

# Business case study for the development of ship STEP ATS 318

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## 요약

STEP은 제품모델 정보를 서로 다른 CAD 시스템에서 교환할 수 있게 하기 위한 중립형식의 국제표준으로서 CALS/EC의 구현을 위해 필수적인 핵심기반 기술이다. 선박 관련 STEP은 지금까지 미국과 유럽의 여러 연구사업을 통해 개발되어 오고 있으며 AP215(선박구획배치), AP216(선박선형), AP217(선박배관), AP218(선박구조) 은 올해 안에 CD(Committee Draft) 안이 완성될 예정이다.

우리나라는 일본과 함께 세계 조선시장을 양분하고 있는 조선 강국이면서도 관련 정보기술의 낙후로 STEP 기술 개발에는 미온적이었으나 최근 선박해양공학분소에서 과기부의 특정과제로 수행하는 KS-STEP 과제를 통하여 ATS 318 (AP218, 선박구조의 ATS) 개발 책임을 맡게되어 본격적인 관련 연구를 시작하게 되었다.

여기에서는 ATS 318 개발을 위해 조선소와 선급 등 선박관련 업체들의 기술 정보 교환 프로세스를 분석하여 나타내었다. 각 프로세스에서 요구되는 기술정보의 형태와 추상화 정도가 분석되고 선박 STEP AP들의 기반 구조인 SCM(ship common model)에서 어떻게 그들 특성을 지원해야 하는지를 검토하였다.

## KS-STEP Project

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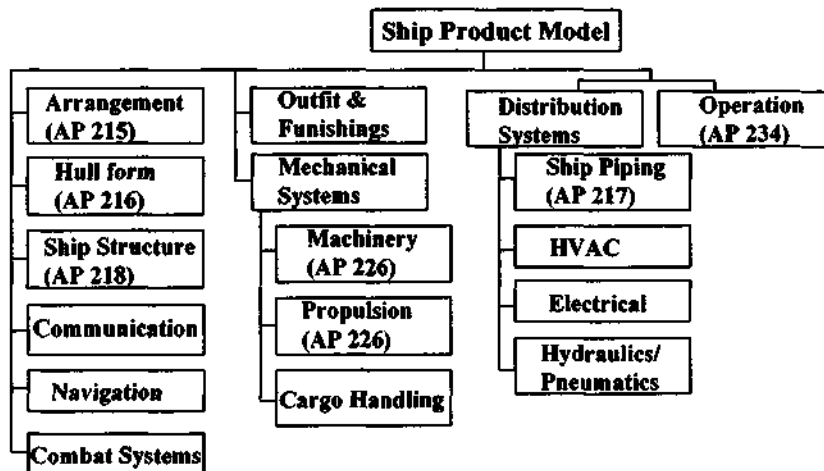
- Duration : 1998. 9 - 2001. 7
- Participants :
  - KRISO, KAIST, KR, DAEWOO, SAMSUNG
- Purpose :
  - Contribute to the international standardization efforts for ship product model
  - Promote STEP in Korean shipbuilding industry and classification society
- Contents :
  - Development of ATS 318
  - Development of prototype systems based on the ship-STEP
    - On-line ship structure approval system between KR and shipyards

