

Secure gas transportation and distribution in urban areas safety system of gas network and Urban Planning

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From accidents and conventional crises to the disasters and the detached crises, what postures to adopt in risk management and crises by the private and the public operators of the networks of transport and distribution of the gas? Technical and human failures, natural and climatic effects, malicious acts, terrorist threats, ... These situations of danger imply sequences of event at risk inconceivable, unexpected, leading very often grave dysfunctions and grave infringements affecting persons, properties, goods and the environment.

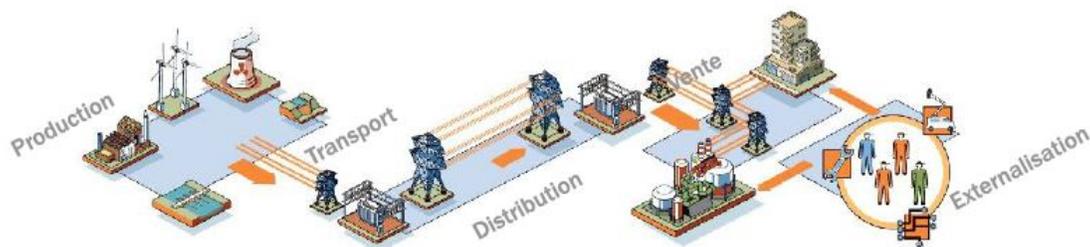
Behind the process and sequence of not wished events: accidents, disasters, appear in reality the cultural, organizational and manager deficits of our anthropotechniques systems as well as the dissonances and the deficiencies between actors in the risk management and the crises. The ability to react of the actors during the crisis often find its limits, the answers delay building themselves, the organization of the help and the emergencies have difficulty in coming true. The anxiety, the collective panic settle down in front of the extent of the damages and the horror. Public authorities, media, operators of vital and critical infrastructures, actors of the civil society try bravely to supply for the tear and for the break to go out of the instability and the global chaos of the anthropotechniques systems affected. The effects domino and the collateral damages around transport and distribution networks of gas come to be added in the blacklist of human, environmental and technical damage paralyzing the territory the society and its economy, complicating the task of the first-aid workers and the emergency: Network of the drinkable water supply, the electricity networks, the transport networks of the properties(goods) and the persons, the houses, the publics equipments and the public access building (ERP). There is a real challenge of global governance which arise to the actors to restore the vital networks, and restore the life and the continuity of the human activities.

The networks of transport and distribution by pipe of the gas for the energy supply of the populations and their economic activities are rightly vital and critical infrastructures at the same time. They are essential in the development of societies and at the same time they

concentrate their own hyper-vulnerability by the increasing interdependence of the direct natural and climatic effects (storm, flood, earthquake, underground disorder...) but also human effects, using them as weapon destructive and potential threat which can serve the hostile and terrorist acts. So it's necessary to master the safety of industrial process of gaz network, it's fonctionnality in the territory. The stakes are high and multiple for companies in charge of the transport and of the distribution(casting) of the gas:

- to insure the access, the supply and the cover of customers, professionnall and private individuals. needs in gas. In this way it is a real mission of public utility;
- improving competitiveness in the context of the performance of transmission, distribution and use of gas by targeting the quality of service, efficiency in the management of this energy and security of persons and property in the vicinity of gas infrastructure . In this sense it is a true mission of protection and prevention through the control of town planning and enhancing network security.and the availability of buseness continuity in producing gas energy against the climatic, natural, human and technological risks.

In fine, transport and distribute the gas put technical, economic, human, environmental questionings, on the background of problematics linked to the proactive and reactive management of the risks and the crises to insure the safety, prevent and protect against accidents and crises. What flow and which pressure to insure in networks? How to configure the works and to size networks? How to exploit them?



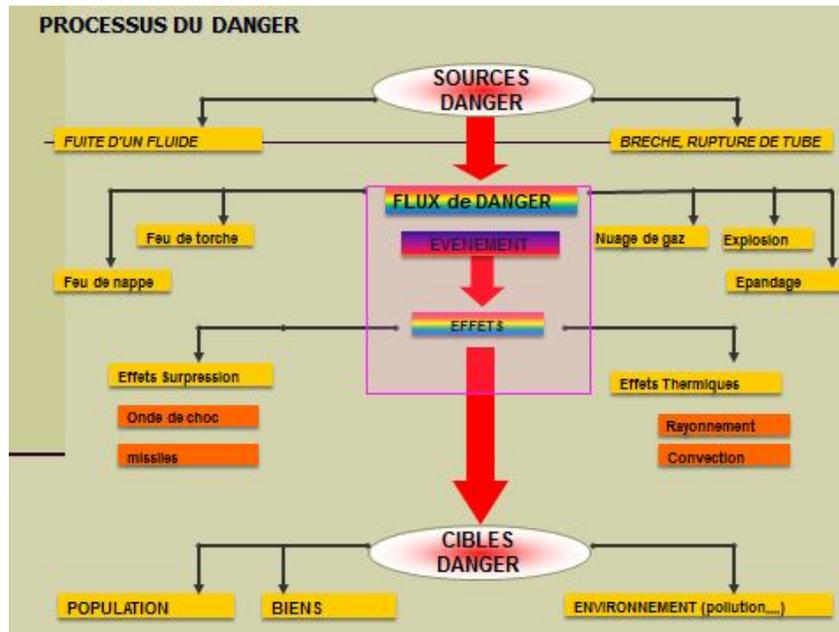
The preparation for emergencies and for crises, arisen from accidents generated directly by the pipeline networks of gas (technical dysfunctions), or from natural and climatic disasters impacting on these networks or from diverse human attacks (malicious acts, terrorism) using these same networks as means of destruction, gets not only as the preparation to react to the crises but supposes and requires to intervene upstream to reduce the risks and the disasters by anticipating the process of identification, evaluation and mastering of the risks, by acting so much on the technological risk and the vulnerability of the systems to increase their impact strength, the kinetics of the danger and the good governance allowing to decrease the dissonances and the deficiencies of the private and public actors in the apprehension and the negotiation of the risk. In this sense we have to take into account a systemic and complex approach of the danger the risks which is generated. The posture which we support involve an approach of global and integrated risks allowing at the same time to combine the determinist and constructivist approaches in dealing with danger, fed by the glances and the points of view of the actors on the background of cindynics dissonance, deficiency, confliction and deficit developed by actors. The goal is to identifie and to

