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# Construction of the Optical Fiber Submarine Cable System in Korea

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## [1] Introduction

This paper describes the necessity and feasibility, the objective area and applied method, and project costs for the construction of repeaterless optical fiber cable system in land and submarine under the project of Korea Optical Fiber Submarine Cable System.

At the moment, KTA is planning to construct the repeaterless optical fiber submarine cable system between main land and Ullung island in the near future.

Some fundamental requirements are already studied and their main factors are introduced in this paper.

I do hope that this paper should be a useful reference for your idea.

## [2] Background of the construction of the optical fiber submarine cable system in Korea

### 1) Government Policy

- Encouraging the development
- Enlarging the distribution of the cultural and welfare facilities equally
- Rapid establishment of the highly developed nation-wide information society

### 2) Telecommunication Policy

- Unifying the telecommunication charge in nation-wide
- Modernizing the telecommunication networks for remote islands

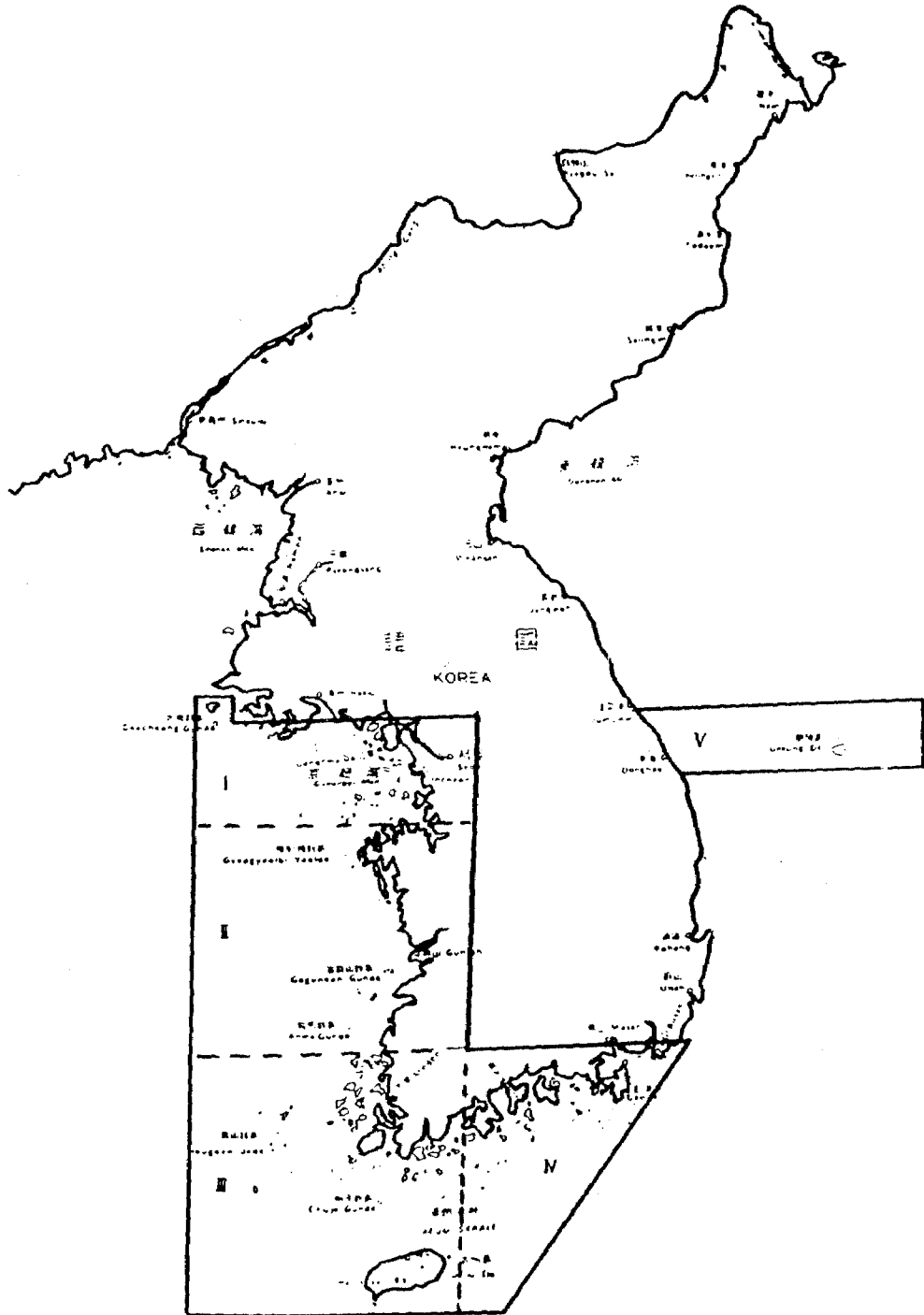


Fig. 1)

- Providing the special services including video and data
- Controlling the telephone service area in remote island by using the host switching system located in main land

3) Miscellaneous

- Developing the technology of the optical fiber submarine cable system (extention of the repeaterless span)
- Preparing for the long term demands of various telecommunications (The characteristics of demands are broadband, large capacity, high speed, high quality)
- Construction of the cost effective optical fiber submarine cable system

3 Selection of the objective island and its applied method

1) Selection criteria of the objective islands: the following factors should be considered for selecting objective areas.

