local politicians and lobbies.

Traffic participants are informed of impending projects by regular media reports/press releases and local information campaigns (distribution of fliers and leaflets). A small, preferably sweet, give-away distributed to traffic participants together with the information will further sweeten the mood. Detailed site information is also provided via the internet and eagerly sought by the users.

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