

***Table of contents :***

1. Idea description in chapters :

A Gesture which Organizes – page nr. 2

Seul The Colours of Incheon – page nr. 4

The Tower of the City of Gyeongna – a trip – page nr. 6

2. Technical description – page nr. 10

3. Technical description drawings – page nr. 15

**1. Idea description**

## ***A Gesture which Organizes***

Every newly urbanized area requires a Distinct Gesture, a gesture which organizes space. The gesture is never performed in a place chosen at random. It can be a Geometric Middle, an Axis of Composition, or even a point, not necessarily chosen in this way, but important for different reasons. The most important reason for such a decision is a conscious, but also intuitive discovering, and investing it with an exceptional meaning. It becomes a point of reference and measure in geometric and emotional space. Such a measure, a symbolic measure which contains spaces which are to attract and become a natural centre of emotions and energy. Such gestures were always performed in the history of towns and places. These gestures were sometimes distinctly spiritual, they created temples – which are places of concentration; or mausolea – which are places of emotional memory [often of the same social groups], or magic places. This is what happens now in CHEONGNA. This community wishes to outline a new vertical axis, upon which depends everything which is meant to have a special value, but which also outlines a direction for everything which is outside - a direction inside. The tower is to be a distinct AXIS OF THE WORLD, a new centre of the world, which would clearly mark Hierarchy and Territories. The tower Cheongna will be a Finial, a CROWN of this part of KOREA and this part of the continent. So it has to have a SIMPLE GEOMETRIC FORM; on the base, of which cross section is oval in shape, there are placed THREE CRYSTALLINE FORMS. Their shape is just a simple metaphor of a crystal, a quasi-regular octagon; the distance between them is similarly irregular. The distance does not grow or diminish proportionally. So this is not perfect geometry. The crystals are irregular to show the lack of perfection in nature, its real POWER. The irregular growth of the crystal depends not only on the unsteady inflow of crystallizing substance [just like in a school experiment], but also on other factors. It is a process which sometimes speeds up, sometimes slows down, or even stops entirely. The distances between the crystals are not regular like organic growth, which is sometimes more intense due to the strong light. Even an irregular CRYSTAL is treated by us as a natural perfection; just as for our human scale we wish for harmony between the beauty of body and mind, wisdom to which we aspire, which however we can never reach. The crystal becomes also a measure of time on the AXIS OF THE WORLD. After all, we do realise that TIME is what brought about its

emergence. In the form of crystal there is a kind of geometry which we understand and which we subconsciously need. It is a UNIVERSAL need; for all people, all races, and all cultures. This is why we call SOME MOUNTAINS DIAMOND MOUNTAINS. This need includes the need to create crystals; almost everyone of us has done a childhood experiment – when a solution of this or that COMPOUND crystalizes thanks to time and some energy, and delights us. Here are three crystals, because it takes three repeating forms to give us a sense of CERTAINTY. Two are a PROBABILITY, one is just a COINCIDENCE. Three forms give us a sense of a true FULL HARMONY. Even an imperfect crystal [or maybe its imperfection is the reason] evokes a feeling of openness, of infinity of the process, in opposition to closing by an absolute perfection of form and its accurate final CUT. Every tower, and especially such a tall tower, is an extremely strong CENTRE of energy. Something in-between the WORLD UNDER and the WORLD OVER. There is also one more aspect, very important for those who come from the outside attracted by the MAGIC OF THE NEW PLACE, by the centre itself; and for those who already live in its SHADE. This aspect is the sense of SECURITY. We feel secure in every city which has an object like this, an object which is a symbolic, thus the most effective, defender. Every city had such an object throughout its history, or it wanted to have it. If this tower, THE TOWER CHOENGNU – THE SAPPHIRE OF THE WOLRD, is to become such an object, it will be this kind of an universal amulet; an AMULET which will offer protection from unknown energies; an APOTROPAIC TOWER, a tower on which we look with anticipation and relief from a window of a landing plane. A DRAMA OF THE NIGHT can be felt more deeply thanks to it, but its existence provides certainty, a point of reference. This is the direction in which we look when we walk away. But this is also the place from which we can see something more, from which we can have a full view. The TOWER creates the dynamics of the DAY, we can sense its look and we know that it takes in everything.

The city of colour creation – formed by light, landform features, the diversity of colour folds, which produce a rainbow-like vibration of light.

The city is filled with light – the energy is produced ecologically, creating a polyphony of reflections of light, which form a mosaic of tensions and emotions through the virtuosity of multicoloured interferences.

