



Faculty of Engineering
Architecture Department

The Philosophy Of Hi-Tech Architecture

Thesis Submitted to Faculty of Engineering – Ain Shams
University as Partial Fulfillment of the Master Degree
Of M.S.C in Architecture

Prepared By

Arch. Mahmoud Hassan Ali Hassan

UNDER SUPERVISION OF

Prof. Dr. Amr Farouk El-Gohary

Professor at Architecture Department
Faculty of Engineering - Ain Shams University

Asst. Prof.Dr. Hoda Mahrous Tawfik

Asst. Professor at Architecture Department
Institute of Engineering – Tiba Academy

2013

Ain Shams University
Faculty of Engineering
Architectural Engineering Department



Researcher: Mahmoud Hassan Ali Hassan

Subject: The Philosophy of High-Tech Architecture

Degree: Masters

Jury Panel:

1. Prof. Dr. Mohamed Kamel

*Architectural Engineering Department-Faculty of Engineering-
Ain Shams University*

2. Prof. Dr. Basil Ahmed Kamel

*Architectural Engineering Department-Faculty of Engineering-
Cairo University*

3. Prof. Dr. Amr Farouk Al-Gohary

*Architectural Engineering Department-Faculty of Engineering-
Ain Shams University*

4. Prof. Asst. Dr. Hoda Mahrous Tawfik

*Assistant Teacher in the Architectural Engineering Department-Faculty of
Engineering-Tiba Academy*

Date of discussion: / /2013

Postgraduate studies: / /2013

Date of legitimization: / /2013

Faculty board approval

/ /2013

University board approval

/ /2013

Dedication

This is dedicated to the martyrs of Jan 25th revolution
(May Allah bless the martyrs and bring them to paradise)
To those whom souls were the price of freedom, lives and
dignity of the Egyptians

Acknowledgements

Praise and thanks to Allah for His great grace and abundant mercy

Thanks to my great teacher Prof. Dr. Amr El-Gohary for his contribution to the output of this research

Thanks to Prof. Eng. Dr. Hoda Mahrous Tawfik for her care and guidance that made her like a mother to me in addition to being a teacher

Special thanks to the architectural engineer

Eng. Omar Khaled Turk

in devotion and recognition for everything he helped me with during my research period

Then I thank all of those who supported me; my mom and dad for giving me strength and affection, my wife for her motivation and consistency to my absolute happiness... My daughters.

Allah is thanked when people are

Declaration

This thesis is presented to the University of Ain Shams for obtaining the master's degree in Architectural Engineering.

The content of this thesis is carried out by the researcher in the architectural engineering department of Ain Shams University from the year 2007 to 2013.

Not any part of this research is presented to obtain any degree from any other institution.

This is my confirmation.

Mahmoud Hassan Ali

Date:

Researcher Profile

Researcher Name	Mahmoud Hassan Ali Hassan
Date of Birth	November 1 st 1983
Previous Degree	Bachelor of Architectural Engineering –Good grade
Graduated from	Tiba Academy
Graduation Date	June 2005
Current Occupation	Assistant Teacher in the Architectural Engineering Department-Tiba Academy
Year of Awarding	2013

-Titles	i
-Figure	vii
- Tables	xvii
- Summary	xix
-Keywords.....	xix
-Introduction.....	xx
-Research Structure.....	xxiv

Contents

Part One: Theoretical Introduction

Introduction Of High-Tech

1-Chapter One-High Technology Historical Approach:

Introduction.....	1
1-1 High-tech Philosophy Historical Approach.....	1
1-1-1 The Industrial Revolution Philosophy (First Machine Age).....	2
1-1-1-1The impact of the evolution of building technology to architecture in the era of the Industrial Revolution (First Machine Age).....	2
1-1-2 Second machine age philosophy (The Modernism Architecture)	6
1-1-2-1Modern Philosophy.....	6
1-1-2-2Modern Architecture.....	8
1-1-3 Third Machine Age Philosophy " The Late Modernism Architecture ".....	10
1-1-3-1 Late modernism Architecture.....	12

