by Pirouz Khanlou

CONSTRUCTION! DESTRUCTION?

Blueprint for Baku's Urban Development

Since Azerbaijan gained its independence in late 1991, Baku's growth, as evidenced by the recent building boom, has been phenomenal. In the past five years, more than 500 new high-rise towers have "sprung up like mushrooms after rain," as the Azerbaijanis say.

Unfortunately, Baku's development has been anarchic with no reference to any comprehensive strategy for urban planning or design, according to Architect Pirouz Khanlou of Los Angeles, who has carried out numerous architectural projects in the city. Regrettably, the city is barely able to cope with such accelerated growth. Khanlou stresses urgency in addressing these issues and insists that unless serious steps are undertaken, the future spells disaster, especially given that the city is located in an active earthquake zone.

As one who has been directly and continuously involved with Azerbaijan since the first days of its independence in the early 1990s, Khanlou shares his concern for the city's development and particularly for the safety of those living there.

Khanlou suggests tackling these problems on both a short-term and long-term basis. Some issues can be resolved quickly; others require a major overhaul of the municipal infrastructure. He urges a broad vision for the city and recommends that the government employ professionals and experienced consultants to conduct in-depth, comprehensive studies in search of practical, but reliable solutions.

The consequence of ignoring growth issues, Khanlou argues, is a guaranteed formula for disaster. Officials and "nouveau riche" developers can fool themselves as much as they want, but their negligence in addressing such issues will not change the bitter truth about Baku's future. One day, sooner or later, Nature will insist on following its own rules. Today is the moment to act. Tomorrow may be too late to avoid catastrophe and correct problems brought on by negligence and incompetence.

It's for this reason that we have undertaken to translate this lengthy article into Azeri and to publish it alongside the English version. We believe these issues are critically important for the welfare of Azerbaijanis and hope that our efforts will lead to community discussion and tangible results.

Ten years ago on October 28, 1995, fire swept through one of Baku's evening Metro trains during rush hour, killing more than 300 commuters and injuring another 500.[1] It was the worst Metro accident ever recorded in the history of railway transport—anywhere in the world.

Shortly afterwards, I challenged Baku's lack of strategy in transportation planning.[2] "The reality," I wrote, "is that traffic on Baku's streets is far more congested today [1995] than it was even just three years ago. In fact, traffic is rapidly turning into a nightmare. In sections of central Baku, it's faster to go on foot than to drive. In this period of transition from a socialist to a market economy, the city will continue to develop in a haphazard way unless there is a serious strategy that anticipates the future. Entrepreneur activities will become paralyzed."

Well, a decade has since passed, and the haphazard development of the city has continued at an even more rapid pace than one could imagine. Traffic has become a daily nightmare and has, indeed, brought the city to a halt. Today, traffic jams are the everyday norm.

Complicating this issue is the fact that there has been a tremendous boom in construction in Baku, particularly during the past five years as more than 500 high-rise towers have been erected—not to mention the thousands of new low-rise buildings. This has led to an incredible high density of population in the center of the city.

Nothing is wrong with development, in and of itself. But when it leads to serious negative consequences related to the safety and welfare of the people, then the issue of urban development must to be examined and steps taken to rectify these problems. Development needs to move forward in a planned, deliberate, systematic and scientific fashion, not one based on spontaneity or whim.

An Azerbaijani friend of mine—an intelligent, highly educated and socially conscious fellow—recently broached the subject with me: "Construction is a sign of progress," he observed. "I realize that something is wrong, but I don't know exactly how to pinpoint the issues."

In this article, I attempt to identify some of these problems and propose some pragmatic solutions—both short term and long term. This article is

Panoramic view of Baku's skyline. More than 500 towers have been erected in the past five years. Architecturally, there is no sense of unity and cohesiveness. Photo: Pirouz Khanlou. October 2005.

written for the general reader—and thus does not use highly technical architectural and engineering terms. The most important thing to understand is that Baku is facing a major crisis, which will have enormous repercussions and consequences if the City does not move quickly and seriously to address these issues and resolve them.

THE LARGER CONTEXT

The issue of traffic should be examined within the framework of its much broader urban context. Traffic congestion is merely a symptom of an "urban planning disorder". Baku's transportation system was designed for the Soviet era [1920-1991], and it simply can't keep pace with the demands of a more open market economy, fueled by the independent spirit of entrepreneurism.

During the Soviet era, there were relatively few cars in Baku. Archival photographs, taken as recent as 15 years ago, show fairly empty streets with few vehicles. The road system seemed fairly adequate with its fairly wide avenues and boulevards.

The use of private cars during the Soviet period was deemed a privilege, primarily reserved for ranking government officials. Even so, it wasn't easy to get a car; there were long waiting lists. People waited for years. In general, the public relied upon mass transportation—buses, trolleys and the Metro.

Oil Baron Haji Zeynalabdin Taghiyev (1823-1924) is credited with being the first person in Azerbaijan to own a car. Soon after Henry Ford began manufacturing Model T's in the United States in 1904, he had one shipped to Baku. By 1911, there were 36 automobiles bumping along the cobble stone streets alongside horses, carriages and pedestrians.[3]

The City Plan at the beginning of the 20th century was quite adequate. By that time, Baku had become the most sophisticated metropolitan center in the Caucasus. Based on well-conceived Urban Planning, the municipal infrastructure included parks, streets and public transportation.

Problems such as securing a safe water supply, which had plagued the city for nearly half a century, had finally been resolved. The Shollar Pipeline brought water from the foothills of the Caucasus, nearly 190 kilometers away.[4] A sewage system was in place, as was a transportation system that included both rail and trolley. Public buildings had been constructed, including schools, hospitals, theaters, government administrative offices, and places of worship (mosques, churches, a huge cathedral and a synagogue). The crowning jewels to Baku's architectural landscape were its private residences—elegant, ornate and often palatial—built by the oil industrialists.[5] During the height of the Oil Boom (1880-1920), Baku witnessed incredible urban development. More than 700 residential and community buildings were constructed. Both local and European architects were involved.

But these glorious architectural buildings faced destruction at an alarming rate when the Bolsheviks seized power in 1920 and confiscated all property. In many cases, the owners who had not fled the country were killed. Buildings were subdivided into multiple living units, sometimes housing as many as 20 to 25 families. Family accommodations were often limited to one and two rooms, but the kitchens and bathrooms had to be shared with other families as communal space. Still today you can see hundreds of examples where dining rooms with highly ornate decorative ceilings were literally partitioned right down the middle of the room with a wall that separated living space for two different families.

Another neglectful practice of the Soviet period that negatively impacted the buildings of the Oil Baron period was the failure to maintain the buildings. Deprived of a sense of ownership, apartment residents did not feel responsible to take care of public spaces such as entrances, stairways, courtyards or facades. As a result, communal spaces often became dilapidated and run down simply because they "didn't belong to anybody". No one felt responsible. Buildings collected a century of dirt and grime, and by the time Azerbaijan gained its independence 70 years later (1991), most buildings were in desperate need of a facelift, via sandblasting. Exterior facades cried out for a coat of paint.

With today's rise in land value, developers are buying up these old properties and demolishing them so they can profit on the limited premium space in downtown. Towers of 15-25 stories are replacing the old buildings that used to exceed no more than two, three, or at most, four floors.