It is an architecture where to be is a luxury; the residents' emotional comfort is expressed by freedom and illumination of colours intertwining and interwoven into the areas of green.

The civilization of light and colours in the new Incheon shapes the image of its residents; it emphasizes the shapes and the temperament of the objects providing them with vitality and personality. The emerging energies of the colours invest the metropolity with a grand scale, improving the individual emotional space.

The rainbow-like city of bright colours, filled with light, is more favourable towards its residents; it is friendly, and it consolidates the need to live in it, or with it. To live, to inhabit, to dwell, to function, to enjoy the euphoric Colours of Incheon. The harmony, reconciliation, and co-existence with the architecture of green forms a biological organism similar to the human organism; it facilitates the natural development and it evokes in the residents a social instinct of responsibility for the city. This way of directing the light in the city space enhances the forces of gravity, human gravity, and the sense of belonging, the sense of ownership and attachment to the places, streets, and architecture of Incheon. The colours enable the dreams to be projected, and it is a crazy projection, formed by the fascination with the agglomeration.

Each district has its own set of colours, which emphasize its unique character. By the effects of the light it also highlights the shapes of the architecture, producing an unforgettable experience for both the city residents and the newcomers. It brings about a dynamic, effective, and harmonious development of the city.

The colours diversify the districts, developing the ethos of the civilizational advancement of the agglomeration.

The districts receive their colours by the diversity of textures and material used for their making.

The principle of the new city is the harmonious diffusion of colours; each district will stress its individual character by being a part of the living palette of the city. From red through pink, orange and yellow to violet, each one will receive its own characteristic colour, which will mark the topographical map of the city.

Additionally, in every district there will be a building which will be a symbol of the colour of the district – a marker, a visual sign, which will be easily recognized. The place where the energetic lines of the city cross constitutes its brain – a tower, which defines the rhythm, scale, perspective, and the speed of the city which is directed at the future. The tower in the shape of a non-regular 16-hedron, the colour of colours – black and graphite, an opposition to the euphoria of colours, a vertical flagpole cut by three shapes in vivid pink, yellow and violet.

During the day it is a strong barrier for the city, a codified vertical sword which takes and accumulates the energy from the living organism of the city.

In darkness, the fluorescent tower changes into three independent objects which are suspended upon the city, giving back the generated energy of the day.

Inside, the tower enables the residents to live through an exciting experience of becoming a colour.

The changes of the temperature of the colour, of physics, and thermo chemical effects of the movement of colours in space; the colours cover, mix, and interfere with one another.

We are working on the vision of a consistent city, which will exist mentally as a part of the world family of cities.

***The Tower of the City of Czeongna – a trip***

I have seen the tower for the first time when the plane was about to land. Visiting Incheon and seeing my friends was not the only reason I came here. I was particularly interested in the tower, and the ecological city of Czeongna. I have seen the tower in the Internet and I knew from the very beginning that I would have to see it in reality. I have heard a lot about the numerous attractions which are inside it; I knew it would be a long and exciting adventure. After landing at the Incheon International Airport, I got on the AREX, the fast city train, and after a while I was in the station of Czeongna. On my way I admired the dynamic development of the whole Incheon from the bridge which connects Yeongjong with Czeongna. The fast train station was located in the northern part of the city and it was surrounded by a floral complex and by a golf course of impressive size. I also saw a public park and a complex of multifunctional buildings which provide services for the station, and which form a gate to this part of the city. I have already seen the tower very precisely; its light colours sparkled against a background of the bright sky. I was lucky – the day was really nice, there was a light north-westerly wind, and the sun was high in the sky. I wanted to be at the foot of the tower as soon as possible. I could choose either a funicular railway, a park through which one could walk right up to the tower, or electric vehicles, which can be rented all around the city and which are its pride. I chose the funicular because I wanted to see the impressive park, to pass near the upper stories of the local buildings and make the best use of the sunny day. I bought a ticket and I took the elevator to the upper platform of the funicular. I was really amazed that everybody speaks English here, which is not the case in other cities in Korea. When we were moving on, I was surprised by the amount of public space, parks, the number of electricity-powered vehicles, and the wonderful diversity of the city architecture. I could already sense its presence; I knew that the tower was watching me; one of its crystals was somehow aiming, or pointing to something, which really impressed me. The tower exuded some undefined power; it was like a magic totem. Now I could see the details of the tower clearly. I saw the light outside layer sparkling with colours, which changed depending on the light; its light construction was evenly slender. I have never seen anything like this before. A few birds flew over me to the tower. Now I could see that they had their nests there. Incredible! There was a park with many attractions in front of me; my destination was close. We stopped on a green mountain; on my left-hand side I could sense the presence of the tower. I took the elevator from the platform down to a green hill, which turned out to be an underground car park. In front of me I could see a similar hill, on the top of which there was one of the electric vehicles rental companies. On my left-hand side there was a green valley. I quickly got to the information office by the funicular station to get to know what kind of attractions I was to expect. I walked down a green tarrace ramp which led me to the very bottom of the valley; there was a canal in front of me, and a garden floating on water on my left-hand side. In front of me there was an island with a tower, by which intriguing cupolas grew out of the ground. According to the guide, there was a Sunken Plaza with restaurants and shops on my right-hand