- Development concerned with resident area
- Efficient allocation of the radio frequency (radio frequency interference is a serious problem in highly densed island areas)
- High quality and large capacity of transmission media
- Trade and industrial merits with neighboring countries

In consideration of the above criteria, Korea coastal area is divided into 5 zones as shown in Fig 1.

2) Applied method

Especially, the West and South coastal greas in Korea are very shallow, and many islands

are densely located in these areas.

Therefore, the priority of the construction of the optical fiber submarine cable system in Korea shall be given to the living zone.

Also, KTA International has completed a feasibility study on optical fiber submarine cable system using repeaterless technique between the East coast and Ullung island and we concluded that the repeaterless system would be applicable in this area.

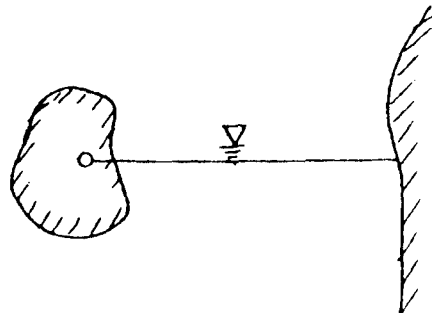
3) Characteristics of the repeaterless system

As the submersible repeater and its peripheral equipments are not required, the repeaterless submarine cable system shall be constructed with the following characteristics.

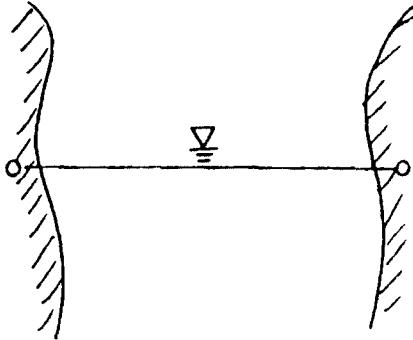
- Simple structure
- Cost effective construction
- High reliability
- Easy maintenance and repairing
- Composing the combined optical and electrical cable system
- No limitation of the quantity of core
- Adding video, data services to the system easily (TV broadcasting, electronic school, electronic clinic service, etc.)
- Easy handling of the submersible cable by small or medium cable ship

4) Application of repeaterless system

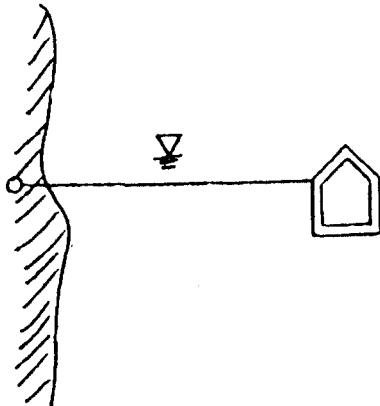
(1) link to main land



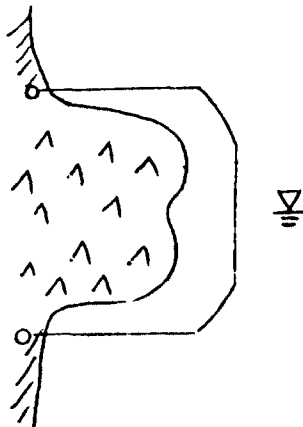
(2) Through the strait



(3) link to sea plant



(4) Bypass link



#### 4] Comparison of construction cost in land and submarine.

The fig-2 shows the investment slope of two different cable systems.

(Preconditions)

- Construction cost based on detailed engineering result in 1988
- Exception of the compensation cost for private land and fishery rights
- Span: upto-50km
- Exception of the cost of terminal equipment

-Exception of the cost of operation and maintenance

(Result)

-The construction cost for the first 1km

land : US\$55,000,-

sea : US\$394,000,-

-The equation of the cost in the land:

$$CL=0.521L+0.029$$

-The equation of the cost in the sea:

$$CS=0.197L+3.743$$

-Cross point is appeared nearby 11.5km, the optical fiber submarine cable construction is more economical than the land cable system in case of 11.5km or longer span.

#### 5] General requirements of new project in Korea.

A new optical fiber submarine cable system is planned to be constructed in the east sea of Korea with the following requirements.