As far as central planning was concerned during the Soviet period, beginning with Stalin's era (until mid-1950s), the center of power was transferred to Moscow, as were all decisions related to its Master Plan. This period was marked by the New Economic Plan (NEP) in the Soviet Union and the undertaking of major construction of numerous public buildings and infrastructure projects.[6]

The next major wave of construction (late 1950s to mid-1980s) is identified with Khrushchev and characterized by large-scale, massive housing projects, consisting of pre-fabricated, low-quality concrete buildings, typically nine stories high. Generally, the same typical floor plans were duplicated throughout the Soviet Union, without taking into consideration the local context, architecture or culture.

From the early 1980s until the collapse of the Soviet Union in late 1991, the Soviet bureaucracy, crippled by an economy that was nearly bankrupt, proved to be incapable of continuing its ambitious Socialist city planning and urban development projects. It could no longer maintain the existing buildings and aging infrastructure. Some experts suggest that the government's inability to maintain the infrastructure was one of the contributing factors that hastened the downfall of the Soviet Union. This collapse suddenly left 15 independent republics, including Azerbaijan, to fend for themselves and take on the responsibility of charting their own destinies.

BAKU TODAY

Obviously, Baku's reality today is quite different from that of the Soviet period. Market economy and private ownership both introduce a different complexity. Owning a car is no longer a luxury. In recent years, an estimated 12 new cars per day have been added to Baku's streets. Traditionally, it was men who drove. Today, many women sit behind the wheel.[7] A few years ago, it would have been quite exceptional for a family to own more than one vehicle but not so today.

Despite the enormous popularity of cars, Baku has not built a single street, highway, overpass or underpass, or developed any other means of modern transportation system during the past 15 years. In fact, many of the existing surface modes of road transportation, such as the electric trains and buses, have been retired. Today, new asphalt covers the old tracks. With the exception of a limited Metro system (two lines), there is no standard single transportation company, which operates what could be called a comprehensive transportation system that meets up to Western standards. There are, however, a great number of bus and mini bus services that operate throughout the city, which are both convenient and operate frequently. However, this mode of transportation cannot be said to be efficient or safe.

For example, there are no properly designated bus stops, which provide benches or seating facilities for passengers who must wait. There are no timetables, route maps and signage. Instead, these mini buses operate, more or less, on a spontaneous basis, picking up passengers and dropping them off seemingly anywhere.

There is no standard ticket system—for example, monthly passes with discounts for senior citizens, students and the disabled. Nor are there facilities to accommodate those who are handicapped to foster independent mobility throughout the city.

Many buses are not well maintained. During morning and evening rush hours, they tend to be overloaded, creating dangerous conditions for passengers, as well as other drivers. Accidents occur. Passengers have even been thrown out of moving vehicles and killed, because of malfunctioning locks on doors. There have even been occasions when people were thrown out when the doors were left open for ventilation.

CITY MASTER PLAN

These days, no city can develop successfully without a carefully deliberated City Master Plan; nor should it be allowed to. Such plans must be based on a series of thorough studies in relation to the actual rate of city growth. The Master Plan should offer solutions for the city's infrastructure in many spheres, including transportation, communication, utilities, housing, commercial activities, and public spaces.

The City Master Plan defines Zoning Ordinance requirements for various types of activities, in relationship to residential, commercial, public services, and industrial sectors. It determines and differentiates between the population densities for land use. It anticipates the complex needs of future growth and development. It is absolutely mandatory for every modern city to have a Master Plan as a blueprint for its current as well as future development. But when you look around Baku and see the chaotic urban development, it's clear there is no Master Plan.

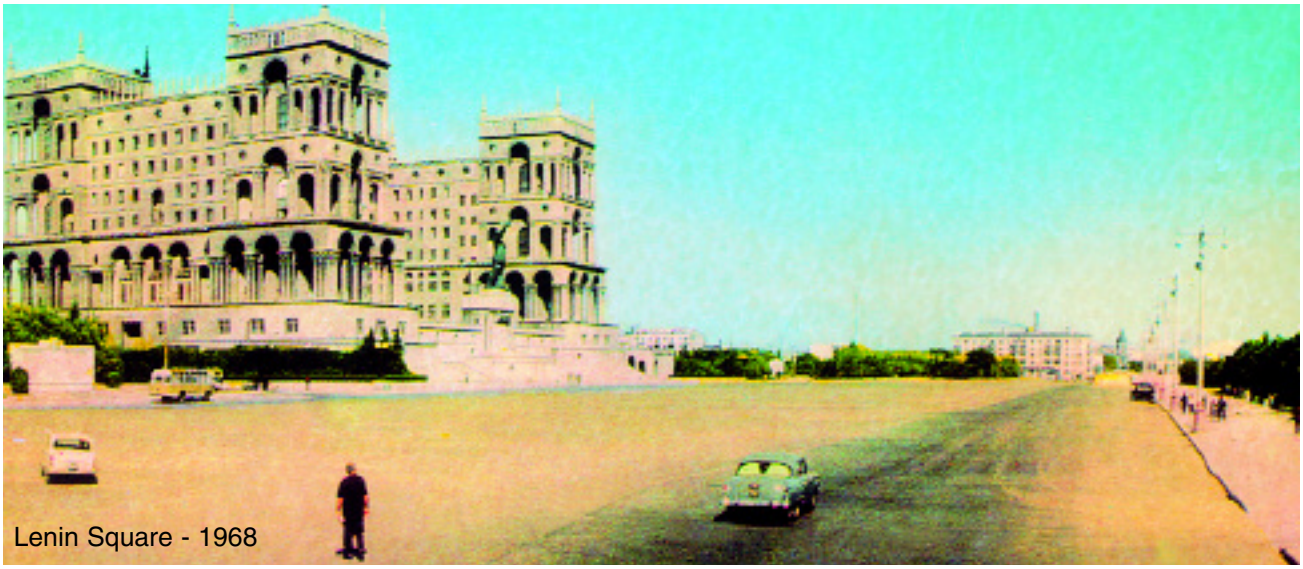
In 1994, a new stage in the development of the country was ushered in with the signing of the "Contract of the Century" for the development of Azerbaijan's largest oil reserves in the Caspian Basin. Western companies began to establish themselves in the capital, during the phenomenon that is often referred to as Baku's Second Oil Boom. But this time, the development has been much more rapid and on a much grander scale than the First Oil Boom that took place at the end of the 19th century.

Catapulted by a market economy, major commercial and residential projects have developed at an extraordinary pace. Construction and development have been so rapid that existing legislation, inherited from the Soviet past, has not been able to keep pace. This is especially true in terms of the municipal administrative bodies, city ordinances and the establishment of various active architectural and planning commissions and other crucial public services governing bodies.

GAS, POWER, WATER SHORTAGES

Existing public services and infrastructure, including roads, electricity network, water and gas supplies, and sewage systems are loaded far beyond the capacity for which they were designed. They are now on the brink of collapse. For the past 20 years, there has not been any major upgrade to these systems. These new towers place exponential demands on gas, water and power supplies. Electrical blackouts occur frequently, especially during winter. The drainage system can't even handle a single heavy rain without serious flooding in the streets.

There are frequent interruptions to water and gas supplies. Outages can last for hours, or even days. This is not to say that such shortages did not exist during the Soviet period. The truth is: they occurred quite frequently.[8] But it is inexcusable that nearly 15 years after independence, these problems have not been solved. The density of so many high-rise buildings in the center of the city merely exacerbates these problems.



