Cheong Gye Cheon Restoration Project
- a revolution in Seoul -

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Before

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I. Introduction

- Seoul and Cheong Gye Cheon
Seoul & Cheong-Gye Cheon

Area: 600 km²
Population: 10 million

Cheong-Gye Cheon
- Length: 13.7 km
- Width: 20~85 m
Old map of Seoul
Early 20C
Problem: sanitation
Solution: covering
Covering work
(1958~1977)
Cheonggye Highway
(1967~1971)
Highway in 1990s
II. Cheong Gye Cheon 2002
Cheong Gye Cheon Area

- Building: over 6,000
- over 100,000 small shops
- Nation’s biggest commercial area
Declining old CBD

- CBD redevelopment stopped where the Cheonggye Expressway started
- Population and employment reduced
  - Population: 40,000
  - Employment: 80,000 in 10 years
- Business headquarters moved to Gangnam (new sub-center)
- Industries in CBD lost competitiveness
Safety problem

✓ Over all “C”, partially “D” or “E”
Safety problem

- Only small cars were allowed from 1997
- Maintenance cost soared: JPN ¥5,000,000,000 ('94~'99)
III. The Restoration Project
- Background
- Outline
- Challenges
- Progress
Decision to restore: July 2002
III. The Restoration Project

- Background
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Site location

- Total length: 5.84 km
  - Restoration of upper reaches of CGC on a long term basis
  - Divided into 3 sections to reduce the construction schedule
Demolition

- Covered structure and highway: 5.4 km
  - Waste (concrete+asphalt): 872,400 ton (96% recycled)
Demolition

- Dust and noise control was vital
River design

- **Design Criteria**
  - Secure the stream capacity for 200 years frequency rainfall (118mm/hr)

- **Access to Water:**
  - Install sidewalks along the lower level of the bank

![Diagram of river design with HWL (200yrs)]
Flow Section

- Basic design
  - secure flood capacity for 200 years frequency rainfall
  - introduce lower terrace to enhance easy access to water
Flooded in Aug 3, 2003

for intensity of 60mm/h, upstream near Cheong-Gye Plaza
Water supply

- Water supply plan
  - Water from the Han river: 120,000 ton/day
  - Underground water from subway stations: 22,000 ton/day

- Waterway plan
  - Depth: average 40 cm
  - Flow velocity: 0.24 m/sec
  - Measures to prevent water loss

- Water quality: better than the 2nd grade
  - BOD: 3mg/l or less
  - SS: 25 mg/l or less
  - DO: 5 mg/l or less
  - Total N: 10 mg/l or less
  - Total P: 1 mg/l or less
Pipe line system

Total length of pipe line: 20.7km
Sewer system

- **Design Criteria**
  - Combined sewer system for rainfall and wastewater
  - Capacity: 3 times of estimated wastewater

- **Combined Sewer System**
Bridge design

- Number of bridges: 22
- Design Criteria
  - Minimize flow resistance
  - Harmony with surrounding area
    - artistic landmark
- International concept design competition
Landscape design

- **Concepts**
  - New green belt with waterfront: West to East
  - Gradual transformation from urban landscape to natural environment
  - Create ecological biotop and environment
  - Thematic places: waterfall and fountains
Typical planting section

Street Tree
- 느티나무
- 토사식재구간 및 플랜트박스 설치 구간

Wall greening
- 콘크리트 및 물เสา기 사이면의 녹화
- 아수령/중شاب생식물
- 담장이영글, 홀사철, 인중당글

Marsh area

Street Tree
- 정돈된 기로변 녹화
- 이엽나무

언주역식재
- 갈대, 갯버들, 물액새 등

식생의 입체적 연결
Lighting plan

- Design Concept
  - Target areas: Start point, Gwang-Gyo, Supyo-gyo and Dongdaemun
  - Appropriate degree of illumination based on fish and insect life.
  - 3-Dimensional consideration
III. The Restoration Project

- Background
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Challenge 1: Transport

- Cheonggye road & hwy
  - Urban backbone corridor
  - 170,000 vehicles/day

- Traffic disaster warned
  - Media, interest group
  - Traffic simulation
  - Project delay
Solutions to transport

- Discourage driving cars in the city centre
  - Leave cars at home one out of 10 days
- Improve traffic flow system
  - One-way streets
- Improve public transport
  - Bus-only lanes
  - Downtown shuttle buses
Challenge 2: Neighboring merchants

- **Business decline**
  - Access difficulty: traffic congestion
  - Worse environment: noise & dust due to construction
Solutions to merchants

- Detailed survey on the markets and continuous interviews
  - consultation offices at the markets
  - regular meeting on the project

- Minimize inconvenience for business activity
  - state-of-the-art technology
  - provide parking space nearby
Solutions to merchants

- **Stimulate business activity**
  - Reduce parking fee
  - Improve parking system for loading & unloading
  - Promote Cheong Gye Cheon stores

- **Financial support and subsidies**
  - Low-interest loans
  - Grants for the market remodeling

- **Special arrangement for street vendors**
III. The Restoration Project

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Construction progress

Started on 1 July 2003
Construction progress

Stage 1: Scaffolding (July 2003)
Construction progress

Construction progress

Stage 3: Covered road demolition (Jan 2004)
Construction progress

Stage 4: Sewer, road & bridge construction (Sep 2004)
Construction progress

Stage 5: Landscaping for the recovered area (May 2005)
First water supply

1 June 2005
Test running & Final touch

June ~ September 2005
Grand opening

1 October 2005
IV. Cheong Gye Cheon 2006
Monitor the changes due to the project

- from Jan 2003~May 2006
- before, during and after the project

Monitoring areas

- Land use
- Industry
- Environment
- Ecology
- Traffic
- Public opinion
- Ripple effect
Traffic

- Speed in CBD
  - 15.5 \( \Rightarrow \) 13.6 km/hr (-12.3%)
    - Morning peak: 17 km/hr
    - Evening peak: 12 km/hr
  - not very much worsened

- Car in/out flow
  - 1.56M \( \Rightarrow \) 1.27M (-18.6%)

- Public transport rider-ship
  - Bus: + 6~10 %
  - Subway: + 6~9 %
Environment

Changes

- **Air**
  - $\text{NO}_2$: 69.7 $\Rightarrow$ 46.0 ppb (-34%)
  - PM10: 74.0 $\Rightarrow$ 60.0 $\mu$g/m$^3$ (-19%)

- **Water quality**
  - BOD: 100~250 $\Rightarrow$ 1~2 ppm

- **Noise level reduced**
- **Heat island effect relieved**
- **Wind corridor created**
Cooling effect

Thermal image
27 July 2005

Average 32.7°C
Cheong Gye Cheon

-3.6°C

Average 36.3°C
Nearby street
Environmental improvement

Public survey (Nov 2005)

- Air
- Water
- Noise
- Odour
- Daylight
- Wind

Changes

- V improved
- Improved
- Unchanged
Ecology: Fishes

- 4 → 25 species
Ecology: Birds

- 6 → 36 species
Ecology: Insects

- 15 species
- 192 species

Changes
V. Final Remarks
Most preferred destination
Most preferred destination
Future of Cheong Gye Cheon

- Identity as the 600 yr old Capital
  - Harmony between preservation & development
- Economic vitality
- Pedestrian oriented street system
Further information

http://english.seoul.go.kr/cheonggye/

Thank you for your attention!