

## Developments of Armenian Industrial Architecture from Contemporary Period

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**Keywords:** industrial architecture, reconstruction, light industry, industrial line, Soviet-Armenian tradition.

**Abstract.** The article is about Industrial Architecture (further IA) in Armenia. However, some aspects of the theme have been studied in an outlined way. But the continuance of the periodization hasn't been researched and especially the contemporary period hasn't been investigated yet. The research carried out in 3 main parts, successively concentrating on following questions: 1. the creation of the data banking of IA in Armenia, 2. supply of a brief milestone of IA from Soviet Union and from the World IA practice, 3. preparation of catalogs including the highlights of IA in Armenia. The output of the study is a matching of the Armenian-Soviet-World IA development properties which are describing the typological characteristics, compositional, technological and building technique features and styles. The focus of the study is on behalf IA of Contemporary or Independence period in Armenia. The study pays to enrich the content of "Contemporary Architecture of Armenia".

### Introduction

The Modern Industrial Architecture in Armenia developed in an irregular way throughout the modern era. Pre-Soviet period IA in Armenia was dissimilar to World Industrialization Architecture from the midst of XIX century. The Armenian factories of the time were of mining and agrarian in manner, such as the industries of different smelting compounds, as well as wine, leather, meat or other productions.

Within the decades of Soviet period, beginning from 1920-ies, the Armenian industrial architecture initialized distinct technical and technological features. That is why the IA of Soviet Armenia technologically was more glorious. But the same could not be said about Post-Soviet IA of Armenia. The balance of light and heavy industry did not preserve. This was the reason that most of the IA heritage in Armenia is abandoned today, in the best case they have regenerated or adapted into other urgent functions of the current use. However, the factories of today are mostly concerned with the construction industry, food-production, light industry and not more. So IA in Armenia needs careful monitoring today. Even there is no decision making criterion for the exploitation of the complexes inherited from Soviet period. The study and the classification of the immovable richness of the factories inherited are very urgent either from the point of town planning needs and architectural efficiency. Indeed, Armenia being a small country, the modern use or regeneration of such heritage is a very important economical factor which is not adapted yet. The main problem of the presented article is the reasonable exploitation of the indicated buildings and complexes. Objectives are: 1. the creation of data banking of IA in Armenia in regards to historical, theoretical and practical design information, 2. the documentation and descriptive study of the old and Modern IA instances in Armenia, 3. performance of the comparative analysis of the above mentioned points.

### Method of the research

Method of the research is on behalf qualitative analysis having a case study approach of IA tradition in Armenia. As research originality, briefly should be mentioned that such methodical study is one of the first studies about IA in Armenia.

## Results

**The Creation of the relevant data banking.** This means, at first to do observe of existing literature of IA in Armenia. However the study of IA in Armenia is very limited today. There is no methodical study about the matter yet. What is in access are several articles and partial industrial characteristics in the context of general history of Armenian Architecture or Soviet Architecture studies. For the latter, among numerous studies appropriate to include “The Architecture of XX century” by A. Ikonnikov [8], as well as “General History of Architecture” volume 12-I which is titled “The Architecture of USSR” [3]. In reality Ikonnikov’s study as much reflects the soviet Armenian Architecture in the World Context, but it focuses on public building instances only [8, pp. 418, 433-434, 645-646], [9, pp. 78, 79, 425-426]. Due to mention that the book does not include the instances of O. Margaryan, R. Israelyan and G. Aghababyan who have significant industrial works in Yerevan capital, such as the first Cloth factory (1929), the Wine cellars in Yerevan (1937), Brandy factory (1937, 1981), the factory of refrigerators (1950) etc. Considering the “General History of Architecture”, should be said that there is some mentioning about IA of Armenia, but remaining limited by several Wine and Brandy factories and not more [3, pp. 361-362]. Actually the soviet references remain far of describing the intensive industrial activities held in Armenia and the other Soviet Republics, they are concentrating on Russian practice only. This is why the IA research remained incomplete, especially in the field of numerous reinforced concrete complexes existed and abandoned after the dissolution of Soviet period.