side. In the ground there was the most modern Aqua Park in the world, which I found a bit like a cabbage that someone put upside down. On the other side of the island there was a Theme Park and a Kids Park over it. Life was vibrating all around me; there were people everywhere, all families, school trips and foreign tourists. I used a bridge to get to the island. I went towards the tower and the cupolas which emerged by its side. I saw the entrance, which was located in a small hollow in the ground. I went inside. On my way signs informed me which entrance I should use depending on whether I was with a trip or alone. When I was inside I understood what the cupolas were. They were giant lenses through which I could see a magnification of the tower and all its details. Now the local birds' nests were almost in my reach. I bought a ticket, and the automatic navigation system led me to the least crowded viewing elevator. The main part of my adventure, the one I longed for, is about to begin! While I was in the lift I admired the panorama of the city; but I decided to make my trip in three stages so that I could visit all the three diamonds thoroughly.

I get onto the viewing platform, an angular shape cut through by streams of coloured reflections of light, my imagination is aroused, I ascend a ramp on my right, which is banded upwards to the level from which one can see technical solutions; functional yet aesthetic possibilities of solar panels, which by the changes of the inclination angles form an exciting glow of colourful mirages of light; they influence the merging of glancing angles of light and create a diversity of colour effects.

By the change of the glancing angle of light the inside defined by construction starts to change its size, setting a different shape of the space where we are; the space becomes virtual. After descending from the ramp, I sit by one of the computer sites where I can learn about the city's topography, see the visualizations of the symbols of the agglomeration, see computer simulations of streets, squares, etc., and learn something about the city life. I descend from the platform to the lower level, which gives a different aesthetic experience; the light which gets inside through Venetian glass makes an impression of being in a dormitory; colourful beams of light create a warm light, almost like in the equator, an experience of being among lush flora. To my amazement, when I come to the window, I can see lots of green with birds' nests – a bird's-eye view is realised literally in this extraordinary scenery. In the horizon one can see a panorama of the nearby areas – experimental rice cultivation immersed in green – high-tech farming surrounded by a hilly landscape makes a great impression. The second platform is a crystal with an assymmetric plan, which is composed of two elements: one contains an oval water tower. A spherical shape of the water tower is used as a screen for film and multimedia programmes screenings. Over the screen there is placed a small balcony which functions as an amphitheatre, or as a resting place.

Then I move to the multi-functional platform, which is the most spacious of them. Just as a previous one, it constitutes an assymmetric base of the platform. We found it suitable as a location for a tennis court; it will be used as a commercial space. This space can also be used for many different commercial and services-related

purposes. After alterations it may function as an exhibition site, showroom etc. Due to its extraordinary location it can host spectacular shows, or can be used by companies to promote their products, e.g. by companies which usually organize presentations of their newest products from automotive, air, or computer industry. Thanks to its special acoustics, it can be used for concerts, theatrical performances, shows of different kind; the places is also adapted to be used as a location for restaurants and services. From the top platform I descend onto two smaller platforms, which can be used as a room for banquets, company parties, wedding parties – it will be available for renting. The third crystal is a typical viewing spot comprised of huge rhombs, which are alternately turned up or down. The ramps, which are turned downwards, function as viewing platforms with the view of the panorama of the city; the ramps turned up towards the base of the tower function as viewing platforms with the view of the sky and the stars at night.