POSTCARD

Lenin Square - 1968

KHANLOU

Azadlig (Freedom) Square - 1993

GURBANOV

Azadlig (Freedom) Square - 2005

DEPARTMENT OF BUILDING & SAFETY

Every modern city needs a Department of Building and Safety (DBS), which oversees and regulates all construction works. This municipal body implements all Building Codes (regulations) as well as all Planning and Zoning Ordinances. It also studies and evaluates all projects in relationship to the impact they will have on the environment. Its primary goal is to ensure the safety of its citizens.

This department provides services such as Plan Checking to ensure the correct implementation of building regulations and various city ordinances. It issues Building Permits and evaluates whether architectural and engineering drawings have been interpreted correctly via a rigorous inspection system that takes place on location during every stage of the construction process.

And where does Baku fit into the picture? Baku Municipality has what they call a Building Department, but there are enormous shortcomings in the way it functions. Building Codes that exist are based on old, out-dated Soviet criteria and those are not even effectively implemented when it comes to new construction.

Baku Municipality does not require an Initial Plan Check process for architectural and engineering drawings (structural, geological, electrical, mechanical, fire). In other major cities in the world, the Plan Check process is a long procedure between the architects and engineers employed by the owner and those employed by the city. But in Baku, construction documents are submitted only for bureaucratic and formality purposes. There is no process to check every detail suggested by the design to see if it is in compliance with the relevant National Building Code and various City Ordinances in order to grant a Building Permit.

Structural calculations are still based on old Soviet standards, which have not been updated for about 20 years. The last update took place after the devastating Armenian earthquake in 1988. Nor do these standards reflect new building technology and materials. Therefore, every structural engineer is left to reach his own conclusion for his projects.

Soil and geological tests, which are absolutely essential in calculating the structural requirements for the buildings foundations and footings, are rarely conducted. The City might argue that they do carry out building inspections upon completion of construction. But evaluating a building at the conclusion of the process does not enable them to check the functions that are covered in walls, floors and ceilings. How can the City really judge whether all structural, electrical, mechanical and plumbing features meet Code requirements if they are not inspected when they can be visibly studied. Building inspection should take place frequently during each of the many stages of construction to ensure that all stipulations and the building codes have been strictly followed. Inspections should be carried out at each stage of construction; otherwise, the durability and safety of buildings is seriously under question.

Another difficulty arises because many of the contractors who carry out most of building projects in Baku do not have an adequate knowledge of high standard building technology. Often there is serious lack of proper supervision on construction jobs to ensure good workmanship, especially given that many of the workers are inexperienced and have not been properly trained. The consequence is sloppy construction. It becomes evident the moment one steps inside some of these apartments. Walls are crooked; floors are not level. Some people are even beginning to crack jokes about Italy's Leaning Tower of Pisa.

EARTHQUAKES

Earthquakes are one of the most serious threats to construction in Baku. The entire region is situated in an active seismic zone. This becomes extremely problematic, given that many of Baku's high-rises have been erected with shoddy workmanship using substandard, low quality materials.

Baku's most recent earthquake occurred in November 2000.[9] Two strong tremors followed one after another. According to the U.S. Geological Survey (USGS), the foreshock measured 5.9 on the Richter scale and was followed minutes later by a massive quake registering 6.3. Such a force is equivalent to an explosion of 30,000 tons of dynamite or a 30-kiloton nuclear bomb. The epicenter of the quake, fortunately, was not on land, but rather offshore in the Caspian Sea 100 km (62 miles) northeast of the capital.

As could be expected, deaths resulted—at least 35. The majority of victims lost their lives from falling masonry and rubble. Gas explosions killed some people. A few died of heart attacks.

In reality, Baku was rather fortunate, given that so much of the construction throughout the city is based upon masonry. However, one must keep in mind that in the year 2000 very few towers had been erected and the epicenter was a considerable distance from the capital, deep within the sea. Baku was lucky this time but who can be sure that nature won't be much more cruel the next time around?

It's not just Azerbaijan that is prone to earthquakes. The entire region is subject to seismic activity. In 1988, neighboring Armenia experienced a devastating 6.9 earthquake in Spitak, a city north of Yerevan. The entire population of the city—25,000 people—is said to have lost their lives. The scale of the destruction was blamed on substandard infrastructure, prompting Soviet authorities to forbid any future buildings to be constructed higher than five stories.

In August 1999, Istanbul was hit with an earthquake of 7.4 magnitude. The Turkish President deemed it the worst natural disaster in Turkish history. Official Turkish government statistics list 17,127 deaths, 43,953 injuries and an estimated 250,000 residents who lost their homes. Poor workmanship was faulted as well as lack of quality control in the use of structural materials—problems, which could have been avoided if the buildings had been carefully inspected during the construction process.

In December 2003, an earthquake of 6.6 magnitude flattened the city of Bam, Iran. An estimated 43,000 people were killed and 20,000 injured. More than 60,000 residents were left homeless. Essentially the city was wiped out. Mud brick was the primary building material—the most susceptible of all in earthquakes.

While this article was being written, yet an even more ruinous quake took place in the Kashmir region between Pakistan and India in October 2005, claiming at least 75,000 lives, and displacing an estimated 3 million people. Again, the devastation could be traced to masonry construction.

These examples, describing how fatal and devastating earthquakes have been in the region, illustrate how imperative it is for authorities to address these issues. To ignore these problems imperils the lives of those who make Baku their home.

CONCRETE IN CONSTRUCTION

The use of mud brick and masonry in construction is categorically the No. 1 Killer during earthquakes. However, faulty concrete construction follows close behind. Being relatively cheap, concrete is naturally very popular in areas that don't have access to forests, timber or other industrial building materials. It is the primary means of construction for high rises in Baku. During the preparation of concrete, there are several practices that must be carried out very carefully so as not to

Right page: Traffic jams are part of the chaos which occurs all day long in Baku, whether it is rush hour or not. Busy streets mean more dangerous situations for pedestrians, more dirt, higher levels of air pollution, as well as excessive noise that comes with frustrated drivers impatiently honking their horns. This photo shows typical chaotic traffic on Istiglaliyyat (Independence) Avenue in front of Baku Sovet (City Hall).

ELMAN GURBANOV

PIROUZ KHANLOU

The construction explosion in downtown Baku creates extremely high density. Since there has not been adequate Urban Planning strategy, the infrastructure is vastly overburdened. October 2005.

undermine the strength of concrete and make buildings especially vulnerable to earthquakes. Unfortunately, Baku builders are often negligent with these tasks.

FAILURE TO "CURE" CONCRETE

Concrete must be poured when climatic conditions are neither too hot, too cold, too dry or too windy. Any of these conditions will cause the concrete to crack. In Baku the greatest concern is heat and wind. In such conditions, extreme care must be taken to cover the concrete to keep it moist and allow it to dry slowly—a process known as "curing". In hot weather—above 30C (86F)—or during high winds and low humidity, concrete can dry out easily. Particular care needs to be taken during the curing process.

This past summer, for example, temperatures often exceeded 40C (104 F). Yet many workers at construction sites kept on pouring concrete without curing it, and then they moved right on to the next level of construction before the lower level had a chance to dry adequately. Concrete must be cured properly in order to increase its strength, durability, water tightness, and resistance to wear.