1) System requirements

-RFS : End of 1992

-System capacity : more than 90Mbps

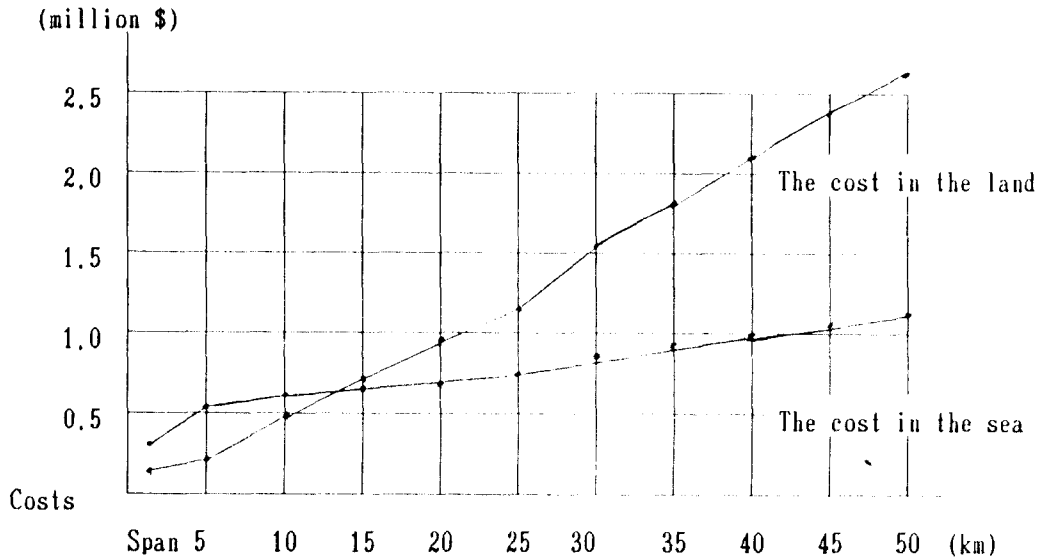


Fig - 2

- System life : longer than 25 years
- System type : repeaterless
- System interface: between domestic system (1.3um) and foreign system (1.5um)
- Cable length : 160km(approximately)
- Usage : Telephone service  
T.V broadcasting service  
Data service

## [6] Conclusion

The repeaterless system will be applicable to the optical fiber submarine cable system for the Korean domestic networks in view of the geographical characteristics.

A special consideration on research and development shall be given in this field, to the tasks of magnification of the optical fiber submarine cable system, and cost effective construction.

It is desirable to exchange information and technologies between the countries under the close cooperative activities, and also desirable that a new regional organization in this field shall be constituted in the near future.

이 논문은 1989년 11월 6일 부터 11월 8일까지 일본 우정성 주최로 동경에서 개최된 아시아-태평양 지역 해저 광 케이블 시스템의 망과 기술에 대한 국제 협력을 위한 세미나에서 발표된 것이다.

참석 국가: 한국, 일본, 필리핀, 말레이시아, 싱가포르, 호주, 인도네시아, 태국, ADB 관계자 등이다.



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## 저지약력

- 1942년 7월 5일생
- 한국항공대학 전자공학과 졸업
- 해군 전자장교
- 제 5 회 기술고시, 체신부 근무
- TCOM Westinghouse 근무
- 삼성전기산업(주) 부사장
- 동성통신기술(주) 대표이사
- 현재 KTAI 상무이사
- 통신기술사, 공학박사

## 용어해설

- **오퍼레이팅 시스템(operating system)**: 컴퓨터에 의한 처리의 효율화와 조작의 용이화에 의하여 시스템의 가용성(可用性)을 높이고 대가적 성능비의 향상을 목표로 하는 소프트웨어 시스템의 총칭이다. 이것은 제어 프로그램, 언어 처리 프로그램, 유틸리티 프로그램, 시스템 제너레이션 프로그램 등으로 구성된다.
- **온도 상승(temperature rise)**: 기기 자체의 내부 손실로 인해 기기내의 온도가 주위 온도보다 고온이 되는 경우를 뜻한다. 좁은 의미로는 온도가 포화 상태에 있는 기기와 주위의 온도차를 가리킨다.
- **온도 조절기(thermostat)**: 제어 대상이 되는 온도를 검출하여 안정된 온도로 유지시키기 위해서 전자 밸브, 전동 밸브 등에 신호를 보내는 온도 조절기로서 제어 동작 방식에는 ON-OFF 식과 비례식(比例式)이 있다.
- **온 디맨드 영역(on-demand zone)**: 온 디맨드 프로그램이 프로세서에 위치하는 영역. 오우벌레이 영역이라고도 한다.
- **온 라인(on-line)**: 정보의 전송 과정에 있어서 단말 기기가 데이터 송신 회선을 통하여 컴퓨터에 접속되고 있는 상태 또는 입출력 장치 등의 주변 장치가 중앙 전산 처리 장치와 전기적, 논리적으로 접속되어 그 제어하에 있는 상태를 가리키며, 컴퓨터의 본체와 입출력 장치를 직접 연결시켜 동작하는 것을 온 라인 동작이라 한다. 또한 전자 교환기의 소프트웨어 프로그램들이 정상적으로 동작하여 교환 시설의 기본 임무를 수행할 수 있는 상태를 의미하기도 한다.