

National Outline Plan 38 for the seismic strengthening of existing buildings: a genuine answer or a fabricated solution?

Executive Summary

Introduction

In April 2005, NOP 38, the national outline plan for the seismic strengthening of existing buildings was approved. In the absence of other significant government measures, NOP 38 soon became the only comprehensive solution the state is offering to hundreds of thousands of buildings erected before January 1st 1980, when a binding standard of seismic-proof construction was enacted in Israel.

Since its approval, the plan significantly enhanced public awareness of the need to strengthen old buildings against earthquakes. However, when it comes to actual implementation, NOP 38 has had little success: in the first six years since its approval, some 1,000 requests for building permits on the basis of NOP 38 were submitted to local planning committees throughout Israel. Of these, 220 requests were approved, and only few buildings were strengthened. These figures suggest major problems in the planning and financial principles on which NOP 38 is based.

Building rights

In its current form, following two changes that were approved in 2007 and 2010, NOP 38 permits the following additions to any residential building, which was built in line with a permit issued before January 1st 1980, provided an engineer stated it requires strengthening against earthquakes:

- 25 square meters to each existing housing unit in the building.
- A new residential floor on the top of the existing building, or alternatively a new ward. The area of the new floor/ward is the same as a typical, expanded floor (including the addition of 25 square meters to each housing unit).
- To close the open floor, increase its area to that of a typical expanded floor and divide it into new housing units.

The plan does not limit the number of housing units which can be built in the new floors.

NOP 38 also allows the old building to be demolished. In such a case, the landlords can built in the same lot a new building that would exploit all the building rights allowed for in NOP 38, and in addition all the building rights defined in the local outline plan that applies to the lot.

Right now, the planning authorities are in the final phases of approving yet another change to NOP 38, change 3. Promoted by the Ministry of Construction and Housing, change 3 would increase the building rights to an addition of 2.5 floors on the top of the existing building, in addition to closing the open floor. Hence, the approved NOP 38 allows the addition of two residential floors to the existing building, while change 3 would allow the addition of 3.5 floors.

Neglecting the periphery and the socially disprivileged

NOP 38 assumes that the solution to the problem of old buildings that won't survive earthquakes is to be found through privatization and the private sector. The building rights the plan allows – the new housing units to be added to the existing building – are meant to finance its seismic strengthening, its renovation and the construction of the new floors, leaving reasonable profit to the contractor, thereby creating financial feasibility to implement the plan.

This approach creates built-in inequality in the prospects for the implementation of the plan. NOP 38 gives universal building rights that apply throughout Israel. However, their financial value varies from one place to another and throughout time. It is affected by the demand for housing, by land values and the general situation of the real estate market in Israel.

According to the Ministry of Construction and Housing, financial feasibility to conduct NOP 38 projects arises when the new housing units, that are to be added to the existing building, can be sold at a price of at least 16,500 shekels per square meter. Such high prices can be found almost exclusively in Tel Aviv and the surrounding cities, which enjoy high demand for real estate. In the periphery, where real estate prices are much lower, there is no financial feasibility to implement the plan. There is an inverse relation between the areas where financial feasibility to implement the plan exists and the areas prone to earthquakes. In towns like Beit She'an, Tiberias, Safed and Kiryat Shmona, all situated along the Syrian-African fault, the risk of a strong earthquake is particularly high, but financially-wise, NOP 38 can not be implemented. Consequently, NOP 38 enhances the gaps between centre and periphery. In the absence of alternative solutions, the residents of the periphery are left to their destiny.

NOP 38 also enhances the gaps between strong and weak neighborhoods in the same city. For example, in Haifa, the plan is implemented in the strong Carmel mountain neighborhoods, where real estate prices are high. At the same time, financially-wise it cannot be implemented in other parts of the city. Therefore, NOP 38 is implemented

mainly in neighborhoods of the high-middle class, and does not give a solution to weaker neighborhoods, either in the periphery or in the centre.

Even in cities and towns that are socio-economically strong, a preliminary condition for the implementation of the plan is high real estate prices. In 2006, the average price of new flats in northern Tel Aviv was about 13,500 shekels per square meter, less than the threshold value that creates financial feasibility to implement NOP 38. It was only thanks to the sharp rise in real estate prices that took place since 2007 through 2011 that NOP 38 became financially feasible in northern Tel Aviv, an area famous for high demand and strong market. Therefore, the plan subordinates a national interest – strengthening buildings and saving human lives – to the ups and downs of the real estate market. The expected fall in housing prices will further restrict the geographical area where financially-wise NOP 38 can be implemented.