DILUTING CONCRETE WITH WATER

The strength of concrete is determined by its ratio of sand, cement and aggregate to water. This becomes a critical issue in Baku when concrete must be pumped to the higher floors. Many contractors unscrupulously cut costs by diluting the concrete with additional water to make it thinner which makes it easier to pump to the higher elevations. Additional pumps should be used to provide the power to lift the heavy cement. Unfortunately, diluting the concrete causes the segregation of its components and severely compromises the strength of the concrete—a guarantee for disaster in earthquake regions.

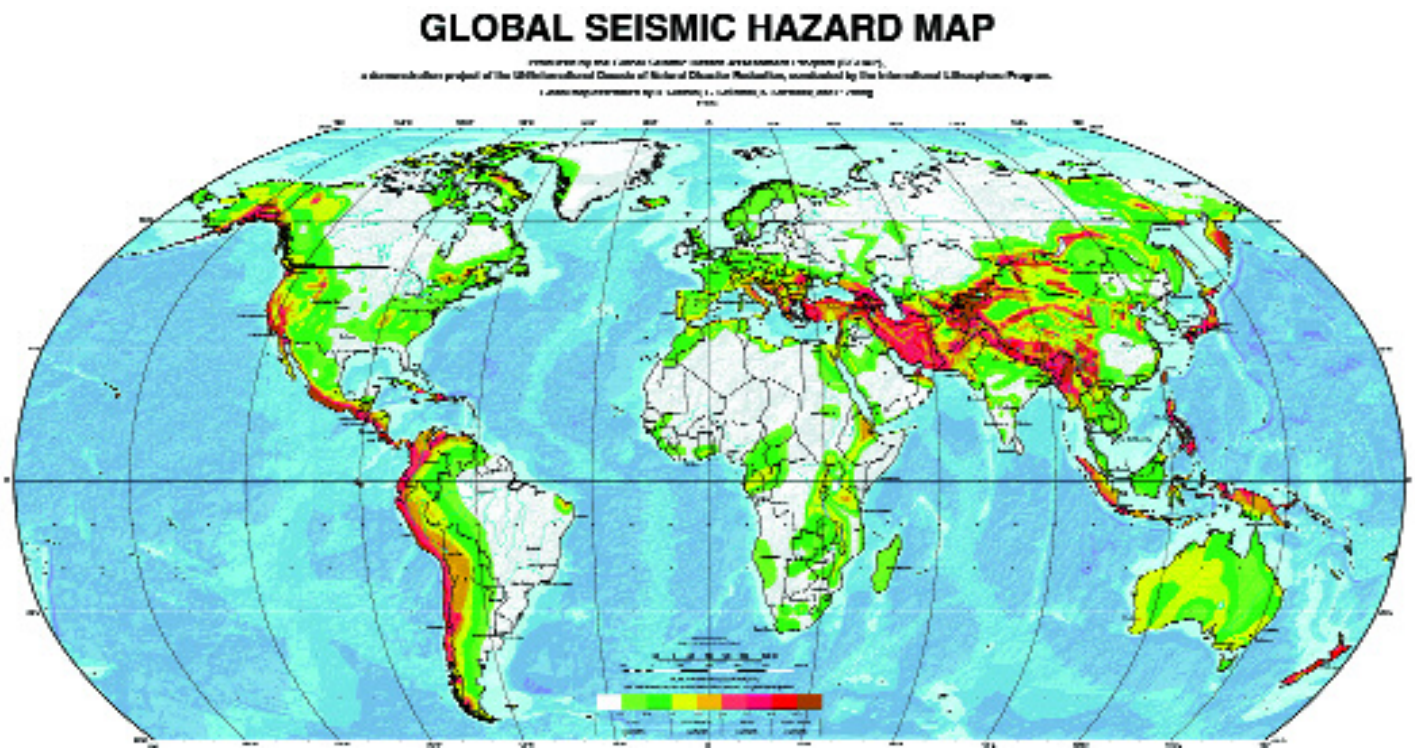
VIBRATION PROCESS

The correct use of vibrators is necessary in order to eliminate air pockets that may occur in the process of mixing concrete; otherwise, air pockets will remain in the construction of concrete beams, columns and slabs exposing the steel rebars. Again, this process weakens the concrete.

FAILING TO TEST CONCRETE

During the construction process, it is necessary to constantly monitor the strength of concrete. Concrete cubes should be made from the same ready-mixed concrete that is being used in the building. A test, known as "crash testing", is carried out in a laboratory to determine strength of the concrete. Unfortunately, many construction sites in Baku do not conduct such tests and, therefore, do not actually know the quality and strength of the concrete they are using. Since there is no official National Azerbaijani Standardization entity to determine the basic standards for the quality of construction materials such as cement and steel, low quality sub-standard grades and even defective materials are being dumped on the market in Azerbaijan. Some of these products are being manufactured within the country, others are imported.

Garadagh Cement, a Swiss-Azerbaijani joint venture, is extremely concerned about the quality of cement being used in construction throughout the country. At a press conference on October 4, 2005,



UNHAZARD ASSESSMENT PROGRAM IMAGE: COURTESY: ANDREW ALDEN AT: GEOLOGY.ABOUT.COM.

The World Global Seismic Hazard Map is a triumph of science, as the whole world has been mapped in terms of its earthquake hazard. The resulting map is the Global Seismic Hazard Assessment Project (GSHAP) to which 500 scientists contributed over a period of seven years.

Chairman of the Board Uve Kohler warned about serious problems in the building sector in Azerbaijan and predicted that most of newly constructed buildings would collapse in an earthquake—even of weak magnitude.

While Kohler vouched for the integrity of the Garadagh cement, he claimed that 50,000 tons of defective cement are being sold and used in construction in Azerbaijan on an annual basis.

SOIL AND GEOLOGICAL REPORTS

In earthquake prone regions, soil and geological reports must be conducted and seriously studied prior to doing any structural design and calculations. This is critically important in the preparation of the foundations and footings in buildings. Problems occur when soils of certain consistencies "liquefy" when the ground shakes, causing buildings to collapse—especially those with small footprints. Unfortunately, many developers do not bother to carry out soil and geological testing. Again, this is a recipe for disaster.

Not only are towers at risk, many of the older buildings that stand within their shadows, would be in jeopardy should any high rise building collapse above them. Although these lower buildings may have survived during moderate earthquakes in the past, today they may be at risk, not through any negligence of their own.

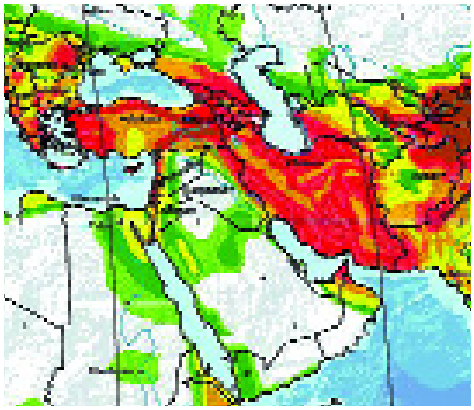
LANDSLIDES

Some areas in Baku—especially near the coast—do not have stable soil and geological conditions, making them prone to landslides. This is another reason why scientific analysis should be mandatory prior to any construction. There have been several recent devastating landslides that resulted in widespread destruction and even death. In the spring of 2000, a vast expanse of hillside in the south of the city, above the highway leading out of the city towards the Bayil district gave way to a massive land slide. More than 70 houses and shops were completely destroyed.

