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PARKING MANAGEMENT THROUGH WHEEL CLAMPING

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ABSTRACT

The use of wheel clamping for the enforcement of parking-prevention policy is described. From the experience gained in Israel and Europe, this device allows ^{for} ~~executing~~ ^{using} an aggressive enforcement policy with relatively restricted means with a higher degree of success than any conventional tactic. Where wheel clamping has been employed, the level of traffic regulations compliance has risen and traffic flow has improved.

Because of the strictness of this enforcement means, a selected and gradual use is recommended. At first, it should be intended only for serious parking offences that cause maximum obstruction. ^{and then} Only ^{should gradually} gradually should its use be expanded for other parking offences.

The effective lever for enforcing parking prohibitions that is created by means of the wheel clamp enables the implementation of traffic management plans that authorities hesitated to implement in the past because of low levels of enforcement.

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INTRODUCTION

Parking management is part of the general policy of traffic management, and its goal is similar: to define the operational strategy by which the best use can be made of the existing infrastructure. Parking policy determines the allocation of the limited parking places available, while parking tactics deal with the means of carrying out this policy.

The problems that parking policy deals with include the following:

- A. The optimal equilibrium between travel lanes and parking lanes -- An answer to this problem sets the level of service for through traffic and the level of accessibility (number of parking places) to the commerce and services in the area.
- B. Priority for public transport -- A clear priority for public transport over other vehicles necessitates taking a policy restricting the number of parking places.
- C. For whom are the parking places intended -- An answer to this problem establishes the public for which the parking is intended : commuters who work in the region, ^{general} long-duration visitors, ^{also} ~~short-~~ duration visitors, etc. In accordance with the decision as to the intended public, the maximum parking time span is set in the area.

The common tactics for realizing parking policy ^{are these} are these : parking tickets, towing, residential parking permits, parking meters, park-and-ride systems, etc. Implementation of these and other tactics requires setting up the following systems : police, data processing, collection, court, etc. The strong demand for parking places, on the one hand, and the small supply, on the other, place on the responsible authority the frequent need to enforce parking prohibitions. In light, however, of the large resources that this action requires (in terms of manpower, machinery, equipment, etc.), enforcement is not carried out with the necessary efficiency. As a result, drivers learn that the penalty probability in the case of illegal parking is not high, and the demand for parking is increased once more.

In Israel, in view of the recognition that the accepted tactics for enforcing street parking prohibitions (tickets and towing) were of limited efficiency, there was an experiment ^{with} with the use of wheel clamps. ^{was used} A wheel clamp is a metal clamp that fits over the wheel and prevents the car from moving. The device was ~~tried~~ ^{used} in Jerusalem and Tel-Aviv for the purpose of preventing on-street parking. It has been in use in London and Amsterdam for over a year.

This article will evaluate the advantages and disadvantages of wheel clamps and will describe the experience that has been gained with this means of parking-prohibition enforcement.

AN EVALUATION OF WHEEL CLAMPING

The main advantages of wheel clamping compared to other means of enforcement may be summarized in ^{as follows} these four points:

- (1) Option to carry out aggressive enforcement with restricted means;
- (2) High exposure to penalty;
- (3) A stricter penalty for the driver in terms of time;
- (4) Clamping may be done under any condition.

The primary advantage of clamping for the responsible authority (police or municipality) is the ability to execute an aggressive act of enforcement with relatively restricted means. Whereas a towing team which generally numbers one or two men, plus an accompanying traffic warden or policeman, can carry out an average of 1-2 tows an hour, a similar traffic team can carry out 12-15 clampings in ^{the same} that time span. This latter team, moreover, does not need a tow truck, only a regular van. In addition, the fine-collection arrangement is reduced, as there is no need for an entire department to send out notices for payment, for giving penalties in cases of non-payment, etc. The driver whose vehicle has been clamped has to show up himself in order to release the vehicle, and payment of the fine is a condition for its release.

