

LANDSLIDE MITIGATION : LAND USE LEGISLATION
AND CONSTRUCTION PRACTICES
THE FRENCH EXPERIENCE

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In France, for ten years or so now, a policy of prevention of risks generated by natural phenomena has been set up: landslides, earthquakes, avalanches, floods, forest fires, cyclones, etc. This policy was launched with the law passed the 23rd July 1982. This is a law concerning insurance, aimed at developing national solidarity to compensate the victims of natural phenomena. This law enabled an original document to be drawn up, the PER (Exposure to Risks Plan) which not only enables the future to be prepared for, by means of a schedule which takes into account natural constraints but also, for existing property and activities, enables the type of damage they may be subject to be determined.

To understand how French legislation is organized with regard to land use, a certain number of explanations of a general nature need first to be given.

DISTRIBUTION OF RESPONSIBILITIES WITH REGARD TO LUP

France has a 4-tier territorial administration system:

- the State,
- the Region (21),
- the "Departments" (95),
- the "Communes" (33 000).

In certain places in the major highly-populated cities an intermediate level exists between the "departments" and the "communes" i.e. the Urban Communities, for example in Lyon and Lille.

A share of responsibility exists, at each level, in land use planning in general and in the prevention of risks generated by land movements in particular.

With respect to land use, the State takes care of drawing up and subsequently implementing rules and national guidelines via major ruling bodies e.g. the "Equipment" of "Architectural and Urbanism" authorities spread over the ministries concerned.

The Region has, in particular, a coordinating function with regard to large development schemes of regional interest. It rarely intervenes concerning details on land use, except for certain specific problems (e.g. in mountain areas).

Since the 1982 decentralization act the role and the means the "departments" dispose of have been reinforced. The Conseil General has its own budget and development and land use policy. It launches major projects which it puts forward and for which it negotiates co-financing with the State. The trend since 1982 has been towards the development of "Department" technical services, independent from the technical services each ministry has in the "departments". The main ones here are, as regards LUP, the "Equipment" (DDE) and Agriculture (DDA) ruling bodies. The DDE and DDA serve the departments, but under the Prefet's (civil administrator) control, who represents the State.

Finally, the communes have rather modest technical means for the most part, except for the Urban communities. They generally entrust the design and construction of their LUP projects to the State "departments" services, with or without private consultants. The DDST (Department Technical Services Management bodies) also play an increasingly more important role since 1982.

THE TWO MAIN DOCUMENTS IN LAND USE LEGISLATION

There are in France, two main documents concerning land use planning: SDAU (Schémas Directeurs d'Aménagement et d'Urbanisme) or Master Plans and POS (Plans d'Occupation des Sols) or Land Use Plans.

SDAU (Master Plans) define major operations for future area planning. Land Use Plans and also major city planning and public amenity project for local communities or the State must be compatible with the SDAU.

The first SDAU's which have been built up in the sixties projected structured urbanization. They have not been updated for 15 years, and it can now be seen that there are wide differences between them and the actual evolution of the planned areas.

SDAU have to some extent not withstood the test of time, plus the action of institutional, economic or social participants, and may in some respects be looked upon as having been an exercise for the sake of pure form.

Surveys are carried out by some agencies assisted by State services and many partners (from economic, university and professional spheres and outside experts).

Concerted thinking has, in the light of experience, further led to questions on a renewal of planning ways and means and to the introduction of a number of innovations bearing on the nature of the document and its elaboration (as relatively open, legislative texts, leaving some latitude on issues dealt with). The main working itineraries chosen have been the following:

- . "Prospective" thinking rather than detailed forecasting.
- . A project and strategy for the urban area, based on a few major objectives capable of mobilizing one and all.
- . Greater flexibility and a new language for graphic expression.
- . Post-Master plan management, as a sliding concept of planning.

The POS (Land Use Plan) is in France a city planning document which defines the right to build (authorization or ban).

POS's are approved by the Community after consultation of State services and competent public services, and following a public enquiry among the population.