estimate "potentially" sources and targets of danger, accidental flows of event via the scénarii of accidents and disaster, to evaluate the technological risk, the vulnerabilities and « the human, technological and natural resiliency » before setting up proportionned corrective, compensatory, preventive and protective measures: Optimization of the plans which minimizes the effect of the accidental events, the safety of gas transportation and the distribution by pipe, make in balance security measures of pipeline with the external environment on the occasion of works (town planning, environment) and in the event of an accident to insure the business continuity of the supply of the energy (gas) in a destabilized environment, having undergone the damage, potentially mortiferous, with a partly unavailable staff for example (disease, personal at home, injoignable...)

I-Feed back from expérences of the dangers and pooling of best practices relative to the pipes of gas transport and distribution in Algeria and in France

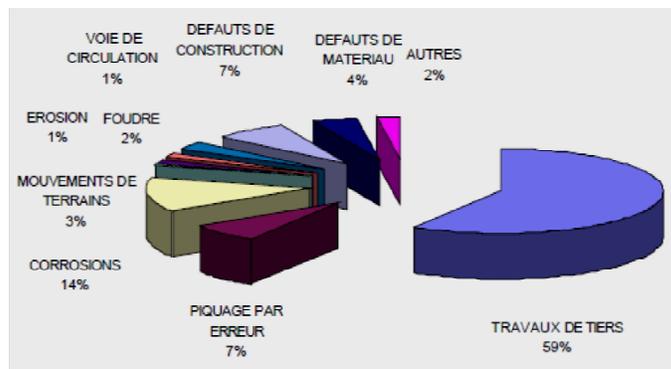
The dangers inherent to the transport of the gas are essentially two orders: the thermic overpressure effects. The natural gas is neither toxic nor polluting; he is weakly broadcasting of CO₂ for the heating for example (230 g CO₂ / KWH compared with the electricity which emits between 500-600g CO₂ / KWH). The accidents often have for cause essentially the loss of seclusion due to the works of third parties, the corrosion, the quality of the welds between section, the defects of materials, the geological and géomorphological dynamics which subterranean disorders and the movements of ground, the accidental interaction with the air electric lines of high voltage, the natural and climatic risks: earthquake, lightning, flood, avalanche and landslide, acts of violence, hostility, terrorism ...

The event initiator is the flow)of flight when technical dysfunction happens (initial event). This one passes by two phases, a first phase of one in two minutes characterized by a fast reaching a maximum before decreasing so quickly before stabilizing. Besides, effects missiles can affect pipes and cause drillings with openings up to 60 meters

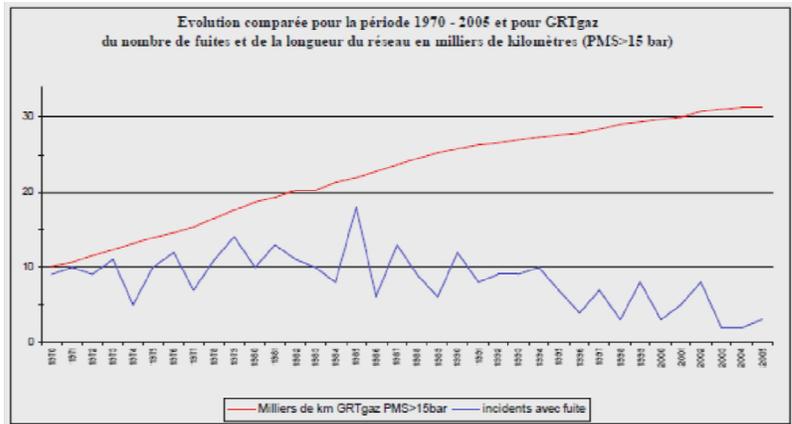


PROCESS OF DANGER

In France, GDF-SUEZ, European and world leader in the gas holds a specific database listing by experience feedback the accidents and the incidents arisen on the network.