The Armenian references about IA of Armenia reflect the situation in a diverse way. The most objective for the case are L. Babayan’s and V. Harutunyan’s articles in the context of “History of Armenian People” 8 volume academic publication (1967-1981), where the IA in Armenia is presented on behalf of monumental trend works, as well as the rational image of reinforced concrete complexes [7, vol.VII, pp. 521, 530-531, vol.VIII, pp. 475-484]. Meanwhile remaining of the authors concentrate on neo classical mannered buildings only. Typical for this case is “The Architecture of Soviet Armenia” by A. Grigoryan and M. Tovmasyan. The authors presented the IA by many buildings of consolidation period from 1950-1960-ies [4, pp. 87-89, 100, 114, 246-249]. In fact remains aside the rational heritage of IA from 1960-ies. The gap possible to accomplish by advantageous textbook of V. Ter-Avagyan’s “Industrial Architecture” (1973) which by its illustrations and methodologies reflects the interests of Soviet Armenian industrial architecture of reinforced concrete instances [15]. There are other studies from the period of independence too, such as E.Haroutunyan’s book (2009) which pays to enlarge the knowledge of IA in Armenia, immediately after 1915 genocide mass immigrations. Many new industrial facilities have been built in newly created settlements such as Nor-Arabkir, Nor-Ayntap and Nor-Kharberd, Nor-Sebastya, Nor-Malatia etc. [6, pp.20-56, 58-74, 76-94]. Considering the study of IA in Armenia very helpful are the articles published in different issues, such as the article by S.Movsisyan published in “Industry and Architecture” monthly and titled “The Fifty Years of the Soviet Armenian Industry” (1970), as well as articles in Architecture & Construction official journal (further JSH). Hereby due invite the attention to an article published by the authors V.Taslakyan (the main part), H. Pepanyan [12] and V. Khojabekyan [10] etc. [14, pp.15-35]. There are almost no other publications about the IA of Armenia from the period of independence. Related to the last mentioned above articles, it is very important the supply of preliminary list of industrial buildings and complexes in Armenia beginning from the midst XIX c. until 1976 [14, pp. 21, 23, 25, 28]. There is a pretty enough material in an article about abandoned factories in Yerevan (2020) by E.Sargsyan, Z.Manvelyan and M. Arakelyan. The study based on results of dissertation from 2015 (challenger M.Arakelyan, supervisor E.Sargsyan) titled “Strategies for reuse of abandoned industrial areas of Yerevan and management model proposal” [1]. Hereby very important is the categorization some of the indicated buildings according to international parallels. However there are almost 800 IA instances in Armenia, the main part exists in Yerevan and have 2700 hectare area capacity. The working enterprises of the mentioned is 7.15, partially working is 3.3%, entirely reconstructed is 1.4%, partially reconstructed 6.2% and notable is the percentage of the abandoned factories today: 82% (Fig.).

Very useful material is available in Wikipedia titled as the factories of Armenia [17]. It is an encyclopedic dictionary of factories active nowadays in Armenia. The site is divided into three categories according to three main cities in Armenia: Gyumri, Yerevan and Vanadzor.<sup>1</sup> E.g. related to Gyumri there are 7 factories, in Yerevan are active 14 factories, in Vanadzor are in use 8 factory complexes. The structure of the catalogues is in alphabetic order, to give an idea about the quantity of active factories in Armenia, let to mention general number of them for every letter: 5 (A) + 2 (G) + 7 (E-Ե) + 2 (E-Է) + 1 (I) + 1 (L) + 2 (K-Կ) + 2 (H-Հ) + 1 (M) + 2 (C- Չ) + 1 (R'-Ր) + 2 (S) + 1 (T-S) = the total is 29 factories.

**Development milestones of World Modern and Contemporary IA.** Before the documentation of Armenian IA instances, it is required to review the development of World Modern IA too. That is in order to realize the development features of Armenian IA. Main milestones of world IA include the following 6 phases.