POS's are more accurate than SDAU (scale 1:5 000 as opposed to 1:50 000) and were approved (after revision) at a much more recent date throughout territory. They therefore give a faithful reflection of the current facts on community urban policies. Paradoxically, SDAU should now be adjusted to POS.

The typical content of a POS may be:

- . definition of settlement procedure.
- . definition of city planning rule (for example for parking areas or green areas).
- . preservation of quality of the urban landscape.
- . adaptation of the shapes of building, of their height.
- . reservation for public facilities.
- . definition of the "COS" (coefficient d'occupation des sols) on land use coefficient, which defines the land surface/authorized area of floor space ratio. These coefficients may vary from 0.1 in a residential zone (200 m² of floor/1000 m² of land property) to 5 downtown.

The map which is the main part of the POS allows the distinction between some main areas as for example:

- U (urban) zones where facilities (roadways, water, sewage) exist. All land may be used for building.
- NA zones (not fitted out, reserved for future urbanization) where building is prohibited in view of the lack of installations. Urbanization may however be authorized in some NA zones subject to realization of comprehensive building schemes: "ZAC's" (Comprehensive Development Areas) or housing estates, where financing of installations is guaranteed by developers.
- NB zones (natural land with scarce buildings). Very limited.
- NC zones (farming): may not be used for building.

- ND zones (protected sites): may not be used for building, except for leisure facilities in some cases.

TAKING NATURAL RISKS INTO ACCOUNT IN TOWN PLANNING DOCUMENTS

The State and the "communes" each bear some responsibility in natural risk prevention (1).

The State must:

- seek and collect data using all available technical means,
- point out and make known all potential danger, and especially to mayors upon drawing up or revising a town planning document,
- check that these town planning documents effectively take the risk into account once it has been notified.

The communes must:

- take the data supplied by the State into account,
- in return feed back to the State their own knowledge of risks.

The POS, drawn up at the commune's initiative, and under its responsibility, must take the existence of natural risks into consideration. It may be invalidated by the State if this condition is not respected.

The existence of risk does not necessarily mean that land is non-constructible, but does oblige town planning rules aimed at handling the risk-generating phenomenon or the vulnerability of the property involved. In the case of the ZACs, for example (see above for definition) the financing of consolidation or of rehabilitation for the site concerned may be included in the overall development budget.

Various specific prevention documents have meant that the base documents of the POS kind have progressively been able to be improved.

- . The risk perimeter, set up in application of article RIII.3 of the town planning code:

This article enables the Prefet (civil administrator) to set out a zone, regardless of commune limits, upon which "building on land exposed to risk such as: floods, erosion, subsidence, land falls, and avalanches may, if authorized, be subject to special conditions".

- . The risk exposure plan (PER):

Instituted by the law of 13th July 1982 concerning compensation for victims of natural catastrophes.

This document defines the exposed zones and the prevention techniques to be implemented both by the owners and by the community or public bodies. The PER thus forms a link between prevention and compensation.

It can impose corrective or back-up measures for cases concerning property and activities which occur prior to its publication (retro-active effect).

and non-respecting of the PER is liable to condition the modalities of compensation.

The PER is drawn up under the guidance of the State representative who prescribes it, renders it public and approves it following public enquiry. The commune is consulted at each stage of the procedure.

It comprises:

- an introductory report,
- graphical documents including in particular:
 - . a hazard map,
 - . a vulnerability map,
 - . a risk map with 3 types of zones depending upon the importance of the risk and the vulnerability of existing or future property:
 - * the red zone, or high-exposure zone: risk-occurrence probability, and the high intensity of its foreseeable effects, are such that no prevention measure exists which is economically appropriate other than a ban on construction.
 - * the blue zone, or averagely exposed zone: risk-occurrence probability and the intensity of its foreseeable effects, which are less important, mean that certain land occupation or use can be authorized, provided that certain guidelines are respected. It is thus defined in such a way that the risk and its consequences are acceptable provided that these guidelines be respected.
 - * the white zone, or zone reputed to be not exposed: the risk-occurrence probability and the intensity of its foreseeable effects are negligible here.