This viewing platform may be the most interesting one I have ever visited; I think this city will bear a genius or two in this maze of senses; where is this falling planet heading? Oh, my mobile is ringing, hi Starki, it's good you're calling, I was just trying to grasp all this city offers, I'm now on the top of the tower and I'm amazed, I'm shocked with what I've seen here, it's sheer madness what they've done here, I'll call you in the evening and we'll arrange where to go, bye. Now it's time to get to the ground, but what's that, ok I'll take the giro drop and go down fast; I sit down, fasten my seatbelt and go, no wait there are a few people still taking their places, finally we start. Oh my God, I'm going down a black hole, a void with nothing inside, I inhale sharp air, I can see all my life passing in front of my eyes, adrenaline level rises, that's the result of smoking, I'll give up cigarettes!!! Now my trip is about to finish, it's great, Starki must go through it too. I go outside, the beautiful day has not finished yet, I guess I should eat something, oh, there's a nice oasis, no it's the Sunken Plaza, a food cort, as if on a papaya leaf plan there are located small restaurants which serve food from all over the world, they even have my favourite dish, where have I last eaten it? In Brooklyn? No, it was somewhere else two years ago. After a good meal I go to a water floral park which is immersed in green; there is a beautiful oval pond filled with water lillies – a view just like in my homeland, but I haven't seen such beautiful ones there. After a quarter-of-an-hour nap on the grass I discover more new places, these are a kids park and a theme park, illuminated places with opalescent green, with a scent of blooming rhododendrons, a great place, there's a science park for kids, well organised, in an easy way it explains different issues connected with physics, chemistry, etc. I must take my sons here the next time. As if this was not enough, the next park is just fascinating; it is an oval tantric shape with many small islands, as if someone placed these small colourful islands with a brisk movement of the brush; you can get to them by boat. Oh, I have almost forgotten, I have an appointment with Starki; there should be an electric vehicle rental somewhere near, oh, yes, there it is, you cannot miss the sign; so I rent a vehicle of the future and I go from new Czeongna to the older district of Incheon.

## **2. Technical description**

### ***The idea behind the structure***

Our goal was to propose a beautifully engineered structure. A one that would be slim and strong, slender and light. Symbolizing contemporary technological achievements, production capability and materials.

### ***Mast as a slim form***

We pursued a slim form. Success was guaranteed only through resolving structural issues. Sort of like in professional sports equipment field. We aimed at a structure which would both meet the client's requirements and at the same time be light, modern, one-of-a-kind and visible from a tens of miles distance. Slenderness alone would not guarantee fulfilling investor's expectations.

### ***Crystal as a pure form***

There appeared an idea of a crystal. Crystals are ideal forms that crystallize on a thin string. Like in silicone forming process. On various altitudes, with different shapes and sizes crystals form. Sharp edges and simple planes. Small and big and not always symmetrical. Big enough, given the scale of our project, to play both practical and useful roles. They can fulfill both public and technical functions.

### ***Tower structure***

The building's structural model matches the cantilever pattern. Due to the building height, the foundation is substantially developed. It must take the load of the building itself as well as that of wind-originated forces. Piling is necessary,

### ***Piling***

To assure foundation stability of the tower and for adequate anchoring in the ground, piling turned out to be necessary. It is an extremely important component of the foundation. The tower's plan surface area comes to approx. 500 square meters. Calculations show that the piled surface needs to be eight times larger than that. We marked that surface on the design. It is a square, 63m x 63m, totaling 4000 square meters. The number of piles that guarantee foundations' stability comes to 1849. These are CFA piles, 23 meters long, 80 cm in diameter and with 1.5 m structural mesh.

### ***Piling and wind force***

Given the great height of the building, wind force needed to be considered and the foundation base reinforced. To neutralize wind-generated side load, additional piles were designed, spaced every 10,5 meters along each side on the piling contour perimeter.

### ***The tower base foundation***

The tower is positioned centrally. For adequate rigidity and load distribution to the piles there emerged a need to design the foundation proper which would be non-typical in its geometry. It is a box structure 7 meters high. Its shape resembles that of multi-circle rosette. Engineered tangentially on those circles expander cylinders assure appropriate foundation strength for the whole structure. Partly capped off provide additional rigidity. As to their function, they play a role of free-access lobby. There are lenses installed in the vaults, selected so that sightseers looking through them can easily see chosen elements of the tower up close as well as its very tip. Appropriate shields prevent interiors from being overheated and disallow light focusing. An underground three-level parking lot for 1800 cars has been designed within that section. On the level “-11” placed below water courses, there are two service tunnels, serving located on the tower base level functions such as: aquapark, foodcourt, kids and parks.