Cause of accidents-incidents (GDF, on 2006)



Evolution 1970-2005 of the incidents and accident and the length of the network GrDF (GDF, on 2006)

According to the INERIS (2002), the causes of most of the major accidents arisen in France recover essentially for:

- 70 % in the works of third party (declared or not),
- 10 % in the corrosion of pipes,
- 10 % in the movements of ground,
- 10 % of diverse origin (lightning).

So, on approximately 50 000 km of pipes in France, the INERIS (2002) estimates the mortality rate in approximately 4.10^{-6} a year and by km.



Corrosion: joint of spiral weld

The functions of control, inspection, maintenance, watching and supervision of pipes, in particular the protection against the corrosion, are in the heart of the safety of functioning of the installations relative to pipes. Some aspects as referenced by GDF Suez and the INERIS require a supervision) and a control in deep:

- The sectional posts on which the flights often of weak flow, are not exceptional;
- The cathodic protection (in particular on equipments): the protection is theoretical, it is difficult to know what the situation is really. Annual tests are realized. He can be useful to make them more often.
- Weld: a regular control is necessary, with a technique suited to the nature of transported product.



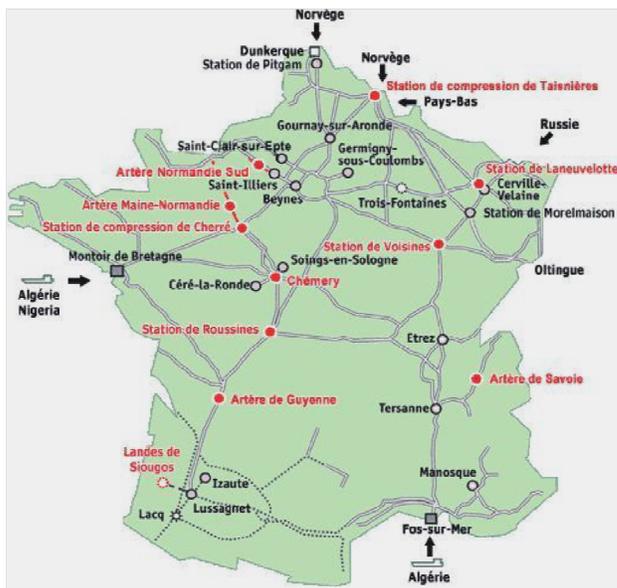
We have not enough statistics and experience feedback strengthened on the Algerian case, but observations found give evidence of an absence of rigorous management of the pipeline network of gases often delivered to itself: irrational space occupation in particular the landuse: housing environment, equipments, infrastructures encroach on the constraints of pipe of gas and more generally hydrocarbons, agricultural and natural territories crossed by gas mains and oil pipelines require a greater attentiveness. Situations so incomprehensible as illicit constructions of persistent houses on the backyard and the zone of the constraints of pipe, the development of pipeline networks along the networks of railroad, the nearness of sensitive equipments as the school, the ERP, plantations of tree, Land and underground works in misunderstanding of networks buried etc. testify of a tolerant attitude and a resignation towards the town planning and towards the management of territories.



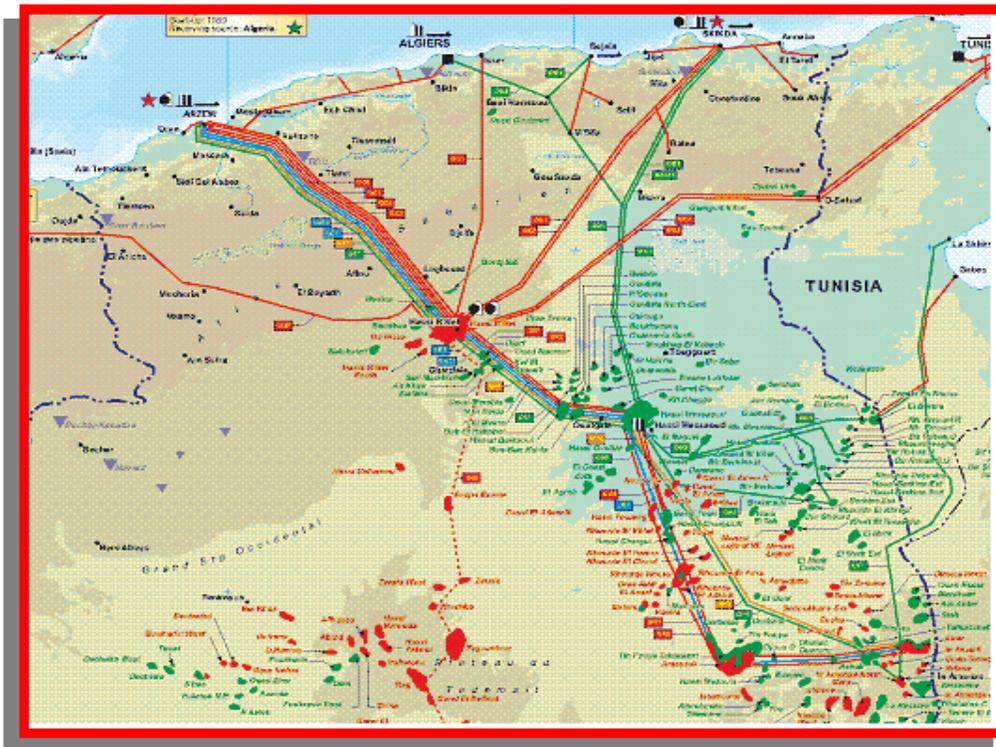
Algerian network of gas transport. 1 household on 3 linked transport and all industrials linked (Sonatrach, ENAC, Sonelgaz)