The regulations define the prevention measures applicable within each zone or sub-zone marked put on the graphical documents.

The regulations will, in particular, indicate those prevention measures intended to prevent risks, to reduce the consequences of them or to render them acceptable, and to define the compatible land occupation and land use, given the existence of the risk, taking into account the respect of these prevention measures.

RIII.3 and PERs are documents which can be opposable to third parties.

Other, purely informative, documents dealing with land movements exist. These are, for example:

- Maps of zones exposed to risks associated with land movements and underground movements (Z.E.R.M.O.S.),
- Underground quarry maps, ...

CONSEQUENCES OF THE PER IN TERMS OF SOLIDARITY AND INSURANCE

We will, in a very diagrammatic manner, demonstrate here the principle of using PERs to compensate victims of natural phenomena.

The basic idea which privileged the 1982 law being adopted was that prevention starts with risk identification, and by informing the population concerned.

Once the PER has been drawn up each owner of a parcel of land knows that he is in either a red, blue or white zone.

- . If he is in a red zone he will not get a building permit. Should he already own, however, a building on the land he will, in the case of damage recognized by the "prefecture" as resulting from a natural catastrophe, benefit from insurance aid.
- . If he is in a white zone the above applies, both to new and old buildings.
- . The situation in a blue zone is different. The owner is informed of the existence of a risk and of economically acceptable measures enabling the risk to be limited are proposed to him. He is free to carry out or not the personal investment relative to implementing them.
 - Should he do so, he acts as a responsible citizen: he will benefit from the related compensations.
 - Should he not do so, he has taken the personal decision to ignore the risk: he will not benefit from compensation.

Details of the practical application of this scheme are more complex. To trigger compensation in fact requires that:

- . the PER has been accepted and ratified.
- . the damages be associated with a "state of natural catastrophe" issued by the Prefet. Such "states" are most easily taken up when the catastrophe affects a vast community, as is the case for flooding, rather than when just one or a few owners are affected.
- . the damaged property be already covered by an insurance against fire, etc.

CONSTRUCTION PRACTICE - REGULATION CLAUSES AND CATALOGUE OF MEASURES OF PREVENTION

The PER must include regulations. The Major Risks Delegation (DRM), together with professional geo-technicians, has produced a guide for drawing up regulation clauses (2).

This guide proposes models for writing up and for recommendations intended to limit risk, particularly in the blue zone, and for both existing

property and activities, as well as for property and activities to be built or created.

These rules are proposed for the main categories of land movements: landslides, subsidence, falling rocks and blocks of stone, collapse, gullyng, erosion, mud avalanche, torrential lava, and underground cavities.

Each of these rules refers to, when calling for a special back-up measure, a descriptive technical catalogue of recommended work.

Each of this catalogue's leaflets, i.e. for each type of prevention work, contains, in order:

- the classification,
- the scope of application,
- the documents which may be referred to in the specifications,
- the other applicable methods,
- methods which may be associated with it,
- specific technical criteria of applicability,
- efficiency and perennality criteria,
- advantages,
- disadvantages,
- the modalities for setting up the project,
- the conditions for carrying it out,
- operating obligations,
- costs.

BALANCE SHEET AND PERSPECTIVES

The French experience with regard to taking into account land movements for land use purposes is of interest in that it provides a clarification in matters of sharing of responsibilities, and it provides a link-up between prevention and compensation should damage occur.

Thanks to the considerable work that has been done over the last ten years under the Ministry of the Environment's Major Risks Delegation's control appreciable progress has been made regarding prevention.

There still remains much to be done, and in particular the training of the various actors involved in the construction process: promoters, developers, architects, design offices, firms, inspection offices, etc. because, apart from the responsibility of detecting and notifying the risk, and then drawing up recommendations, there is also the responsibility of drawing up special technical specifications for all construction operations on unstable land: procedures, deadlines, calculation methods, and architectural concepts all must undergo specific adaptation (3).

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