Change 3 to NOP 38 was designed to expand the geographical area where, financially-wise, the plan can be implemented, by increasing building rights. However, according to the Ministry of Construction and Housing, even after the approval of change 3, there will be no financial feasibility for the implementation of the plan in the periphery, and not even in cities like Hadera, Ashdod and Rehovot.

NOP 38 can not be implemented in non-residential buildings, such as public buildings, facilities of hazardous materials, etc., since housing units cannot be added to such buildings. In a strong earthquake, public buildings play a major role in providing shelter for the wounded, temporary residences to people whose houses collapsed and in allowing the authorities to manage the disaster and cope with it. Despite this, the government rejected a recommendation of a ministerial committee to allocate 10 billion shekels (throughout a period of 20 years) to strengthen public buildings in Israel. Instead, the government decided to allocate to this end only 3.5 billion shekels (throughout a period of 25 years). In addition, the government decided that half of the total sum is to be taken from the current budgets of the relevant government ministries and only the other half will be paid for by the treasury. This seriously undermines the prospects for the implementation of the decision. It was only in 2011, following a harsh report by the State Comptroller, that the government allocated the first 140 million shekels for the strengthening of public buildings. The actual strengthening has not begun yet, and the works are in the planning phase.

Engineering problems

Buildings must sustain various loads: both weight loads, the result of the weight of the building itself and the objects therein, and environmental loads, such as winds and earthquakes. The larger the weight loads, the higher the risk for the collapse of the building in a significant earthquake and the larger the investment required in its seismic strengthening. Adding floors on the top of an existing building, which is seismically inadequate to begin with, increases the weight loads on the building and the risk for its collapse in a major earthquake. It defies basic engineering logic. While

the seismic performance of an existing building can be enhanced even if new floors are added, this renders the strengthening much more complex and expensive. For this reason, using building rights for additional floors as an incentive to encourage seismic strengthening of existing buildings is not done in other countries. Indeed, the financial mechanism on which NOP 38 is based is an Israeli invention.

The cost of the seismic strengthening of an old building without new floors and expansion of existing housing units is much smaller than the cost of a whole-scale NOP 38 project. According to the Ministry of Construction and Housing, in a typical 16-housing units residential building of four floors above an open floor, the cost of strengthening alone is approximately 312,000 shekels (19,500 shekels per housing unit). In the same building, the cost of an NOP 38 project (including expansion of existing housing units and adding one floor on the top of the old building) is approximately 4.7 million shekels – 15 times more than the cost of strengthening alone. While the residents can only rarely withstand the costs involved in a whole-scale NOP 38 project, in many cases they can bear the much smaller costs of just strengthening the building against earthquakes.

Due to their complexity, NOP 38 projects involve lengthy licensing and construction procedures, which, in most cases, last several years. In contrast, the seismic strengthening of an existing building, without the additions allowed for in NOP 38, can be completed in a few months, and using some methods, even quicker. Therefore, even in areas where financial feasibility for the implementation of NOP 38 exists, the plan does not allow a large number of buildings to be strengthened in a short period of time.

Harm to urban fabric

NOP 38 contains detailed instructions and allows building permits to be issued, without need for further plans. Given that NOP 38 is a national outline plan, it cannot address the unique characteristics of each community, neighborhood, site and street. This has far-reaching consequences. For instance, the addition of one floor to an existing 8-floor building is likely to produce marginal effect on its surrounding. The same addition to a 2 or 3-floor building could have significant negative effects. But NOP 38 doesn't take these differences into account and sets uniform building rights everywhere.

Before one adds many housing units to an existing neighborhood, it is necessary to make sure the physical infrastructure (sewage, roads, parking etc) can bear the proposed addition. It is also vital to make sure the programmatic needs (public buildings and public open spaces) for all the residents, including the new ones, are met. These vital issues can be addressed only within the framework of a detailed local outline plane, which would take into account all the relevant aspects at the local level. Due to its very nature, a national outline plan can not achieve such fine resolution.

In some places, the additions allowed for in NOP 38 do not pose any significant planning difficulty. In low-density neighborhoods that have wide roads and enough public open spaces and public buildings, NOP 38 additions may fit into the existing urban fabric. But in other places – especially in the centers of old cities that are quite dense – wide-scale implementation of NOP 38 is expected to result in a major harm to urban fabric.