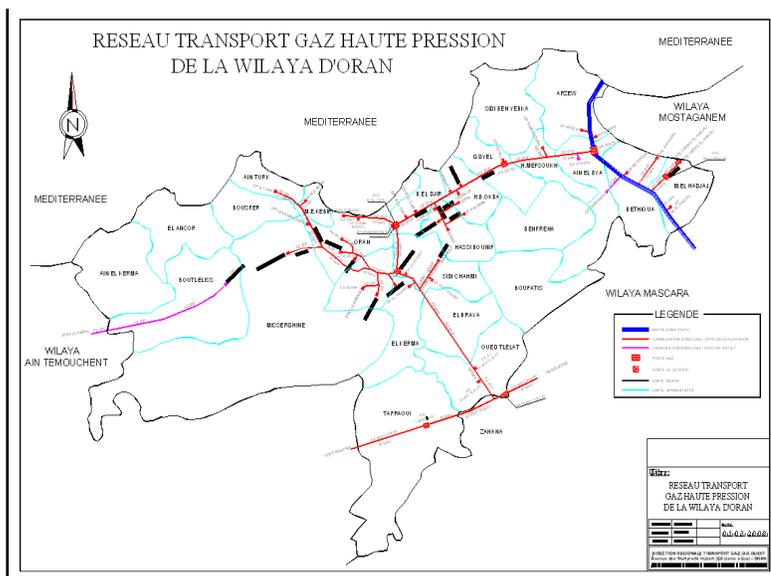
Euro-maghrébin network of gas



French main transport network (5 entry points, 12 sites of storage and the regional connecting points (GDF Suez, on 2011)



5 oil pipelines and 4 gas mains between Hassi R' mel and crossing Arzew 7000 ha of tablecloth, zones rural and agglomerated to watch (Algeria).



A network of gas transport and distribution requiring a greater attentiveness (W Oran, Algeria)



Agricultural works to Hassi-Bounif (W. Oran, Algeria) damaging a gas main in spite of the controls and the advice of the operators.



Works of opening of trench for the pose (installation) of the gas main Medgaz (Chentouf W Temouchent (Cosider-Sonatrach, Algeria) damaging a gas main with nearness emergency intervention.



a motorway node

Post GRD (gas) in Oran in



Construction of the regional office of the employment in 10-20m of a pipe gas (GZ 014 "-Ain-el-Bya / Bir-el-Djir, W. Oran, Algérie) without dialogue with the operators and the authorities in charge of the control (GRTG-DMI)



Gas network not respected: construction of house and children's games (W. Oran, Algeria)



Houses near the gas network

In France, in spite of the technological progress and the effort of mobilization and raising awareness of the operators of the gas, we registereven every year not less than 6000 incidents-accidents on the pipes of distribution of gas, for the greater part due to the realization of works without real dialogue nor real technical circulation of information between operators upstream and during the implementation, but also due to the other causes bound(connecte) to the problems of maintenance: desertion and wear of materials, technical dysfunctions of electric order for example (cast iron of pipe in polyethylene taken in a fire with breakaway of the gas, the short circuit damaging a pipe, a gas leak at the level of the gates of dam, faucets, or insulating joints). This damage affecting pipes is often mortal for the on-site staff and the population when it is about urban and agglomerated circles. Over the recent period, between 2007 and 2008 we listed four grave accidents intervened in urban zones (Base ARIA: Niort, Noisy-le Sec, Bondy, Lyon).

In Algeria and in a lesser degree in France, the human factor is widely clocked by the finger so much highly-rated of companies in charge of the management of the transport and the distributionof the gas by pipe as public actors in charge of managing the town planning, the environment : Failing organization, no dialogue between operators, decision-makers, loss of attentiveness, no raising awareness(sensitization) nor sufficient mobilization of the staff to the culture of the risk and the safety(security), there is no real strategy of global and systematic maintenance, and nor a strategy of in-depth defense ...



Bondy (30-10-2007) - Perforing of a pipe and a breach(negligence) in an obligation(bond) of caution, explosion and fire, 1 deaths, 63 wounded persons among whom 10 brulés (Paris region, France)



Noisy-le-Sec (22-12-2007) - Gas leak and explosion further to works of drilling. Building HLM(COUNCIL HOUSE) STEPHENSON destroys by the explosion, those adjoining very damaged (76 impacted households. 176 mobilized fire brigades - (Noisy-le-Sec, Paris region, France)



Lyon (28-02-2008) - Gas leak, explosion and fire, 1 death and 40 wounded persons, several damaged buildings; 180 mobilized fire brigades.



(Algeria), pipeline Hassi-R'mel-Arzew Mohammadia, corrosion - flight of gas explosion-fire, 78 persons hurt, damage to property - similar to a previous accident le19 in August, 2004

II- Legal framework based on the experience feedback

Nevertheless the Algerian legislation and more still French are well enough provided in text regulating the realization and the management of the works of transport and the distribution of the gas by pipe.