The high exposure to penalty is a direct result of the fact that the device that clamps the wheel is readily obvious and the clamped vehicle remains for a number of hours on the spot where it was caught. During this time, curious onlookers clearly see the penalty, other drivers are deterred from parking illegally, and the impact of the clamp is engraved

in the memory more than any other means. In contrast, a towed vehicle is simply taken away, and no impact remains except for a free spot for the next vehicle to park.

Another effect of clamping is the ^{time} delay in time to which the affected drivers are subjected. Whereas a parking ticket does not delay the driver, clamping does delay a driver for even a relatively longer period than towing. The driver whose vehicle has been clamped is not required (as in some towing cases) only to come to the police pound and pay the fine. In addition, ^{use} this driver must return to the vehicle and wait for the wheel clamp to be released. This process can take time, depending how well the authority is organized. Apparently this penalty may be more painful than fines.

Still another advantage to clamping is that it permits clamping of a continuous row of vehicles without having to ensure maneuvering space for the vehicle(s) as is required for towing. This fact allows the penalty to be employed in cases where the illegal parking is alongside or near a fire hydrant, crosswalk, or bus stop, places where towing may not be possible.

Wheel clamping does have some disadvantages as a tactic. One clear disadvantage compared to towing is that the vehicle clamped continues to occupy the space and may obstruct traffic until it is released. Towing, by contrast, removes the vehicle immediately from its spot so that it does not continue to create an obstruction. From the experience with clamping in Jerusalem and Tel Aviv, it appears that this disadvantage is not as significant as might have been expected. The reasons are as follows:

A. The level of enforcement before the introduction of clamping was so low that there were in any case many obstructions to traffic from illegally parked vehicles. In the worst case, then, clamping only returns the situation to what it was previously.

B. ^{from road works} The Israeli experience and also that in London point to the fact that clamping enables an aggressive level of enforcement in ⁱⁿ ~~the~~ wake of which there is a significant improvement in the traffic flow.

C. It is always possible to combine towing and clamping. Towing can be selectively applied to extreme cases of traffic obstruction.

In order to evaluate the efficacy of the enforcement level enabled by means of towing, a ^{parking} survey was conducted in Haifa. This survey took place over four days, ⁱⁿ at five road sections, on the two main arterials of the CBD. Every vehicle that parked illegally was recorded. As can be seen in Table 1, the occupancy (hourly number of vehicles illegally parked) was generally greater than the number of parking spots. In the period of time during which towing was performed, occupancy was greater than in the same amount of time in which there was no towing. Moreover, ^{parking} parking duration when there was towing was shorter than in the period when there was no towing.

In order to stress the ineffectiveness of the towing tactic, a comparison was made of the number of vehicles that were parked 10 minutes before towing and those parked for 10 minutes afterwards. There was almost

no difference in number. The conclusion emanating from this survey is that the principal impact of towing as a means of enforcement is, not that it prevents parking, but that it creates a high rate of substitution of parked vehicles. In other words, its main effect is to clear a parking spot for another vehicle.

THE EXPERIENCE WITH WHEEL CLAMPING

This section will describe the experience gained in Jerusalem and Tel-Aviv with wheel clamping. The Israeli experience will then be compared with that gained in London and Amsterdam.

The Jerusalem Experience

In the CBD of Jerusalem, there are some 5,500 parking places (legal and illegal) of which 58% are on-street; some 60% of this street figure are illegal spots. At its peak, 65% of the spots that are forbidden to parking are occupied by a vehicle. These statistics certainly show the surplus demand for parking places.

The use of wheel clamps is restricted in Jerusalem to the following areas (1):

1. Main arterial roads in the city that may become bottlenecks;
2. Stops and junctions where parking creates serious traffic problems;
3. Reserved parking spots, as for the disabled, diplomats, police, etc.

As may be shown, enforcement with the use of wheel clamps is intended only for areas in which illegal parking causes a serious obstruction to traffic. The experiment started with 5 streets containing 230 illegal parking spots, and was gradually expanded to a larger number of streets.