1. Experimentations of metal and glass building-parts in Europe, then the spread of industrialization period from the midst of XIX c. and later (1800-1916) [5, pp.17-32].
2. The creation of Modern Factory which include the IA activities held by P. Behrens, such as the standardization of bearing system at the cross section, as well as H. Muthesius's evolution of roof and the interior, the industrial line and design diffusion in industrial projects by W. Gropius, the problem of involvement of complicated technologies in design of factories by A. Kahn etc. (1892-1925) [5, pp.91-103].
3. Experimentations in concrete and reinforced concrete from the ends of XIX c., such as the factories by different prefabricated elements by H. Zieger (Wayss & Freytag Hall of an Enamel and metal Goods Factory in Ligetfalu), August and Gustave Perret (Esders Ready-made Clothing Studio in Paris), the Jahrhundrethalle in Breslau by M. Berg, the hangars of Orly by E. Frayssinet, the hat factory in Luckenwalde by E. Mendelsohn etc. (1880-1939) [5, pp. 105-115].
4. Other instances of factory architecture development held in the context of style developments. Hereby, particularly are important the examples of prefabricated architecture, i.e. "Concrete Containers" from the midst of XX c. This means that within the WWII, IA developed into two main branches: a. IA in a modernism style, b. IA of rational style using metal, reinforced concrete and other building materials (1912-1960-ies) [5 pp. 257-63].
5. After WWII industrial architecture is on behalf of E. Eiermann style, such as Olivetti headquarters of Electronic production, as well as IA using open structures, futuristic mannered complexes, such as N. Foster's Swinden Headquarters etc., which are possible to describe as Hi-Tech featured complexes. After the revolution of Post Modern and Deconstructivism and other trends, IA continued as individual kind of complexes architecturally using styles as other public buildings in Architecture etc. (1956-1990) [13, for example the chapters of Hi-Tech, pp. 67-105 and Experimentations in Japan pp. 432-462].
6. The "Case study" style remains typical for IA in the years of Contemporary architecture too. Very identical for the period are the Megastructures created. It is due to emphasize that the stylistic trend remains identical, but distinguished by newly invented technologies applied and new building materials used (1991-today).

### **The cataloging of the IA in Armenia or documentation**

*General information about IA of Armenia until 1990.* According to the information of Armenian architecture from different periods, until the independence period there were below presented industrial buildings.

1. *Pre-Soviet IA in Armenia (1845-1920)*, have not the Industrialization of World Architecture (1784-1916). Most striking examples in Armenia are Neo - Classical or eclectic in manner designed by officially renowned architects: V. Mirzoyan, Eng. K. Ionisyan, B.Mehrabyan and M. Fon-Der-Nonnet. The buildings are 1-3 arched halls, 1-3 story rise buildings [comp. with 2, pp.173-185, tables 57-60]. Among such buildings possible to include: a. Metallurgic

<sup>1</sup> It is important to mention that there are many such encyclopedic catalogues available in the web which are possible to be used for the studies.

buildings and complexes from Alaverdi, Kapan etc.; b. Yerevan Old Rail-way Station; c. Wine and Brandy factories; d. Slaughterhouse of Yerevan; e. Leather Factory of P. Azaryan and G. Navasardyan on the Hrazdan River; f. Lemonade Factory and public profitable building of H. Gilananyants in Yerevan; g. Wine and Brandy factory of Tahiryman-Shustov; h. Wine and Brandy Factory of Sarajyan on market-place street.