1-1-4 Slick-tech philosophy.....	15
1-1-4-1 Characteristics of Slick-Tech Philosophy.....	16
1-1-4-2 Slick-Tech Architecture.....	17
1-1-5 Philosophy of High Tech Architecture.....	17
1-2 Towards The Use of Advanced Technology.....	22
1-3Conclusion Chapter One.....	24

2-Chapter Two- Development of High- Tech:

Introduction.....	25
2-1 Theories of High Tech.....	26
2-2 Rules of Hi-Tech.....	27
2-2-1 Light Materials.....	27
2-2-2 Mass Producing Building.....	27
2-2-3 Tents and Cables Structural.....	27
2-3 The entrance to identify the high tech.....	28
2-3-1Study the historical background of hi tech.....	28
2-3-2 The reason of naming high tech by this name.....	29
2-3-3 Targets on which the high tech.....	30
2-3-4 Characteristics of high tech.....	31
2-4 Basic design considerations affecting the design of high-tech.....	32
2-4-1 Function and representation in high-tech.....	33
2-4-2 Structure and services of high-tech.....	34
2-4-3 Space and flexibility of high-tech.....	36
2-4-4 A practical strategy of high-tech.....	38
2-4-5 The typology of High-tech.....	40
2-2 The revolution versus continuity of high-tech.....	41
2-6 Problems that faced architects in high technology buildings designed....	43
2-7Criticism Criteria of Hi-tech.....	45
2-8Conclusion Chapter Two.....	46

Part Two: Analytical Studying

Analysis Of Architects Product

3-Chapter Three- Norman Foster:

Introduction.....	47
3-1High Tech Architecture and High Tech Architects.....	47
3-1-1Norman Foster.....	49
3-1-1-1Biography.....	49
3-1-1-2Norman Foster's architecture philosophy.....	50
3-1-1-3Norman Foster Projects.....	51
3-1-1-4Compare between three Foster projects.....	66
3-1-1-5Pros and Cons of Norman Foster philosophy.....	67
3-2Conclusion Chapter Three.....	68

4-Chapter Four- Richard Rogers:

4-1-2 Richard Rogers.....	70
4-1-2-1 Biography.....	70
4-1-2-2 Richard Rogers's architecture philosophy.....	70
4-1-2-3Richard Rogers Projects.....	71
4-1-2-4 Compare between three Rogers projects.....	83
4-2Conclusion Chapter Four.....	84

5-Chapter Five- Nicholas Grimshaw:

5-1-3 Nicholas Grimshaw.....	86
5-1-3-1Biography.....	87
5-1-3-2 Nicholas Grimshaw's architecture philosophy.....	87
5-1-3-3 Nicholas Grimshaw Projects.....	87
5-1-3-4 Compare between three Nicholas Grimshaw projects	97
5-1-3-5Pros and Cons of Nicholas Grimshaw philosophy.....	98
5-2Conclusion Chapter Five.....	99

6-Chapter Six- Nicholas Grimshaw:

6-1-4Renzo Piano.....	100
6-1-4-1 Biography.....	100
6-1-4-2 Renzo Piano’s architecture philosophy.....	102
6-1-4-3 Renzo Piano Projects.....	102
6-1-4-4Compere between three Piano projects.....	113
6-1-4-5Pros and Cons of Renzo Piano philosophy.....	114
6-2Conclusion Chapter Six.....	115

7-Chapter Seven- Nicholas Grimshaw:

7-2-5 Frei Otto.....	117
7-2-5-1Biography.....	117
7-2-5-2 Frei Otto architecture philosophy.....	117
7-2-5-3 Frei Otto Projects.....	117
7-1-5-4Compere between three Otto projects.....	126
7-1-5-5Pros and Cons of Frei Otto philosophy.....	127
7-2Conclusion Chapter Seven.....	128
7-3Tracing the high tech features within the architecture product.....	129
7-4The Philosophy (Idea) and Architecture Thinking.....	130
7-5Conclusion Compare between pioneers of Hi-tech	131