Figure 1 describes the number of wheel clampings in the first 10 weeks of the experiment. By the 10th week, ^{it can be seen} one may see from the figure that clamping was 60% of what it was in the first week, while the number of illegal spots where this enforcement means was carried out grew by a factor of 2.47 (or from 230 to 570). During the first week, the number of clampings constituted 18% of the number of illegal parking spots, whereas during the tenth week only 4.6%. The number of streets where this enforcement was carried out grew from 5 to 16.

No systematic investigation was made of travel speeds in thoroughfares where the enforcement was undertaken; but the personal impression of city engineers was that following the use of wheel clamps, a great easing took place in the traffic flow. Travel speeds increased; and in areas where there had been traffic jams in the past, the traffic now flowed freely.

The municipality estimated that public response was favourable. On the one hand, some citizens called for the expansion of the use of wheel clamping to other areas of the city; ^{while} on the other hand, no violent reactions on the part of drivers were met with. ^{encountered}

As of this writing, some seven months after the start of wheel clamping, its use has been expanded to 30 streets, ^{to 30 streets} which have a total number of 1,120 illegal parking spots. The daily number of wheel clampings stands at 45, or 4% of the number of illegal parking places.

In the opinion of city traffic engineers, the experiment has met ^{been} with success. ^{of} Wheel clamping enables the start of an aggressive policy of parking enforcement with relatively limited means, something that the other enforcement means do not permit.

The Tel-Aviv Experience

and availability
In Tel-Aviv, the gap between the demand for parking spots and the available stock is higher than it is in Jerusalem. This situation has caused an excess of traffic offences: parking on the sidewalk, in bus stops, on cross walks, and in vehicle travel lanes. Often, there is double and triple parking.

Because of the parking problem, there was a feeling at City Hall that a massive enforcement had to be carried out with wheel clamps. Some 100 vehicles a day were clamped in the first few weeks after this means was ^{introduced} adopted. Wheel clamping was performed on a large number of streets and for any parking offence. At the same time, however, the enforcement machinery was not set up to deal with releasing the clamped vehicles, ^{with the resulting} that ⁱⁿ there was a 6-7 hour gap between the time when the driver paid the fine and the time when the vehicle was released. ^{In addition,} Then, too, cars were clamped in the evening; since the drivers could only pay the fine the next day, the penalty of wheel clamping stretched for up to 20 hours.

There was a widespread
Public opposition to this punishment was ^{widespread} in Tel Aviv. ^{involving} ~~There even took place~~ incidents of violence, involving physical damage to the clamps. A citizen organization was set up ^{expressly} to cancel this coercive measure. In ^{wake} of these ^{strong} sharp reactions, the municipality changed its enforcement policy after some four weeks. Clamping was limited only to the main traffic arterials, and only for the severest offences : sidewalk parking that blocked pedestrians' way, parking in an intersection, parking on

a cross walk, and parking in a bus stop. In light of the change of policy and despite the large number of clampings (120 per day), the driver population of the city came to terms with the measure, and gradually parking lots in the ^{CBD} periphery of the CBD began to fill up. Currently, the city plans ^{CAPR 2013} an expansion of the use of the wheel clamp, but very gradually and selectively. ¹⁹⁸²

The lesson of the Tel Aviv experience was that the public has to be gradually accustomed to obeying parking prohibitions. Drastic means like wheel clamping, therefore, should be employed selectively. At first, it should be limited only to areas where illegally parked vehicles cause serious disruptions to the traffic flow; then after the public has become accustomed to obeying the more serious offences, it can gradually be accustomed to obeying the less serious traffic offences, too.

Experience in London

In London, wheel clamping has been used since May 1983 for the following offences: parking on yellow lines (67 percent of all vehicles clamped), unauthorized parking in private residential areas (23 percent), and offences at meters (10 percent). Clamping is not intended for dangerously or obstructively parked vehicles.

According to Kimber (2), the main change in Londoners' parking behaviour was that motorists stayed on yellow lines for shorter periods than before. Although the number of cases of illegal parking did not change appreciably, the average parking time dropped by 40 percent; as a consequence, the density of parked vehicles dropped by 30 percent.