### ***The stem***

Reinforced concrete structure has been used for the whole building. The primary material is 150-180 MPa concrete.

For desired slenderness and rigidity we propose tubular structure system. It is based on a structural model formed by four mutually tangent circles. To provide a proper stem rigidity it was necessary to reinforce this pattern by another four circles superimposed and rotated by 45 degrees. Modification of this pattern by adding more star-shaped patterns led finally to rosette shape. It is now much more complicated. It shows various shapes, diameters and wall thicknesses. Brought into third dimension it becomes a bundle of mutually intersecting reinforced concrete tubes. The hollow with walls created inside constitutes the core of the structure.

Such solution guarantees achieving the required rigidity with relatively low wall thickness. Calculations show that for the lower portion, the thickness of 80 cm is sufficient. For the higher part of the building, thickness can even be lowered down to 40 cm.

### ***The stem and ecology***

Reinforced concrete lends itself to passive energy collection. It needs time to warm up. Using this property we can naturally cool it utilizing temperature difference between day and night. Appropriate cooling of the stem generated by gravitational air movements outside and natural ventilation inside can totally eliminate the need to air condition the lower building. Helpful in this arrangement is substantial number of water courses at the foot of the tower. Water evaporates and cools concrete which accumulated heat during the day. Such long, cool reinforced concrete tubes are perfectly capable of gravitational conducting large amounts of air needed to ventilate the tower and the crystals as well as the green patios designed in some places within the tubes.

We assume that some energy can be gained from wind. For that purpose appropriate space has been provided at the top of the tower.

### ***Bracing***

Each engineered structure needs bracing. Application of reinforced concrete and tubular structure system assures adequate rigidity and does not require horizontal bracing. But due to impressive slenderness of the building, using vertical bracing cables is necessary. These are braces running in walls around the perimeter as well as bundles located in the inner parts of the stem in the thickest rosette wall sections.

### ***Rosette field functions***

The structure determines function and architecture. As result of mutual intersecting of the tubes, the stem section consists of various fields of different surface area and shape. These structural air cavities were ascribed various functions. The views show their suggested allocation, such as:

1. Vertical service spaces
2. Elevators, fire exit stairs, technical and cargo winches
3. Panoramic elevators
4. Gyro-drop

### ***Crystal structure***

## The arms

The crystals are created by placing arms in the tower stem. The hollows in the stem have different functions. Some tubes have almost exclusively structural function. Integrating crystals into the stem required a separate structural analysis, which showed that it should be done gradually and symmetrically so that stem bending effect can be avoided. To create rigid structural triangles, an idea emerged of slanted cantilevered arms attached to the stem and connected with one another under an angle. These reinforced concrete structures are anchored in the appropriate rosette tube. To diversify crystal shapes, each arm can be anchored to the stem at a different altitude, can have a different length and each pair of arms can be connected under a different angle.

### ***Crystal encasement***

Thus created structural skeleton can be now encased with shielding planes forming both the roof and walls. Advanced technology materials have been used for this application. Primarily, it is glass with self-cleaning ability and hyper-transparency on inside as well as light access adjusting capability on outside. The geometry of these planes creates the architecture of the crystals.

The created spaces, depending on specific needs can be divided with floors and ceilings at will as well as remain single-spaced.

### ***Structural balance***

The crystals are not spaced centrally on the stem. They have irregular shapes, height and length. We attempted to eliminate this eccentric location to avoid structural problems. So we made sure that the structural balance principle is observed. We compose the crystals in such a way, that if one side outweighs with its volume, than the other balances it with its weight. For example: a significant public function can be balanced with technical function, such as water tank serving buildings surrounding the tower.

### ***The crystals' function***

Crystals placed on the tower structure can fulfill any function, can have any shape and size. That depends on particular investor. Their quantity is also to be determined. Transportation stems assure access to each one of them. These can be banquet rooms, exhibition rooms, auditoriums etc. All of them have a panoramic view guaranteed. They can also play technical roles (water towers).

### ***The crystals' envelopes***

The crystals are covered with various envelopes depending on function performed. Those which are given energy-gaining function, are covered with photovoltaic cells. So can be the part of the asymmetrical crystal which functions as water-filled counterbalance (traditional water tower principle). Education-related envelopes, covered with OLED glass act as a screen, which enables projection of information, films etc.

The lowest crystal performs a pro-ecological function. Its lower envelope is to be shaped and covered with a bird-friendly material, so they can find here a piece of their natural environment where they can nest and which they can treat as their own