Another serious settlement took place in 2004 as a result of faulty engineering of a high-rise project under construction. Wide cracks suddenly appeared in the asphalt in the road north of the Cabinet of Ministers. Developers had not properly built a retaining wall. Residents from nearby apartments had to be evacuated and the avenue was closed for six months. This resulted in the closure of one of the main thoroughfares between the north and south ends of the city and further congested traffic in other parts of the city.

SAFETY GLASS

Glass is one of the most prominent features of these high-rise towers. However, even in a mild earthquake,



This map insert shows that Azerbaijan and neighboring countries, such as Iran, Turkey, Armenia and Georgia, are situated in one of the most seismically active zones in the world according to the World Global Seismic Hazard Map organized by the United Nations.

glass could instantly shatter, flying through the air—like thousands of daggers. Residents inside the apartments would be at risk, as would those living in adjacent low-rise buildings and pedestrians and passengers in cars in the streets below.

Tempered (toughened) glass drastically reduces such risk. When tempered glass breaks (and it certainly could even in an quake of low magnitude), it shatters into many small, cube-like pieces that are relatively harmless.

Another type of safety glass, known as laminated glass, has a transparent plastic sheeting sandwiched

BLAIR

Ornate stone carving on the facade of the Mitronoff Residence built during Baku's Oil Boom at the beginning of the 20th century. Buildings of that period are often highly decorative, inside and out. Many such buildings are being demolished and replaced with skyrise towers.

inside the glass. This prevents the glass from shattering and flying out. Unfortunately, it is extremely rare for contractors in Baku to use any of these types of manufactured safety glass in construction.

FIRES

In many parts of the world, the greatest damage from earthquakes comes from fires caused by gas explosions when gas mains or pipes break. California Building Code addresses this issue by requiring every building, old or new, to be equipped with automatic shut-off gas valves. This simple and relatively cheap device (less than $50) can prevent catastrophic fires and loss of life. Such basic equipment is not even known in Azerbaijan!

But if a fire were to break out in most of these towers, few of them are equipped to handle them. Most towers do not meet Western Standard Fire Codes. Many lack standard code fire alarm systems and don't offer sufficient fire emergency escape routes. Few have back-up, battery-operated emergency lighting to indicate where the exits are should the electricity suddenly be cut off.

Few buildings have been constructed using fire-rated materials of low combustibility, which retard the spread of fire. In addition, many buildings have used electrical systems manufactured from substandard cheap materials, which have no certified code approval from any recognized standard authority. Therefore, their safety value is not known and may not be reliable.

Then there is the question of the capability of the city even to fight fires successfully. When fires break out, traffic is likely to impede emergency vehicles from arriving at the scene of the fire in those first critical moments. In 1996, the British government donated fire-fighting equipment to Azerbaijan—80 Green Goddesses[10] (as the green fire trucks are called in the UK). These vehicles provided twice the pumping capacity of any fire equipment that existed in Azerbaijan at the time.

Intensive courses were provided so that Azerbaijani firefighters could train on the new equipment. But the current status of maintenance and training is not known. In addition, there were no high-rise towers in Baku a decade ago and so the question remains whether the existing fire fighting equipment could extinguish a fire that breaks out on the top floors of these 15-25 story buildings.

SHORT-TERM SOLUTIONS

The problems related to construction and development in Baku are so complex that they cannot be resolved quickly. It will take years of hard work and determination to rectify these problems. However, the current situation cannot be ignored. It is so critical and so dangerous that it requires immediate attention.

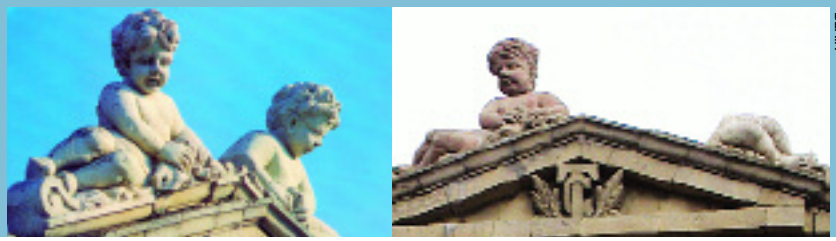
The best strategy would be to identify both short-term as well long-term solutions. Temporary stopgap measures would give the city a chance to "buy some time" during the transitional period to more permanent fundamental solutions. Here are a few preliminary steps that could be implemented quickly without considerable investment of time or money. Even these small steps could profoundly impact the city in a significant way.

1. HALT CONSTRUCTION PROJECTS

The first major step—fundamental to all decisions—would be to immediately freeze all construction projects on a temporary basis. No Building Permits should be issued at this time. Such a decision might seem radical, but it would be the best way to seriously begin to address construction issues to minimize future catastrophes and loss of life.

2. CONSERVATION AND RESTORATION COMMISSION

Baku desperately needs an active Commission for the Conservation and Restoration of the Architectural Heritage of the city. Some might argue that such a commission already exists, but if it were truly functioning as it



BLAIR

should, the demolition of these 100-year-old, well designed, well constructed buildings of irreplaceable charm that date back to the Oil Baron period (1880-1920) would not be taking place. It's quite tragic that there are no ordinances to protect these buildings from the sledgehammer and wrecking ball. And thus, we are eyewitnesses to the deplorable loss of some of the finest architectural examples that Baku will ever know. In reality, the cityscape that defined central Baku as Baku for the past century is fast disappearing.

Such a commission should study each building of that era, as well as those few that still exist from earlier periods, and commit to their conservation and restoration. Some of Europe's major cities, which survived the extensive carpet bombing of Europe during World War II—Prague, Budapest and Vienna—have grappled with such issues, and have adopted ordinances that forbid the destruction of buildings of specific historical periods.

If Baku does not act quickly, the unique legacy of the city's architectural heritage will exist only as a stack of old faded photos stashed away in a drawer of an aging historian. It would be such an enormous aesthetic loss to the city—the tragic consequence of unwise decisions in an era, marked primarily by greed.

AGHAYEVA

November 2000. Consequences of the earthquake in Baku which registered 5.9 on the Richter Scale.
Top Corner: During the earthquake, one of the Twins on the pediment of a building dating back to Oil Baron times in the Pasaj fell to the street below. Above: Multi-storied building on Azerbaijan Avenue across from the Museum Center collapsed. Masonry is the most hazardous construction techique in seismic conditions.

3. CREATE RESPONSIBLE COMMISSIONS

An independent Architectural and Engineering Commission should be created, which would provide the ultimate authority to oversee all building practices and have both legal and executive power to recommend and implement the following changes:

4. BUILDING CODES

The process of writing comprehensive National Building Codes specific to Azerbaijan would be a very involved and complex process. In the mean time, a stopgap measure could be to temporarily adopt Building Codes that have been implemented in other seismic-prone locations, such as Los Angeles, San Francisco, Tokyo or Mexico City.

5. ASSESS ALL TOWERS

Evaluation should be made of all multi-story structures that have been built in last decade. Engineering inspections and tests should be made to ascertain if the buildings are in compliance with the newly adapted Building Codes in terms of both architectural and structural design. Highest priority should be placed on determining whether the buildings conform to structural integrity in relationship to Baku's seismic conditions.

Buildings that are not found to be in compliance should be evaluated as to whether they can be upgraded or retrofitted to make them safe. Buildings that are determined to be unsafe and which cannot be salvaged should be condemned. A compensation package should be worked out between the City municipality and the owners. Negligence and irresponsibility on the part of both city and developer should be taken into consideration.