2. *IA instances of Soviet period from 1920-1990.* The Soviet period of IA in Armenia follows with the periodization of Soviet Union and World Architecture having the following phases. The first phase (1920-1932) which is in accordance of World Modern Factory establishing period. Most striking examples of the time are on behalf of following buildings and complexes: a. Hydro Station Hrazdan by Al. Tamanyan (1923); b. Spinning Factory called after Lukashin in Leninakan (Gyumri) by Gh. Sargisyan (1924); c. Aygher Lij substation by Al. Tamanyan, (1926); d. Carbide Factory in Yerevan by N. Bayev (1927); e. Manusa factory of Arabkir. Yerevan (1927-1929); f. Cloth factory in Yerevan by O. Margaryan, A. Aharonyan (1929), Tabaco Factory in Yerevan by O. Margaryan & Z. Hatsagordzyan (1931).
3. *IA instances of Soviet period from Second phase of the Establishing period (1932-1945).* They are signaled on behalf of Ararat Trust Wine Factory (begun by arch. G. Kochar, then involving the main part continued by arch. R. Israelyan, 1937), as well as the Silk Factory of Nor-Sebastia (by Eng. A. Igitkhanyan, 1935). Both are notable for masterly initialization the industrial line in layout. Considering the wine factory, should be said to be one of outstanding World monuments of its type. That is because of organically combining the vernacular tradition in IA design. Both of presented complexes are in social Realism manner.
4. *IA instances of Soviet period from Post WWII decades (1945-1990).* The period in role of flourish period of Armenian IA. From one hand it contains the national Romanticism examples of IA Architecture in Armenia, from other hand includes factories built up of metal and reinforced concrete prefabricated elements.

Striking examples of National Romanticism style factories are: a. Oshakan Wine Factory by Rafael Israelyan (1949); b. Champaign and Wine factory by Z. Bakhchinyan (1949); c. the Refrigerator factory by Grigor Aghbabyan (1950); d. The brandy factory by O. Margaryan (1952); e. Ijevan Wine and Brandy factory (1951); f. the Textile factory of Gyumri (1958) etc. Factories built up by metal and reinforced concrete elements are almost 800 in number. Most of them are abandoned in current situation. Very few of them are in use. This is one of current problem of Architecture which faces Armenia. It is a special subject of research, hereby presented in a typological way, because of the limitations of an article. As general, the IA in Armenia almost belongs to the following types: mining, energetic, chemical, machine-tool design and electro technology, building materials and production of prefabricated building parts, wood preparation, Light industry, Food industry [11].

Comparatively the industrial buildings are apparently diverse in Armenia. However matching the case with world IA instances, there are 8 following kinds of IA in Armenia: 1. 9 mineralogical great scale factories constructed; 2. 17 different energetic type stations; 3. 10 chemical factories; 4. 23 machine-tool design and electro technological factories; 5. 18 factories for building material production and prefabricated building parts; 6. 4 factories for wood production; 7. 11 factories for light industries; 8. 20 food factories etc. [14]. Significant examples of the mentioned kinds successively possible to present the following buildings or complexes: a. Copper Smelter Factory in Alaverdi and surroundings from 1931-1935; b. Hrazdan Electrical Station from 1974; c. the Chemical reactive and Vitamin factories in Yerevan from 1965-1969; d. Machine-tool design factory “Eraz” for car Production from 1965; e. Building material companies and factories of prefabricated construction elements consisting a network in different cities of Armenia which are elaborated within the years 1950-1965; f. Wood production factories, such as the Furniture Factory in Yerevan from 1965; g. Numerous establishments of Light industry, such as “Masis” shoe factory from 1962); Food industry complexes, such as Wine and Brandy companies, Conserve factory in Masis region from 1967, etc.

Briefly, presented factories is a whole branch in IA science which is outlined in Ter-Avagyan's book. The main accepted types of the industrial buildings are in following nomenclature:

- a. 1 story industrial buildings, almost are the prevailing instances of IA in Armenia which have the following features: in plan composition they are of span type, hall type, and cellular type. According to constructive scheme are: one and many span with certain details of consisting elements and structure system [15, pp. 8 - 91].
  - b. Multistory industrial buildings. Are usually classified according to number of the stories included (not more than 6 stories), as well as the involvement of moveable bridges hanged on the ceiling or not. According to constructive scheme are: one and many span with certain details of consisting elements and structure system [15, pp. 98 - 120].
  - c. Other constructive elements include the following building parts: Partitions [15, pp. 120-133], gates [15, pp.123-126], doors [15, p. 127], stairs [15, pp. 127-129] etc.
  - d. Auxiliary buildings and halls. Hereby are included the content of the infrastructures and their arrangements. They are as usual of blocked type, linear-datum type and frontal composition [15, pp. 129-132]. Very principal is the design of communal parts which include the wet zones and the clock rooms, the recreation, sport and other spaces [15, pp. 132-162].
5. *The IA of Armenia from the Independence period* signaled a new epoch. There is urgent need for a careful systematization of them inherited complexes and the new instances. A basic information about the contemporary factories are the lists available in Internet titled as "The factories of Armenia" [17]. However the site supplies an encyclopedic information about the factories existing in Armenia today. Actually the category of the cataloging is according to Wikipedia encyclopedic dictionary method. Because of the limitation of an article it is not possible to import the content here in the article (for more detail see the observation of the literature of this article or review the site by itself). So using the matter, as well the studies done above, advantageous is below presented a selected architectural classification of them according to following 5 typological categories.
- a. *IA new instances as continuation of above presented National romanticism style buildings or their regeneration*, such as following examples notable for beside mentioned profiles: a. Proshyan Wine Factory (Food industry); b. Armenia Wine factory (Food industry); c. Areni Wine Factory (Food industry); d. Many Food Factories of Diaries (Food industry); e. Conserve production factories (Food industry); f. Champaign and Wine Factory (Food industry).
  - b. *IA instances as continuation of above presented metal and reinforced concrete complexes or their regeneration*, these are almost of mining profile, as well as AHES (Atomic Hydro Electro Station) type. For main examples see: a. Alaverdi mining Factory (mining); b. Kapan mining factory (mining); c. Medzamor AHES (energy); d. Yerevan Aluminum industry factory (light industry); e. Grand Sun Factory (light industry); f. Grand Tobacco Factory (light industry); g. Yerevan Shoe factory (light industry); h. Caritas factory for shoe production (light industry); i. Compound for the Production of Souvenirs (light industry); j. Gold smith factory (commercial); k. Yerevan Furniture factory at Zeytoun quarter (light industry); l. Spandaryan industrial compound (light industry); m. The Refrigerator Factory (light industry).
  - c. *IA instances of adaptive use type*, this is almost most preferable approach in Armenia. Being a small country having limited financial possibilities, for Armenia the inherited industrial complexes are in role a richness which have economical affect, in the case of immediate use. Already there are efforts from this point of view on behalf of following conversions of some complexes: a. the cloth factory converted into showrooms (commercial); b. Factory converted into residential (residential); c. Factory of Machine industry converted into Art college (education); d. Eurasia University (education); e. "Eraz" car factory converted into residential quarters (neighborhood planning); f. Machine - tool factory converted into trade center; g. Machine aggregate factory

- converted into “Yerevan Mall” trade center (commercial); h. the Piano factory converted into private different multiple use sectors (public); i. The Watch making factory now used as a school (education); j. Factories for Exact Electronic equipment (electronic industry).
- d. *IA instances built by new technologies and building materials adapted.* These are new complexes almost of food or light industry, as well as establishments specialized in construction technologies, building material, building parts, several interior and exterior fixture production. A special group of this category are: the Cement Factory at Artashat region, several construction companies spread throughout Armenia (see the special issues of catalogs published by JSH journal regularly).
  - e. *IA stances designed for heavy industry purposes from Soviet period, but abandoned because of the absence of technological and the resources existed at the soviet period.* This is a divergent point in IA of Armenia. In reality there is radical turn and require of serious alterations in exploitation yet in progress. In order to have an idea of the matter see the accompanied diagram (Fig.). However the industrial zones occupy 12% of whole Yerevan (see Master plan of Yerevan from 2005-2012) [14].