- II-1. The French legal arsenal and its evolution

The network of the pipes of transport of gas is governed in France by a whole legal arsenal which regulates and regulates the safety(security) of chemical transport of products (decree n°65-581 of October 18th, 1965), works of transport of fuel gas by pipe (Stopped(Arrested) of May 11th, 1970), in the employment(use) of the soldering in the construction and the repair of devices with pressure (Stopped(Arrested) of March 24th, 1978), concerning the content in sulfur and compounds sulphurized by some natural gases transported by pipes of transport (Stopped(Arrested) of January 28th, 1981), pipes of transport of fluids under pressure others than hydrocarbons and the fuel gas. The organization of the civil safety(security), in the protection of the forest against the fire and in the prevention of major risks (decree N 88-622 of May 6th, 1988 taken in application of the law N 87-565 of July 22nd, 1987), for pipelines with liquid hydrocarbons and liquefied (stopped(arrested) of April 21st, 1989), concerning the information of the populations (Decree n°2001-470 of May 28th, 2001) without forgetting the decree of October 15th, 1985 for the gas and the decree of 1989 for liquid hydrocarbons and fluid, in the execution of works near certain subterranean, air or underwater works of transport or distribution(casting) (decree 91-1147 of October 14th, 1991), pressure equipment (decree 99-1046 of December 13th, 1999), carrying(wearing) security regulation of the distribution(casting) of fuel gas by pipes (stopped(arrested) by 13 In July, 2000), concerning the diet(regime) of the transport of fuel gases by pipes (decree 2003-944 of October 03rd, 2003, pipes of transport of fuel gases, liquid hydrocarbons or liquefied and chemicals (Stopped(Arrested) of August 04th, 2006)

The French administrative procedure for the setting-up(presence) of a new pipe (or the arrangement(development) of an existing pipe) leans in sound contained on a study of impact, a study of safety(security), a plan of supervision and intervention, as well as an estimation of the repairs. A backup plan and Of intervention also concern the pipeline networks of the gas on the model of the plan of operation internal of the installations classified for the environmental protection (ICPE). The pipes of transport are besides the object of a specialized backup plan, which corresponds to the particular plan of intervention of the ICPE.

In France further to a series of accidents in particular that of Noisy-le-Sec in 2007, A report(relationship) of survey(investigation) was realized by the Ministry of Ecology, the sustainable development and the town and country planning, recommending about twenty measures to reduce the risks of accidents and to strengthen the rule:

recommendation of administrative order (unique(only) counter(ticket office) computerized to facilitate the statutory steps(initiatives) before works, better transmissions of information between the actors);

- precautionary measures (periodic surveillance(supervision) of the operators, the implication of the project ownership most upstream possible, improvement of the information of the mapping(cartography));
- educational (intensification of the experience feedback on construction sites, better information and trainings(formations) of the participants(speakers));
- operational (employment(use) of machines not oversized to realize the works).

On the basis of the experience feedback and of the aforesaid report(relationship), the French State committed(hired) the modernization and the intensification of rules concerning the safety(security) of the works near networks by implying(involving) a plan Anti-Endommagement through the recent publication of a first " decree Statement(Declaration) of

Works/ statement(declaration) of Intention of Beginning of Works " (come into force in July, 2012) for the works near the distribution networks. He allows at the same time to light(enlighten) the responsibility by a collaborative system between the actors: the principal, the developer, the company of works. This Plan Anti-Endommagement leans on four ideas-strengths:

- The implementation of a " Unique(Only) Counter(Ticket office) " connected with Ineris.
- The addition of additional measures of prevention: improvement of the mapping(cartography) of networks, stop(ruling) of the construction site in case of considerable difference between the state of the basement and the information carried(worn) in the knowledge of the company of works.
- The intensification of the skills in safety(security) of the staff of the project owners and the companies of works.
- The implementation of a " national look-out post(observatory) DT DICT " to make live the experience feedback and maintain the information and the raising awareness(sensitization) of the actors concerned by the stakes

Operational recommendations using the new information technologies to reassure(secure) more the transport networks of the gas:

In the continuity of the prevention policy and the protection of the technical and operational barriers are introduced by the French operators:

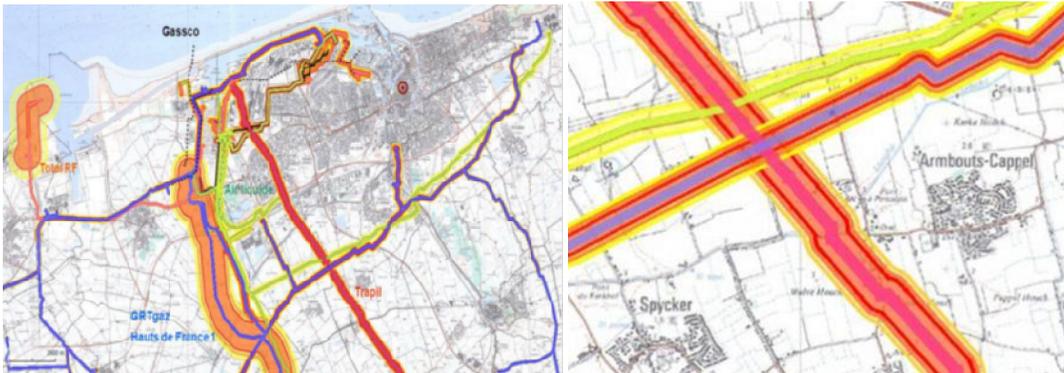
- the Resistance of pipes by strengthening their thickness (32 ton mechanic shovel) mechanical Protection (paving stone concrete, stick steel)
- Equipment of the machines of TP(BUSINESS RATE,PRACTICAL CLASS,PRACTICAL CLASSES) of GPS(GLOBAL POSITIONING SYSTEM,GLOBAL POSITIONING SYSTEMS) with entrance(entry) of address and phone number(coordinates) of the pipe Surveillance(Supervision) by satellite
- Detection of the mechanical machines by fiber optics(optical fiber) in phase works