6. FIRE COMPLIANCE

Compliance for fire and electro-mechanical systems, especially emergency fire exits, fire alarm systems and safe electrical systems should be required. Buildings which do not meet these standards should be retrofitted accordingly.

7. SAFETY GLASS

Very few towers have installed safety glass—either tempered or laminated—in their windows. This safety feature is absolutely crucial to reduce risk of broken glass. Since replacing all the glass in a building would be very costly, an effective compromise would be to apply a self-adhesive transparent safety film to all existing glass. Lamination of safety film prevents glass from shattering when it breaks and can save lives. In future buildings, the Building Code should mandate that tempered or laminated glass be used.

8. PARKING

Parking requirements for each building should be established per unit. For example, in the U.S., the Building Code stipulates two parking spaces for each apartment. In Azerbaijan, minimally one parking space should be designated for each unit. To date, the majority of new residential towers do not allocate sufficient parking. Some totally ignore the issue and have not provided any parking spaces at all. Others provide a few spaces and sell them to owners at premium costs of $15,000 to $30,000 per parking space. Buildings should be required to resolve this problem by exploring the possibility of creating surface parking spaces on their sites or converting some of their lower floors to parking levels.

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A frequent practice in Baku is to build a fence around the construction site that protrudes far out into the street (see top corner on right hand page and photo above). This obstructs public space and creates enormous traffic congestion. Techniques and methods exist for handling tight urban sites which do not intrude into public space but yet ensure the safety of pedestrians and the flow of traffic.

9. TRAFFIC

In regard to Baku's congested traffic, a comprehensive Transportation and Traffic Engineering Feasibility Study should be carried out, not on its own, but in conjunction with a City Master Planning and an Infrastructure Development Plan. In the meantime, some temporary solutions could be implemented to ease traffic bottlenecks. Many rules governing current traffic pattern flow are left over from the bygone Soviet era. The reality of a market economy makes them outmoded, obsolete and extremely impractical. For example, traffic rules forbid "left hand turns" and "'u' turns". Coupled with the fact that many streets are designated for "one-way" traffic, drivers often have to drive far out of their way to reach their destination.

This leads to redundant traffic movement. It wastes valuable time, consumes excessive fuel which is expensive, and leads to unnecessary traffic snarls—all of which further pollute the environment. Traffic flow should be studied. More flexible and practical traffic patterns should be implemented to alleviate these situations.

Traffic patterns should also be identified during peak periods, both on a daily basis as well as on weekends. Plans should be tailored to alleviate problem areas. For example, in Los Angeles, traffic police have recently been assigned to busy street intersections during rush hour to facilitate traffic flow. The mere physical presence of an authority directing traffic at those busy locations helps to speed up traffic, alleviate blocked intersections and other difficulties. In some cities, car lanes are reversed during heavy traffic periods to provide additional flow of traffic in a specific direction as needed.

10. STREET PARKING

One of the primary causes of the city's congestion is the manner in which drivers park their cars.

Vehicles are parked anywhere and in any direction: they're parked double and even triple, perpendicular or at angles to the curb, and even facing the opposite direction on one-way streets. These practices are viewed as the norm since no planned or regulated street parking exists.

Parking spaces should be designated properly and the road painted to help drivers become more compliant to standard, predictable parking. In the city center and commercial areas, parking meters should be installed. Presently, Baku has no parking meters at all. Meters could provide a steady source of revenue for the city and could help regulate parking and facilitate traffic flow.

11. RETRAINING TRAFFIC POLICE

Traffic police should be trained to take an active role in helping alleviate congestion and in facilitating the flow of traffic. It's not uncommon for

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police to turn a blind eye to drivers going the wrong direction on one-way streets or when they double or triple park. These infringements are accepted as the norm, rather than as serious aberrations to the obstruction of public space and traffic flow.

Training should emphasize how to increase traffic flow and ease the situation brought on by Baku's crowded streets. It often turns out that the traffic police themselves are the cause of traffic jams because of the way they mishandle the traffic situation, adding more anarchy to confused situations.

12. CONSTRUCTION SITES

Construction sites should not be permitted to invade half of the street, setting up construction fences that protrude half way out into on-coming lanes of traffic. Currently, this is accepted as normal even though the duration of construction may last for several years. This practice should be stopped and not allowed as it obstructs public space.

13. GOOD TRAFFIC SIGNAGE

Clearly designated traffic signs that are based on standard international traffic symbols and standard international sizes should be erected in places that offer high visibility. Drivers should be informed well enough in advance so that they can respond quickly and appropriately to important regulations such as "One Way", "Stop", "Yield", "Do Not Enter", etc.

14. INTERSECTIONS

One of the major causes of traffic jams occurs when cars get stuck in intersections. Many countries forbid cars from entering street intersections unless the driver can successfully pass through to the other side. In the UK, this is known as the "Yellow Box Rule" because yellow lines are painted in the forbidden intersection area. Drivers are ticketed if they break this rule should they get stuck when the light turns red, as this interferes with the normal traffic flow from the intersecting street.

15. RETIREMENT OF CARS

Many major cities throughout the world insist on a retirement program for old vehicles. This helps to regulate the number of cars on the highway. Such a plan should be explored in Azerbaijan. A systematic car retirement program not only would eliminate old worn-out cars but it would help to reduce traffic congestion and cut down on pollution.

BLAIR

Heavy limestone blocks are commonly used as construction material in Baku as a substitute for lighter weight bricks or blocks (see blocks in the wall partitions in the high rise). The use of limestone blocks is extremely dangerous under seismic conditions. The abrupt lateral force of an earthquake will cause any wall without steel rebar reinforcement to collapse. This is the most common cause of death in earthquakes zones.

16. FUNERAL TENTS

Funeral tents that are erected in the middle of streets also cause serious traffic problems. Roads that are accessible in the morning are often blocked in the afternoon. Terrible traffic jams result.

Funeral tents provide a venue for friends and family members to gather and share their grief and condolences. The tradition is very valuable in society. Such activities would normally be held inside homes if they were large enough to accommodate all the guests.

But the time has come to examine whether the tents that are erected at the doorstep of residential buildings every time a resident dies is the most effective way to carry on this tradition.

There are several reasons why alternatives should be sought. First of all, there have been several occasions when speeding cars have accidentally driven into the tents and injured and even killed people.

Secondly, with so many towers being erected in the center of the city, the population is more highly concentrated. Proportionately there will be more deaths occurring per square mile. It will become very impractical always to erect tents whenever someone dies.

Just as weddings are now organized in specifically designated restaurants, perhaps the time has come to explore the possibility of certain halls being used on the occasion of funerals. Funeral tents obstruct public space and should no longer be permitted.

17. PUBLIC SERVICE MESSAGES

The media could provide an incredibly effective tool for educating the general population. Public service messages should be created and presented on TV, radio and newspapers to emphasize safe driving practices such as the use of safety straps, the importance of not blocking intersections, consequences of double parking, hazards of changing lanes without indicating with blinkers, the importance of crossing the street only at intersections,

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Top: Bakikhanov Bridge near the Hyatt Hotel passes over Tbilisi Avenue.
Above: Baghirov Railway Bridge (underpass) on Heydar Aliyev Avenue (formerly Moscow Avenue) on the route toward the airport. This underpass was built in 1953 because Mir Jafar Baghirov, First Secretary of Communist Party and Stalin's right-hand man in Azerbaijan, got stuck waiting for a train to pass while he was rushing to the airport. Baku has fewer than half a dozen overpasses and underpasses. Bridges are essential for facilitating traffic flow.

the necessity of pulling over to the side of the road and stopping to let emergency vehicles pass, etc. The widespread repetition of public announcements would go a long way to educate the general public, raise safety standards and facilitate traffic flow.