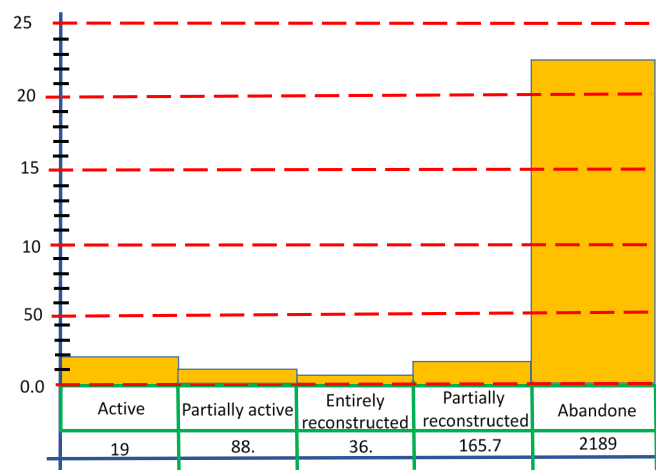


Fig. Complexes in Yerevan capital in the years 2005-2012, according to reference [10]

## Conclusion

Conducts the following IA aspects in Armenia:

### A. Typological Developments

**a. Classification.** The development of IA apparently is different in various periods of Modern Armenian Architecture.

1. The Pre-Soviet period (1845-1920) have not the Industrialization of World Architecture (1784-1916).
2. The Soviet period of IA in Armenia follows with the periodization of Soviet Union and World Architecture having the following phases. The first phase (1920-1932) is in accordance of World Modern Factory establishing period. The second phase (1933-1945).
3. The third phase is the post WWII period of IA in Armenia (1945-1990). The period is in the same manner of Armenian Romanticism architecture from the Consolidation phase of the simultaneous decades.
4. Very important is the creation of IA in Armenia built up of metal and glass, as well as reinforced concrete prefabricated elements which are from the same post WWII period.
5. Developments of Armenian IA from contemporary period (1991-until today), as it is studied above conducts the following trends: a. IA new instances as continuation of above presented National romanticism style buildings or their regeneration; b. IA instances as continuation of above presented metal and reinforced concrete complexes or their regeneration, which are almost of mining profile, as well as AHES (Atomic Hydro Electro Station) type; c. IA instances

of adaptive use type; d. IA instances built by new technologies and building materials adapted; e. IA stances designed for heavy industry purposes from Soviet period, but abandoned because of the absence of technological and the resources existed at the soviet period.

**b. Typological transformations noticed** are the mainly agrarian manner of the Pre-Soviet IA in Armenia. The Soviet period IA in Armenia signaled the Romanticism style of industrial period, as well as the great achievement of Metal & Glass, as well as the reinforced concrete complexes which were around 800 instances. The contemporary IA in Armenia in the independence period preserves some metallurgic instances: food industry, as well as light industry in feature. There are some other limited number of factories having heavy industrial profile which are of construction industry branch.

**B. Compositional Developments** are related with the morphologic aspects of included forms of typology which are mainly related to following styling characteristics:

- The creation of harmony, where the industrial line is the datum, the hierarchy is the enveloping of the inner space, as well as the production development axis(s) created in the interior.
- The creation of compositional nomenclature conducting the plasticity of cross sections, as well as other physical properties of surfaces, such as the textural and facture design, shape and color association etc.
- The creation of form regularities, such as the scale, proportion, ratio etc.

All above mentioned are elaborated with the stylistic prevailing manner of the time in Soviet Architecture.

**C. Technological Developments** are almost of new imported technologies. There are some instances which have ecological design reasons, as well as adaptation of sustainable design solutions implemented as adaptive use of some developments in creating green spaces, drainage for water use, rarely energy conservation solutions which are mainly are insulation manner and supply of solar panels etc.

**D. Building Technique Developments** are on behalf of conservative building systems. There are some new instances using modern imported technologies, conveyed in terms of mounting new equipment using interior design modern methods. Should be said that for the development of existing building technique characteristic is the façade-ism method of design.

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