Compensatory measures are called back by the order of aforesaid August 04th, 2006 allowing to reduce the probability of case(occurrence) of certain accidental phenomena and thus to lead(drive) to redefine the choice of the reference scenario of loss of seclusion:

" Arrangements(developments) (strengthened beaconing(tagging), rests(poses) of paving stones in concrete, for example), measures of construction or pose(installation) (surépaisseur of metal independently of that required by the category of place of the pipe, to surprofondeur, creation of bank, for example), measures of exploitation(operation) and information (strengthened surveillance(supervision), reduction of the maximal pressure in service, information of the local residents, information of companies susceptible to make works near pipes, for example) specific intended to decrease the risk of breach of personal safety and the properties(goods) and in the environmental protection and subjected as such to the approval of the service loaded with the control.. "



Vehicle of surveillance(supervision) of network (VSR) - GrDF with an embarked mini-lab and a technician analyst. The vehicle inhales(sucks up) the ambient air with sensors situated in front of the vehicle. The meditative information is analyzed by a detector of methane embarked (GrDF).



Plans of pipes with safety zones (distances of effect irreversible and lethal) (France)



Example of detour(deviation) of plan with compensatory measures and pose(installation) of paving stones of mechanical protection (France)

II-2. The Algerian legal arsenal and its evolution

For its part, the Algerian State develops a policy of safety(security) and protection through a compatible legislative and statutory device with the charters and the international agreements(conventions) of which it is signatory. It's like that of the prescription N 76-4 of February 20th, 1976 relative to the applicable rules in safety(security) against risks of fire and panic creating at the same moment committees(commissions) of prevention and disaster and emergency services, the decree 76-34 of February 20th, 1976 concerning the dangerous, unhealthy or uncomfortable establishments; the organization of the production, the transport and the distribution(casting) of electrical energy and gas (law 85-07 of August 6th, 1985), the institution of perimeters(scopes) of protection of the installations and the infrastructures (decree N 84-105 of May 12th, 1984), perimeter(scope) of statutory servitude of August 19th,

1986; the risk prevention of disaster (decree N 85-232 of August 25th, 1985); the organization and the Implementation of the interventions and the help in case of disaster (decree N 85-231 of August 25th, 1985); the regulations applicable to the installations classified for the environmental protection (ICPE) (decree N 88-149 of July 26th, 1988), the organization of the procedures and the applicable systems of control in realization and in travel(movement) of the works of electrical and gas energy (decree 90-411 of December 22nd, 1990). If the control of the installations and the works relative to the pipes of transport and the distribution(casting) of the gas is evoked in the Algerian legal device, the reference to systematized studies of safety(security) and to plans of prevention is indistinct and of legibility. They are left with the appreciation of the public administrations and the operators, according to their skills and their specificities.

The coordination between these public administrations is not easy(well-to-do) thing(matter) and we regret the absence of a good governance around the stakes Stakes in safety(security) when we know that one of the main causes of the danger is exactly this absence of coordination and dialogue between the public and private actors. Besides, the feedback of national and international experiences(experiments), the technological innovations are not capitalized by the production of legislative and statutory texts relative to the management and to the safety(security) of the sector of the transport and the distribution(casting) of the gas by pipe.

III- Systemic vision of the danger in the heart of the complexity of the systems anthropotechnique: a reading cindynique networks of transport and distribution of the gas

The sectorial vision essentially technical cannot well-managed the risks of gas transport and distribution by pipes. It is necessary to globalize the problem of the danger and the risks which it generates to integrate the vision of public and private actors in systems of decision-making collective, often ineffective.

Beyond the determinist approaches which consist in estimating the risks of a pipe of transport from the measure of a potential of danger by leaning on the technical majorants scenarios and more aggravating, on the measure of the flow of transit of the transported gas and the distances of effect, it is necessary to complete the analysis of the risks by integrating(joining) a systemic vision making interaction and retroaction between the human, economic, environmental and natural dimensions and by integrating(joining) the experience feedback, policy and actors. In this context the analysis of the vulnerability of the territory (urban, rural, natural) and zones of human activity(occupation) (housing environment, equipments, ERP, activities) more or less close to pipes is essential to optimize the plan of networks, warn(prevent) the risks to the source (human factors and internal techniques to the company) and in the target (the population, the human activities, the surrounding circles, more or less close to the source(spring) of danger).

More forward, a prevention policy of the accidents in particular the major accidents generated by the installations of type(chap) pipes of transport and distribution(casting) of the gas requires to set up a management system of the safety(security) based(established) on the double concept of risk-system and in-depth defense, allowing to warn(prevent) and to protect in a more interactive and more retroactive way the various constituents human

(societal, cultural), technical, organizational, economic and environmental against the aforementioned technological major accidents.