Part Three: Analytical Studying

Analysis of Futuristic Architects of High-Tech

8-Chapter Eight- Ian Ritchie:

Introduction.....	132
8-1 High Tech Architecture and High Tech Architects.....	132
8-1-1Ian Ritchie.....	134
8-1-1-1Biography.....	134
8-1-1-2Ian Ritchie’s architecture philosophy.....	134
8-1-1-3Ian Ritchie Projects.....	134
8-1-1-4Compere between three Otto projects.....	142

8-1-1-5Pros and Cons of Ian Ritchie philosophy.....	143
8-2Conclusion Chapter Eight.....	144

9-Chapter Nine- jan kaplicky:

9-1-2Jan Kaplicky	146
9-1-2-1Biography.....	146
9-1-2-2Jan Kaplicky's architecture philosophy.....	146
9-1-2-3Jan Kaplicky Projects.....	146
9-1-2-4Compere between three Kaplicky projects.....	156
9-1-2-5Pros and Cons of Kaplick philosophy.....	157
9-2Conclusion Chapter Nine.....	158

10-Chapter Ten- jean Nouvel:

10-1-3Jean Nouvel	160
10-1-3-1Biography.....	160
10-1-3-2Jean Nouvel's architecture philosophy.....	160
10-1-3-3Jean Nouvel Projects.....	160
10-1-3-4Compere between three Nouvel projects.....	170
10-1-3-5Pros and Cons of Nouvel philosophy.....	171
10-1-4The result.....	172
10-2Conclusion Chapter Ten.....	174

Part Three: Analytical Studying

Results and Recommendation

11-Chapter Eleven- Results and Recommendation:

Introduction.....	176
11-1Study results.....	176
11-1-1The conclusions of the analytical study of the study samples for the "High-Tech" buildings.....	177
11-2Recommendations of the thesis.....	183
11-2-1Recommendations and Future Fields of Research.....	183

11-2-1-1 Recommendations to the architects interested in working on architectural buildings.....	183
11-2-1-2Recommendations presented to the parties in charge of teaching the architectural design course in architecture departments in different colleges and institutions.....	184
11-3Recommendations of futuristic studies.....	185

Figure

1-Chapter One:

Fig (1-1) Diagram of the industrial revolution (by researcher).....	1
Fig (1-2) Eiffel Tower was the world's tallest building from 1889 to 1930.	2
Fig (1-3) Eiffel Tower under construction in July 1888.....	3
Fig (1-4) First Iron bridge over the River Severn at Ironbridge Gorge, Shropshire, England, UK, 1779.....	4
Fig (1-5) The Crystal Palace, Paxton, 1851.....	4
Fig (1-6) Early Construction of the Crystal Palace. Illustrated London News (1850).....	4
Fig (1-7) building bourg la reine Francois Hennebique, 1890.....	5
Fig (1-8) building bourg la reine The most important buildings Which carried out Concrete.....	5
Fig (1-9) Inauguration ceremony, Crystal Palace, London, 1851.....	5
Fig (1-10) Interior of the Crystal Palace, Montreal glass and iron.....	5
Fig (1-11)Interior of the Crystal Palace, Montreal.....	5
Fig (1-12) Gropius Farnsworth_House, Baker bridg road, lincoln, Massachusetts, USA, 1938, Walter Gropius.....	9
Fig (1-13) Gropius Farnsworth_House, Baker bridg road, lincoln, Massachusetts, USA, 1938.....	9
Fig (1-14) Guoggenheim museum exterior and interior design , Newyork, 1956:1959, Frank Lioyd Wright.....	10
Fig (1-15)Tokyo Olimpaid for Kenzo Tanging 1964.....	11
Fig (1-16) aLegislative Assembly building in India Bchandejard architect Le Corbusier.....	11
Fig (1-17)Yale University building, Paul Rudolph.....	12
Fig (1-18) Map showing the sequence of appearance slick and hi-tech.(by researcher).....	16
Fig (1-19) Hans Hollein schullin jewelry shop, Vienna, Austria, 1974.....	17