In many of the old Israeli cities, a significant shortage of open public spaces (public gardens, municipal parks etc), that play a vital part in creating a suitable residential environment, exists. A government building guide stipulates that each neighborhood must have at least 5 square meters of public open space per capita. However, in many Israeli neighborhoods the amount of open public spaces is much smaller. For example, in a 2,400-people residential area in the centre of Petah Tikva there is only one public garden of 1,870 square meters. Hence, the existing open public space per capita is only 0.78 square meters. In full realization of NOP 38 (including the building rights allowed for in change 3), the number of residents in this area will increase to 4,025 and the amount of per capita public open space will shrink to 0.45 square meters – less than one tenth of the minimum required according to the government guide.

In wide implementation, NOP 38 projects could increase urban density in an uncontrolled manner. The integrated construction, development and conservation national outline plan (NOP 35) sets a density range of 110 to 220 housing units per hectare in Petah Tikva. In full realization of NOP 38 (including the buildings rights defined in change 3), the density in the above mentioned residential area in Petah Tikva would increase from 161 housing units per hectare today to 257 housing units per hectare. Without a whole-scale upgrading of the physical and programmatic infrastructure there, such high density, which exceeds the maximum density set in NOP 35, will harm the quality of life of the residents.

Other solutions

Many other countries in the world are under the threat of earthquakes, but none chose to handle the problem by its privatization and granting building rights for the addition of new floors to old buildings, as means to finance their strengthening.

In California, which is prone to even stronger earthquakes than those threatening Israel, successful initiatives for enhancing the seismic performance of old buildings have been implemented. Unlike NOP 38, which applies to all old buildings, California authorities differentiate between various types of buildings, according to the degree of seismic risk. For example, in San Francisco, the local law requires landlords of old building to strengthen them. However, the law applies only to one type of buildings (unreinforced masonry) which past experience showed are particularly vulnerable in earthquakes. Furthermore, the legal duty to seismically strengthen such buildings applies only to buildings that have at least five housing units.

The US and California authorities offer public funding to help building owners strengthen their property. Two federal grant programs fund up to 75 percent of the cost of seismic strengthening. In addition, many local municipalities offer long term, low interest loans for seismic strengthening. The city of San Francisco, for example, offers 20-years loans that are not index linked at low interest (at the moment, 1.5 percent for low income persons and 5.25 percent for the rest of the population). The loan may cover up to 100 percent of the cost of strengthening. In some cases, San Francisco grants 55-year loans.

Throughout the world, advanced seismic rehabilitation methods, which have not yet been introduced into Israel, are implemented. One of these methods involves the addition of seismic dampers to existing buildings. These dampers sustain much of the energy the building is exposed to during earthquakes and prevent major harms to its structure. The addition of seismic dampers can be completed in a few days and in many cases is cheaper than the strengthening methods currently used in Israel. However, NOP 38 does not allow seismic dampers to be used.

Recommendations

There is a major public interest in strengthening the larger possible number of existing buildings in Israel in the shortest possible period of time. NOP 38 does not provide a comprehensive solution to this national problem. In order to properly address the issue, taking into account the experience of other countries, the following measures should be implemented:

- There should be no connection between the seismically strengthening buildings, on the one hand, and the issue of building rights, on the other hand. Building rights should be given only according to planning criteria, not as a financial tool to achieve other goals. This means that in 2015, when NOP 38 will expire, its validity should not be expended again.
- The Israeli parliament should pass a law that would require the owners of old buildings to strengthen them against earthquakes. The law must make distinctions between various types of old buildings and set priorities for the seismic strengthening of those types that are at high risk. It should also stipulate that seismic strengthening begin in the periphery. The obligation to do strengthening works should apply only to buildings that have at least five housing units. This would ensure that the efforts are directed at buildings that have a significant number of residents.
- Various proven seismic rehabilitation methods, including seismic dampers, should be recognized and their use be allowed.
- Subject to income tests, public funding for the seismic rehabilitation of residential buildings should be offered. The lower deciles should be given grants that would cover 75 to 100 percent of the cost of seismic strengthening. The middle classes will

be given long range, low interest loans. The higher deciles will be required to seismically rehabilitate their residences at their own cost.

- The state must immediately begin the strengthening of public buildings against earthquakes, giving priority to public buildings in the periphery. The government should also force the owners of hazardous materials facilities to seismically upgrade them within a short period of time.