The reasoned human development, in a prospect(perspective) of sustainable development, contributes undoubtedly to limit(ease) and to reduce the dangers and the risks which are bound(connected) to them. Indeed, the concept of sustainable development which leans on the logic of the human development articulates the social equity, the viability and the economic reliability, the environmental quality in the order of the human performance and the territories. It implies the implementation of a strategy and an engineering of the human and technical impact strength in the heart of the vulnerability of our ecosystem.

To articulate three social, ecological and economic constituents and to integrate(join), every time, and in a combined way, an approach multirisks in the town and country planning urban and rural require a plural and interdisciplinary vision of the human development. The violence and the urban risks generally obey the chance and cannot be known in advance.

The problem of the risk is so in the heart of the human development of territories. She(it) defines itself well as the combination(overall) or the product of the urban chance (dysfunction, insecurity, Violence), natural or technological by the vulnerability. We know well that we cannot act on the first member(limb) of the equation, the chance, unpredictable and uncertain. So, the action will come from the master of the vulnerability which is rather the result of choice of development. To act so more globally on the target of the danger by bending over the joint(articulation) "vulnerability-insecurity" becomes relevant and opens the way to politics(policies) of mitigation and preparation for the risks of insecurity in a coherent frame of human development.

Risk spatial Techno-socio= Chances x Vulnerability

Adapted to the case of the transport and some distribution(casting) by pipe of the gas, the level of risk can conceive as the combination of the vulnerability (V) technical, societal, environmental and territorial with the potential dangers (D) multiple of type(chap) natural, climatic, human, territorial and urbanistic, with the severity (ies) function of the transported product, the gas, and conditions of transport and distribution(casting) and with the control(master's degree) of the risk (P) (objective, reserved level of performance)

$$\mathbf{R = V \times D \times S \times P}$$

The risk and the vulnerability are so an anthropotechnique construction which depends on societal, territorial, political and economic aspects. So the urban development, in its strategy, its processes and its modes(fashions) of action(share) and according to its viability and its correctness is the main constituent acting positively or negatively on the vulnerability. To reduce the risk consists in decreasing the vulnerability by a process of sustainable human development.

This approach is held by states and international authorities (UNO) because she allows to advance and to question in a more realistic way the relative relevance and global coherence of the strategy of human development to avoid the urban risks and of territory. The choices of development of town and country planning influence directly on the level of gravity of the

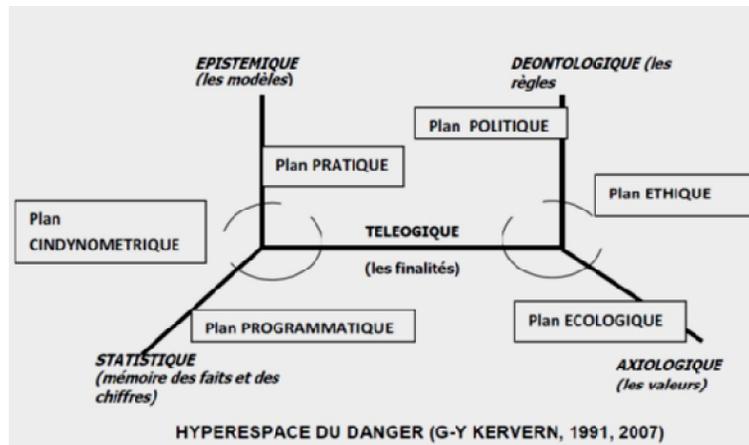
potential dangers arisen from the systems sociotechniques. To the man victim of the disasters we substitute the man responsible for his acts and for his choices of development in capacity to reduce the risk and the vulnerability of the ecosystem before any decision-making in human development.

In this change of paradigm fed by the scientific research, there is a strategic change in the method of approach problem of development by integrating(joining) to it a global and systematic vision of the danger in the heart of the vulnerability of our urban and territorial ecosystems.

The vulnerability of the territory is conversely proportional in its impact strength in its various dimensions, human, social, technical, economic and environmental. The territorial, climatic, natural and technological change is not the only expression of the risk; this one also depends on the level of performance and on vulnerability of the company(society) and on its territory to master him(it) and reduce him(it) through a community of stakes, ethics, values and to become (ends(purposes), objective purposes) livened up(led) by producing actors of territorial sense(direction). The confrontation of actors' networks on the background of stakes and of values of human development helps in the understanding of the problems of safety and qualities of the urban spaces. It is on the foundation of constructivist paradigm of apprehension of the technological, human and territorial risk which we invite to leave the approaches strictly " technical " and determinists of the professionals of the safety(security). The safety of functioning, the study of industrial processes, the technical urban planing (configuration, shape of houses, technical distances of safety(security), arrangement(development) of the ground and the basement) proceeds of this determinist security approach(initiative) on the vision of the only technical engineering of the risk " while the human, organizational aspects, the game(set,play) of the actors, the elected representatives, the operators, the administrations, the citizens and the associations, the media weigh on the problem of the risk and are often by the lack of coordination, of dialogue and good governance at the origin of the danger. Where from the logic englobante and systemic which we defend to réduire the risk and treat it.