Fig (1-20) Hans Hollein retti candle shop, Vienna, Austria, 1965.....	18
Fig (1-21) picture details.....	18
Fig (1-22) First Ironbridge over the River Severn at Ironbridge Gorge, Shropshire, England, UK, 1779.....	19
Fig (1-23)Palm House, Decimus Burton, Kew Gardens, 1844.....	19
Fig (1-24) living pod project by David Greene of Archigram, Alanding module for the planet Earth, 1965.....	20
Fig (1-25) Michael Webb's "bowellist"Furniture Manufacturer's Association Headquarters, 1958.....	21
Fig (1-26) Michael Webb's "bowellist"Furniture Manufacturer's Association Headquarters, 1958.....	21
Fig (1-27) James Stirling's Engineering Building at Leicester University, 195.21	

2-Chapter Two:

Fig (2-1) Diagram of Development of High Tech.....	26
Fig (2-2) Diagram of Rules of Hi-tech.....	28
Fig (2-3) Pompidou Center, Paris,1971-1979.....	29
Fig (2-4) Diagram of entrance to identify the high tech.....	30
Fig (2-5)John Hancock Center,860-880 Lake Shore Drive.....	30
Fig (2-6) Hongkong and Shanghai Bank Headquarters1979-1986.....	32
Fig (2-7) The Olympiapark in Munich, Germany, (GüntherBehnisch and Frei Otto's),1972.....	33
Fig (2-8) Digram of basic design considerations of hi-tech.....	33
Fig (2-9) Nicholas Grimshaw's, Ice Rink, Oxford, 1984.....	34
Fig (2-10) fabricated in factories.....	34
Fig (2-11) quickly bolted together on site.....	34
Fig (2-12) Norman Foster's Sainsbury Centre.....	35
Fig (2-13) The Inmos microprocessor factory, Richard Rogers,Newport, South Wales,1982.....	35

Fig (2-14) Inmos Factory, Structural system, This system provides uninterrupted column-free spaces for maximum internal flexibility.....	35
Fig (2-15) Renault Building, (now known as Spectrum), Swindon, Norman Foster, 1983, roof structure highly flexible and adaptive, able to accommodate a warehouse, training school, restaurant and showroom within a single enclosure. The building's yellow exoskeleton created.....	36
Fig (2-16) Richard Rogers, Interior rendering - Heathrow Airport Terminal 5, London, 1989-2008.....	37
Fig (2-17) Richard Rogers, Terminal 4 Madrid Barajas Airport - 1997-2005 Below baggage collection area Photo.....	38
Fig (2-18) Hong Kong and Shanghai Bank, skyscraper commercial office tower, bank headquarters, Norman Foster, 1979 to 1986, Design Sketch Section....	38
Fig (2-19) Richard Rogers, Interior - Thames Wharf Studios, London, 1984-1991.....	39
Fig (2-20) steel prefabricated Dymaxion bathroom, Buckminster Fuller, 1936	38
Fig (2-21) Herman Miller arehouse, Nicholas Grimshaw, Chippenham, 1973.	40
Fig (2-22) Nagakin Capsule Tower, Tokyo, Kisho Kurokawa, 1972.....	40
Fig (2-23) The Hopkins house, Michael Hopkins, London, 1976.....	41
Fig (2-24) Helmut Schulitz House, gerando, Los Angeles, CA, USA, 1973.....	41
Fig (2-25) House Almere, Benthem Crouwel, 1983.....	42
Fig (2-26) centre pompidou. urban context is not an overriding concern of high tech architecture.....	44
Fig (2-27) the Lloyd's building seen through tower bridge picturesque profile disguising a diagrammatic plan.....	44
Fig (2-28) Hong Kong bank in context.....	44
Fig (2-29) Diagram of Rules Of Hi-tech.....	46

3-Chapter Three:

Fig (3-1) Pioneers of hi tech architecture.....	49
Fig (3-2) Norman Foster Projects.....	53
Fig (3-3) Beijing Capital International Airport Beijing, China, 2008.....	54