LONG-TERM SOLUTIONS

After short-gap measures are put in place, more thorough studies should be carried out and fundamental long-term plans should be implemented.

Fundamental reforms and changes are needed to Azerbaijan's municipality to make it an effective governing body. Presently, the mayoral position is an appointed post and there is no Advisory City Council to support the immense job of governing the city. No doubt these are national political issues that must be decided on a governmental level. Establishing a system of accountability of officials is critical to the efficient administration of any city.

Departments in the mayor's office relate to architecture, planning, engineering, public works and building construction. However, the guidelines under which they work continue to be based on outmoded Soviet models and Soviet styles of management. Baku needs modern, well-trained managers, administrators, engineers and architects to lead the city. It is a well-known fact that corruption runs rampant throughout all levels of City management. Such a situation precludes the ability of the City to function with integrity and leaves the entire population exposed and at enormous risk because safeguards in the building process have not been followed. The following suggestions could lead to strengthening these governmental entities.

1. BUILDING AND SAFETY DEPARTMENT (B&SD)

The current crisis within the City provides ample proof that Baku's Building and Safety Department does not function well. No city can develop unless such responsibilities are assigned to an integral part of the governing infrastructure and are strictly adhered to and followed.

It is the Building and Safety Department, which must take on the responsibility of issuing Building Permits and in providing controls, related to the safety and compliance of all construction. It is their responsibility to enforce building regulations through a system of Plan Checks and Inspections at every major step of the construction process.

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In essence, such a vital department does not exist in Baku today. A Building and Safety Department should be created that truly functions in this capacity. The key to its success would be in hiring recently trained technical staff, who are both knowledgeable and conscientious. Perhaps their training could take place in one of the major cities such as Los Angeles or San Francisco, which deals with seismic conditions similar to Baku's. Such possibilities should be explored.

2. MASTER PLAN

Baku needs a modern Master Plan like every other well-functioning cosmopolitan center. The Master Plan should be designed to provide guidelines and a working basis for the city's present requirements, as well as its future needs and development. During this past decade, Baku's existing Master Plan has neither been adhered to, nor has it been updated to reflect the reality of an independent nation based on an entrepreneurial market economy.

Construction and development activities that are currently being implemented have not followed the existing Master Plan. For example, even public parks and open public spaces are being privatized and built up by private developers! Zoning Ordinances have completely been ignored which regulate and deal with issues such as urban densities, building heights, and the land use of residential, commercial, public buildings, industrial areas, parks and green zones.

A carefully thought-out Master Plan would provide direction so that the city could make critical decisions that benefit the population as a whole. The most efficient way to create a Master Plan would be to create a commission, comprised of expert consultants in Architecture and Planning Engineering from the private international sector. Such professionals should be chosen who could bring considerable experience and expertise to this complex task.

Model cities should be studied. For example, the city of Dubai (United Arab Emirates) is an excellent example of how a rather simple, small city has been transformed into an incredibly sophisticated and dynamic international cosmopolitan within less than 30 years. China is another example of a country, which is undergoing major urban development and is in the process of total transformation. In the process, China has hired some of the world's top experts in the fields of architecture, planning and engineering.

3. BUILDING CODES (REGULATIONS)

Azerbaijan desperately needs to adapt modern National Building Codes, which would satisfy contemporary needs. A commission consisting of well-trained and experienced architects, planners and engineers should be created and new Azerbaijani Building Codes should be formulated.

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Top: Ceremonial funeral tents are often erected in the narrow streets in front of the apartment buildings of the deceased. Such practices are viewed as normal despite the fact that traffic may be obstructed from one to three days. Since Baku is becoming so densely populated, this tradition could be carried out in designated halls inside buildings which could accomodate such crowds.

Above: Parking–double, triple, angular, irregular or "anyway you can"–is one of the primary causes of traffic jams in Baku. Such parking is so commonly an accepted practice that it even goes unnoticed and unticketed by the traffic police. The Baku Municipality has not yet designated parking spaces on the streets or introduced parking meters–both of which would help establish some order to this chaotic situation.

In this regard, it's not necessary for Azerbaijan to "reinvent the wheel". Azerbaijan can draw upon the global achievements in architecture, planning, engineering, as well as the building and construction industry. Building Codes could be studied and evaluated that have been successfully implemented in other exemplary modern cities throughout the world, especially those which mirror seismic conditions similar to Azerbaijan's.

For example, the California chapter of Uniform Building Code (UBC) could provide a basic model since it already addresses serious seismic conditions. Then these regulations could be modified to take into account specific variances and differences in Azerbaijan, which relate to architectural style, culture, climatic and environmental factors.

4. NATIONAL STANDARDIZATION

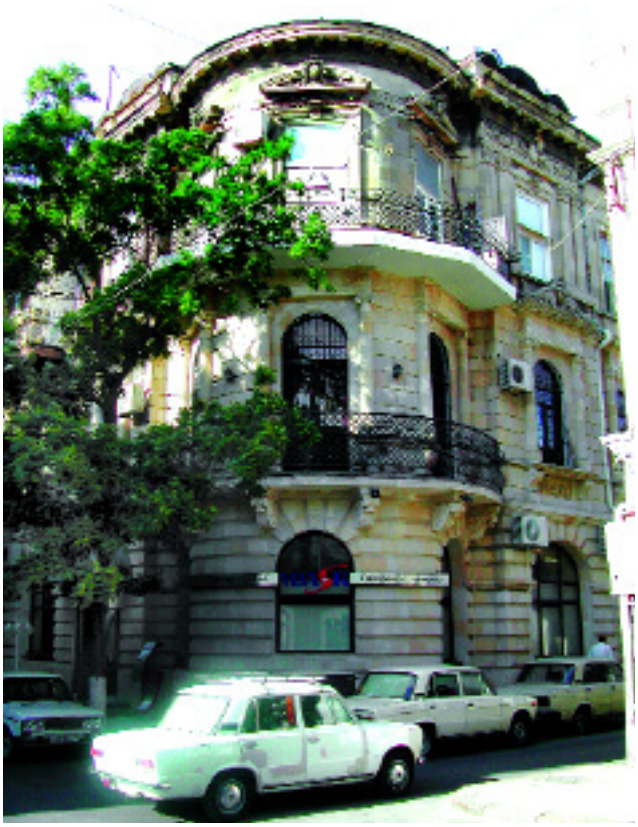
There is an urgent need to establish a National Institute of Standardization in Azerbaijan. Such an institute would be responsible for the regulation of every product that is marketed in the country, whether it be produced locally or imported from abroad. Every product would require the Institute's certificate ascertaining that it had met the required criteria for quality and safety. Building materials such as cement, steel and glass would need licensed approval from this Institute.

This nationally recognized agency would test all products in its departmental labs in every field from pharmaceuticals to building materials and electrical appliances to ensure that each product fulfilled its stated function and met safety requirements. Such an authority would seek to prevent unsafe, substandard goods from being dumped on the market in Azerbaijan.