This more global, systemic and interdisciplinary technological and territorial approach of the risk, interesting the networks of gas transport and distribution in pipe, cut with the the technical vision of the security, the determinist and linear approach and is linked with the science of the dangers, the cindynics and especially in our field the technological and territorial cindynics.

The science of the danger, the cindynics, develops an approach of actor and the notions of "glance" and "point of view" to identify and estimate the socio-urban, technological, natural, economic, human risks and psychological etc. The cindynic hyperspace of every actor offer through its glances and its points of view a reading of the dysfunctions, the gaps, the deficiencies and the degenerations of every constituent of this hyperspace, the confrontation between actors allows to seize the dissonances between them (between hyperspaces). There are from alerts and from corrections of the trajectories of the possible within the framework of the elaboration of a project of realization, maintenance or from modification of vital networks.

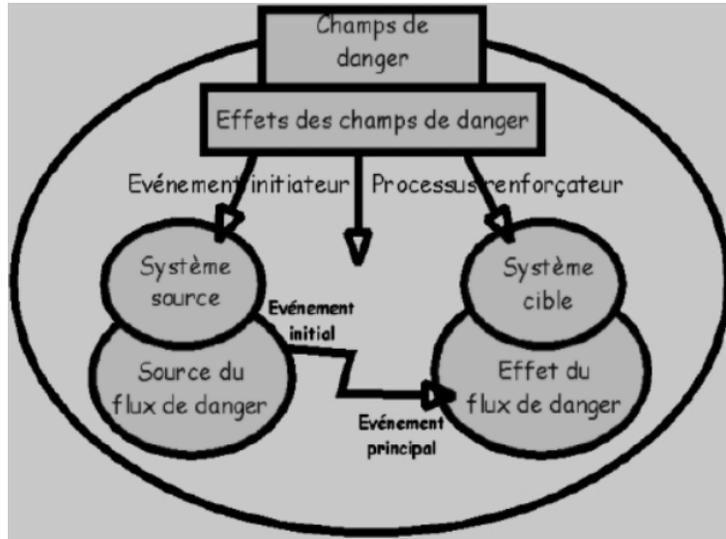


The search for the collective optimum is the product of the integration and the participation of the actors and will come true in the sense(direction) of the common good(property) by leaning on the evaluation of the hyperspace of the danger of every actor through reference tables axiologiques of values, ethics and cultures, marks and ethical dimensions (rules), téléologiques (ends(purposes), purposes), épistémiques (model, conceptualization.), statistics and mnésiques (the history(story) and the memory of the facts, the information and the communication, the capitalization of experience feedback).

The logic of safety privileging the manners and the societal, industrial, technological and territorial practices establishes(constitutes) for us the key of entrance(entry) to understand(include) the safety of n etworks of transport and distribution(casting) by pipe of the gas; she(it) is preferred to the logic of safety. The safety of functioning of the réseaux of gas gains(wins) to be translated in paradigm cindynique based(established) on the game(set,play) of the actors by betting on the practices and the industrial, technological and societal manners rather than paradigm of the technical prevention, limited, dealing with the only material and technical vulnerability of the space and its dangerousness. From this point of view the treatment of the situations cindyniques is culturaliste, historic and strategic, integrating(joining) the complexity of the technological and territorial reality.

- **The methodology MADS-MOSAR to arrest(dread) the chances and the urban vulnerabilities**

Through the methodology MADS (Method of analysis of the Dysfunctions in the systems) of the scuniversity of Bordeaux (IUT-HSE), we deal with the not wished events (ENS) explaining the insecurity of gas networks. The representation of the systems sources of danger and target of danger in the field of the danger allows to put them in relation so training(forming) the process of danger to be modelled or the flow of danger (danger of material(subject), energy, information) processed by the field via processors of time(weather) (chronic, limited flow) and spaces (limited(punctual), diffuse flow). We proceed then, ex-ante (conception) and ex-post (experience feedback), to the phases of identification, evaluation, control(master's degree), management and management of the ENS in the considered urban ecosystem.



Process of danger, MADS model, IUT-Bordeaux, Univ. Bordeaux1

The risk management is strategically and operationally explained by proactive and preventive positioning (act on the source of danger) or reactive positioning acting with a policy of protection (act on the target of the danger).

The representation of the process of danger under different aspects (point of view, glance, aspect fed by actors' network) allows to have a global view(sight) and cindynique of the technico-urban system of the networks of transport and the distribution(casting) of the gas and the their potential failures.

This base and this refoundation of the problem of the risk of the networks of gas transport and the distribution by pipes, on the principles of the cindynics logic, give a sense to a complex construction, well structured ; in the same time it's open the large vision to the comprehensive résiliency, vulnérability of the territory. There is a relationship at the risk more opened in the manufacturing of the project and a culture of the project-risk more " résiliency " and successful. And so elaborates the systemic approach of the management of networks and projects with the human and territorial in the center of our investigation. This help us to impact strength to anticipate, restore, to improve and to regenerate the situations of development become obsolete, deficient(weak) or failing. It is more necessary than necessities to take into account the approach(initiative) "actors" and their hyperspaces cindyniques (taken in the projective sense(direction)) to build networks successful of gas transport and distribution.