One of the main advantages of this density change was the reduction in journey times for through traffic. The net reduction associated with parking-density reductions on yellow lines was estimated at between 8 and 14 percent. Kimber emphasizes that "these consequences are thought to follow from the greater deterrent effects of clamping compared with vehicle removal, and result probably from the greater conspicuousness of clamps and clamping teams. In contrast, once a vehicle has been removed nothing visible remains as a deterrent to others."

Usage in Amsterdam

According to a short report in Traffic Engineering & Control (3), wheel clamps have been in use to enforce parking regulations in Amsterdam since August 1983. First results were encouraging : the level of non-compliance was reduced from 60 to 20 percent, and long-time overstaying at meters lessened from 30 to 10 percent.

SUMMARY AND DISCUSSION

Wheel clamping is a means of enforcing parking prohibitions, that enables carrying out an aggressive policy of enforcement. With ^{relatively} restricted means, a stronger impact can be created with this means than with any other accepted tactic (towing, fines, etc.) Authorities can learn from the experience with this device in Israel and elsewhere, that the following use of wheel clamps, the level of ^{compliance} complying with traffic regulations rose ^{in addition to a} and there was a significant improvement in the traffic flow.

The experience of the two largest cities in Israel (Jerusalem and Tel Aviv) points to the fact, however, that this bitter medicine has to be used selectively. At least in the initial stages of its introduction, wheel clamping has to be purposefully directed only at areas where severe

traffic obstructions are caused because of the illegal parking of vehicles. Drivers, apparently, find it easier to come to terms with this particular penalty when they understand the severity of the offence. In cases in which the wheel clamp was used on vehicles that officially were committing an offence but not actually interfering with traffic, drivers found it difficult to accept the penalty and there was deep bitterness. It is reasonable to assume that after the population of drivers has become accustomed to a high level of enforcement of parking regulations, it will be possible to expand the use of the wheel clamp to other areas.

In contrast to the situation that prevailed prior to the introduction of wheel clamping, the quantity of offences following its employment decreased immeasurably. Despite the fact that the vehicle clamped continues to constitute an obstruction until its release, the overall effect is that of a significant improvement in the traffic flow. It should be noted that it is always possible to combine conventional enforcement means, like towing, with wheel clamping; in such a case, the towing could be intended for those places where the traffic offence is especially obstructive.

The effective lever for enforcing traffic prohibitions that wheel clamping gives to the authorities enables carrying out traffic management plans that in the past these authorities hesitated to implement. In Haifa, for example, the police were of the opinion that they could not enforce a parking-prevention policy with conventional means. Accordingly, when the

Wheel clamping is an effective lever for enforcing traffic prohibitions and enables authorities to execute traffic management plans which these authorities were hesitant to implement in the past.

second author of this paper was Deputy Mayor of Haifa, he formulated a plan to give ^{priority} to public transport in the CBD, in which two of the three traffic lanes in each of this district's two main arterials were specified for public transport. Wheel clamping was to be an integral part of the enforcement tactic. Its use would have provided a solution for implementing an aggressive policy of parking prevention. As part of the plan, too, the ^{relevant} areas of ~~the~~ permitted parking in the CBD were expanded, based on the criterion that these new parking spots did not constitute traffic obstructions.

ACKNOWLEDGMENT

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REFERENCES

1. H. Eini. "Enforcement Through Denver Booting." Traffic and Transportation," No. 7, February 1985. (In Hebrew).
2. R.M. Kimber. "The Effects of Wheel Clamping in Central London." TRRL LR 1136, Crowthorne, Berks., 1984.
3. Traffic Engineering & Control, Vol. 25, No. 6, June 1984.