5. AESTHETICS

Many of the newly designed buildings lack from good architectural design, especially in terms of the massing (forms and proportions) of buildings. In addition, there are situations when the design bears no relationship to its cultural or architectural context. Buildings are often finished with cheap, low quality materials such as stucco claddings painted in a range of bizarre colors. This results in a strange cluster of eclectic buildings, which offer no sense of unity and cohesion in relationship to their context. Given Baku's rich architectural heritage, this is extremely unfortunate and disappointing.

An effective, well qualified Architectural and Planning Commission could help to remedy this problem and raise the level of aesthetics in building design throughout the city. Such a commission would have the responsibility of approving each project at the initial stage of every project, and of organizing public



BLAIR

Fortunately, some of Baku's early 20th century residential buildings are being restored. A Commission for the Preservation and Restoration of Baku's Architectural Heritage should be established that actively functions to preserve these fine buildings.

hearings to which the community would be invited. This commission could even draw attention to some of the existing towers and recommend re-design or "face lifts" for those, which have become an embarrassment to the city's appearance. Sometimes major visual improvements can be achieved with minimal changes and expense. For example, merely repainting the facade or re-applying higher quality cladding materials can often transform a bad design into one that is acceptable.

6. PARKING

Baku's traffic problem will never be completely resolved until parking requirements for new buildings are enforced. Building Codes should stipulate the minimum parking requirement that each building must provide. For example, in the US, the Uniform Building Code (UBC) requires two covered parking spaces per single-family dwelling. The same requirement is applicable for multi-unit apartments. Additional parking is also calculated for Visitor and Handicapped Parking. Generally, office buildings require three parking spaces per 100 square meters, and three to five spaces are mandatory per 100 square meters of retail commercial buildings.

But this does not solve the parking dilemma for hundreds of buildings that have already been erected, whose developers did not provide parking for their residents and clients. For these situations, the city should construct public parking structures in the city center, funded by those building towers, which did not make adequate plans for parking. Residents could rent long-term, permanent parking spaces and thus provide additional revenue for administering the city.

Once sufficient public parking spaces were provided throughout the city, designating "Restrictive or Limited Drive Zones" in the city center or applying "Congestion Fees" for private cars could also alleviate heavy traffic in the center of town.

Such cities as London and New York have recently implemented these practices and begun charging tolls when cars are driven into certain districts of the city. Cities are discovering that, indeed, such practices really do cut down on the complications brought on by ever-worsening traffic and pollution. There are many advantages: traffic is reduced, speed is increased, noise level is decreased and pollution reduced. At the same time, funds are raised to help sustain the administration for the city.

7. TRAFFIC FEASIBILITY STUDIES

A comprehensive Transportation and Traffic Engineering Feasibility Study should be conducted. A traffic engineering consultant company with broad international experience and expertise should be hired to tackle such a large-scale project.

The study should seek to find solutions to facilitate the flow of traffic, recommend efficient methods of connecting various districts of city, propose various modes of connectivity via highways, freeways, connector bridges, underpasses and overpasses. Also it should explore

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Footnotes

1. "The Terrifying Escape: Eye Witness Accounts of Baku's Metro Accident" by Chris Cannon. AI 3.4 (Winter 1995).
2. "Baku's Metro Accident: A Challenge to Strategize" by Pirouz Khanlou and Elisabeth Atwell. AI 3.4 (Winter 1995).
3. "The First Car in Baku" by Manaf Suleymanov. AI 7.3 (Autumn 1999).
4. "Water: Not a Drop to Drink. How Baku Got Its Water. The British Link—William H. Lindley" by Dr. Ryszard Zelichowski. AI 10.2 (Summer 2002).

   Also: "Building Infrastructure: Taghiyev's Commitment to the Water Problem" by Manaf Suleymanov. AI 10.2 (Summer 2002).

   "Baku's Search for Water: A Brief Chronology" by Mammad Mammadov. AI 10.2 (Summer 2002).
5. "Architecture: Prominent Oil Baron Mansions. A Glimpse Inside" by Betty Blair and Dr. Farid Alakbarli. AI 13.2 (Summer 2005).
6. "The Metamorphosis of Architecture and Urban Development in Azerbaijan" by Pirouz Khanlou. AI 6.4 (Winter 1998).
7. "Women Drivers: 'Hey Dragon! Need a Driver?'" by Arzu Aghayeva. AI 11.4 (Winter 2003).
8. "Perennial Water Shortages in Baku" by Betty Blair. AI 2.3 (Autumn 1994).
9. "Earthquake Rocks Azerbaijan". AI 8.4 (Winter 2000).
10. "'Green Goddesses' to the Rescue", SOCAR Section. AI 4.3 (Autumn 1996).

KHANLOU

An example of one of the new Metro Liner bus stops in Los Angeles which offers an excellent example of a new public transportation system. Its design incorporates safety, efficiency, comfort and aesthetics. The pavilion provides shelter, illumination, route map, automatic ticket machine, computerized display screen indicating the arrival of next bus, audio announcement system, seating, public telephone and several trash cans.

the possibility of building inner or outer Ring Roads around the city.

Ring Roads are deliberately designed to bypass city centers. They detour vehicular traffic so that it doesn't have to go through the city center to reach its destination. Historically, this is still an opportune time for the Azerbaijani government to undertake the construction of Ring Roads, as much of the land still belongs to the government from the Soviet period and has not yet been privatized.

Baku has three distinct city districts that have been built in concentric rings from the center. The inner core consists of the Old City (Ichari Shahar), dating back to medieval times. The second ring was developed during the Oil Boom period (European architecture of the late 19th and early 20th century). The third, or outer ring consists of those parts of the city that were developed during the Soviet period. Generally called "micro regions", they consist primarily of massive housing projects.

These Ring Roads could first be built in the micro regions. The first Ring Road could connect the district of Ahmadli in the east to Micro Region No. 9 in the west. These Ring Roads could be freeways with limited entrances and exits so traffic could move quickly. In the future, another Ring Road might be considered even further out on the periphery.

The feasibility study should also evaluate existing public transportation systems and recommend new means of transportation according to both the city's present as well as its future needs.

CONCLUSION

Growth and development are inevitable and denote progress, but they need to be regulated and structured, following a careful scientific approach, which is governed by rules of urban planning and design. Baku has a unique history. The discovery of oil transformed the sleepy little mid-19th century town into a sophisticated cosmopolitan center within less than 40 years (1880-1918). Early industrialists and authorities had the wisdom and vision to understand the limitations of their technological competence. That's why they invited experts—some of the best architects and engineers that Europe could offer—to help them develop a sophisticated and elegant city, and to seek solutions to the problems that they didn't have experience and know-how to handle themselves.

Unfortunately, today's reality is quite different. The new Oil Boomers have not followed the judicious path of their ancestors. The present state of affairs bears witness to their negligence.

It's easy to point fingers, placing blame on the present-day municipal leaders, but this will not resolve the issues that Baku faces today. Practical and constructive solutions must be found. A serious disaster in a country as small and fragile as Azerbaijan could bring the country to a halt, resulting in incalculable loss and suffering and making recovery virtually impossible.

Officials and "nouveau riche" developers of this country can fool themselves as much as they want. But their negligence in addressing such issues will not change the bitter truth about Baku's future. One should not be blind to the fact that one day, sooner or later, Nature will insist on abiding by its own rules. Tomorrow may be too late to correct today's mistakes and negligence and avoid catastrophe.

Pirouz Khanlou is a practicing architect based in Los Angeles who has carried several very successful architectural projects in Baku. ■