Table 1: Summary of the parking census in Haifa

<u>Zone No.</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
No. of illegal parking spots	16	19	12	12	16
<u>No. of parked vehicles per hour</u>					
Average	27.7	23.2	20.6	21.2	27.2
during 0 towing	28.3	22.9	19.7	21.2	29.4
during 1 towing	29.3	22.2	19.9	23.2	23.5
during 2 towings	24.5	-	21.2	24.0	-
<u>Average parking time (min.)</u>					
Total	20.7	14.8	16.4	16.1	17.2
during 0 towing	22.7	14.5	20.9	21.8	15.0
during 1 towing	22.5	15.5	26.3	17.2	27.0
during 2 towings	24.1	-	14.9	10.5	-
<u>No. of parked vehicles in 10 min.</u>					
before towing	10.8	6.6	6.2	4.5	9.0
after towing	10.6	5.5	5.2	4.0	8.0

□ No. of ILLEGAL PARKING PLACES
▨ No. of WHEEL CLAMPINGS

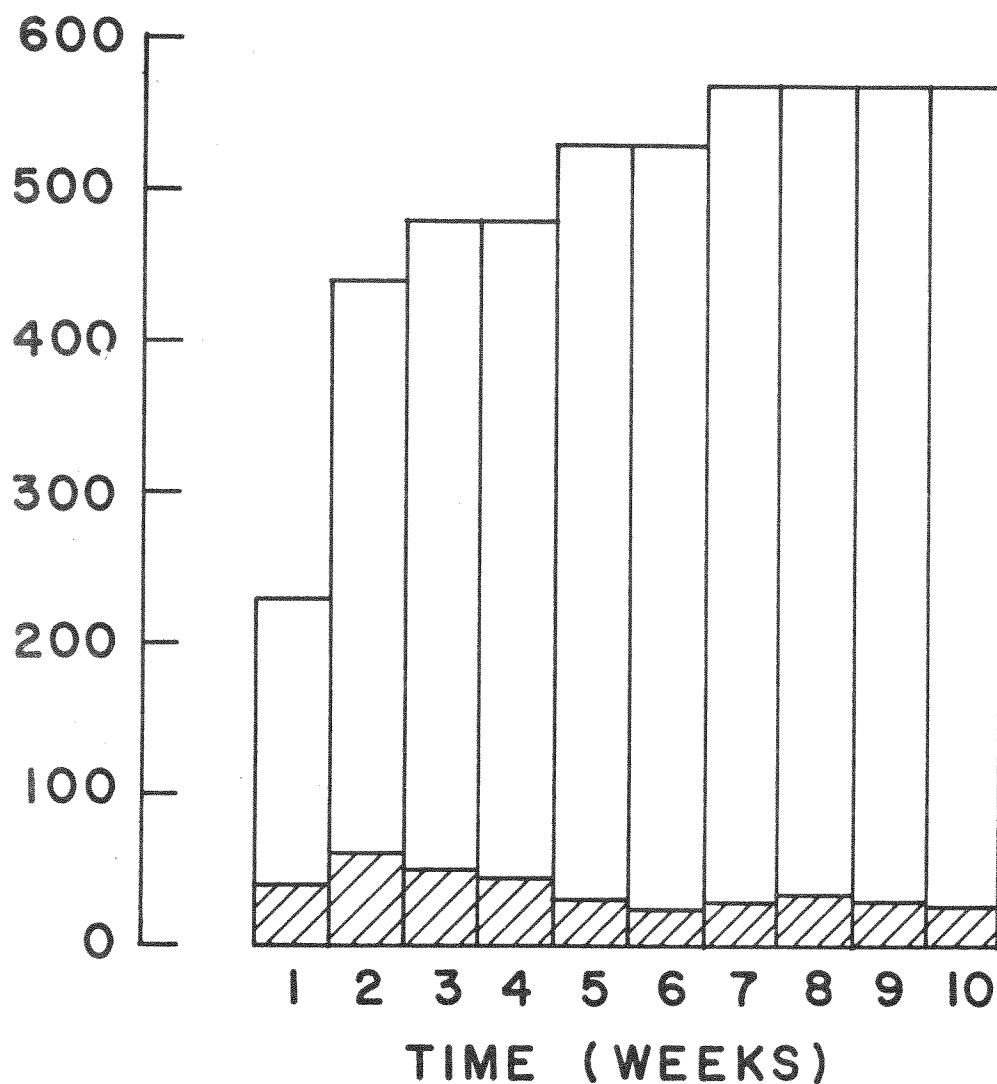


Figure 1: Number of illegal parking spots and number of wheel clampings for each of the first 10 weeks.