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## Ship STEP AP's

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## What is an ATS

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- 'abstract'
  - means 'generic' or 'applies to all'
- test suite
  - a collection or range of tests
- test case
  - a specific test to assess conformance
- ATS
  - define necessary tests in a form that is applicable to all processors to be tested.
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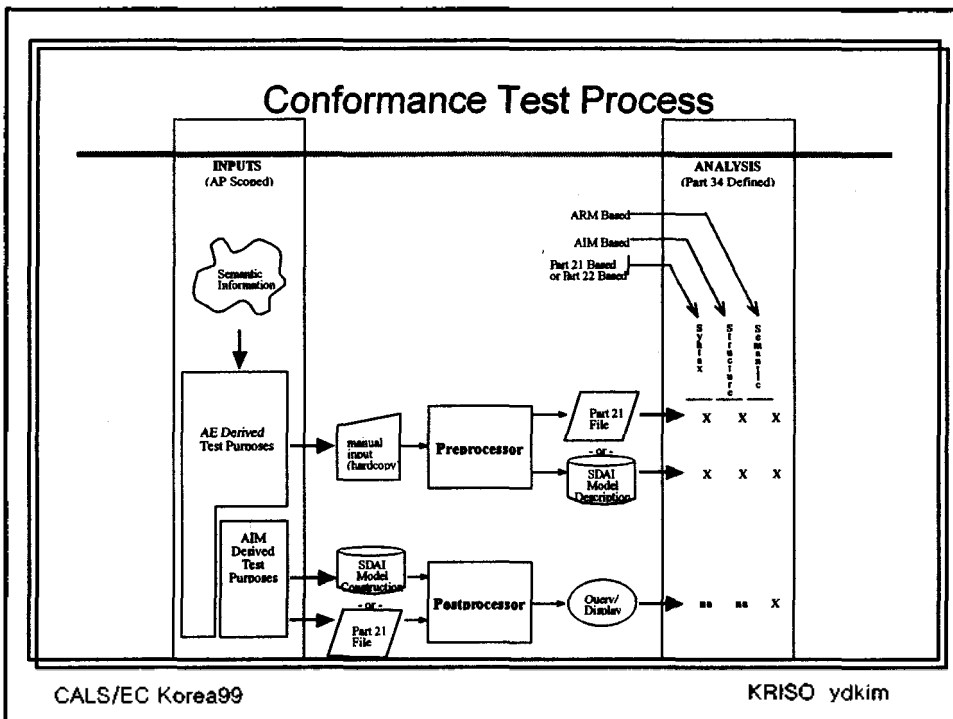
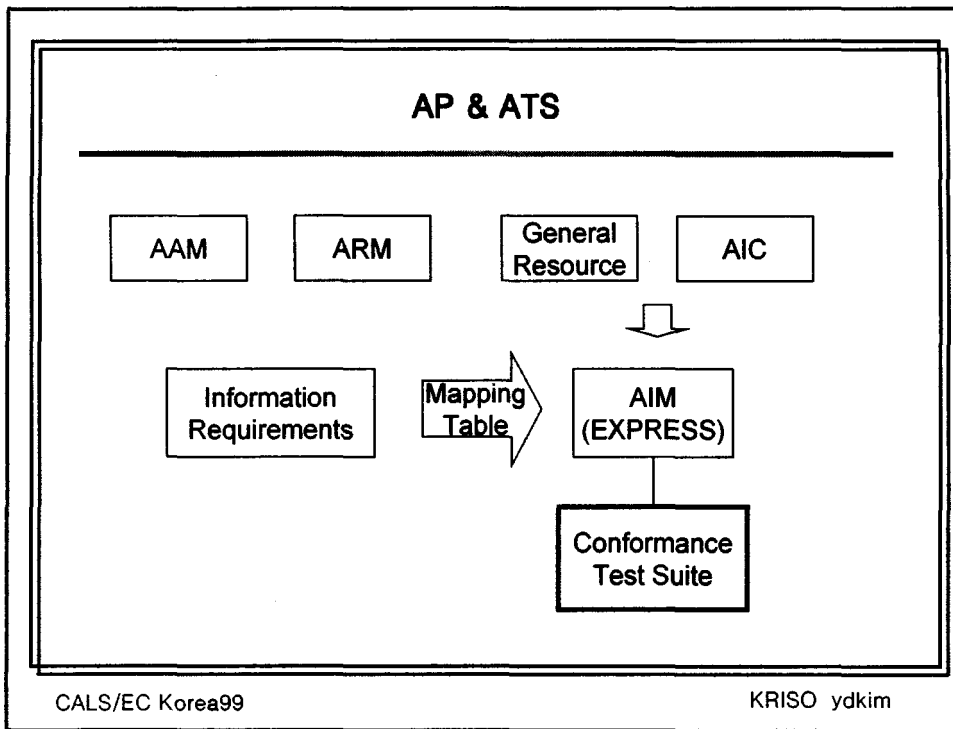
## Purpose of ATS

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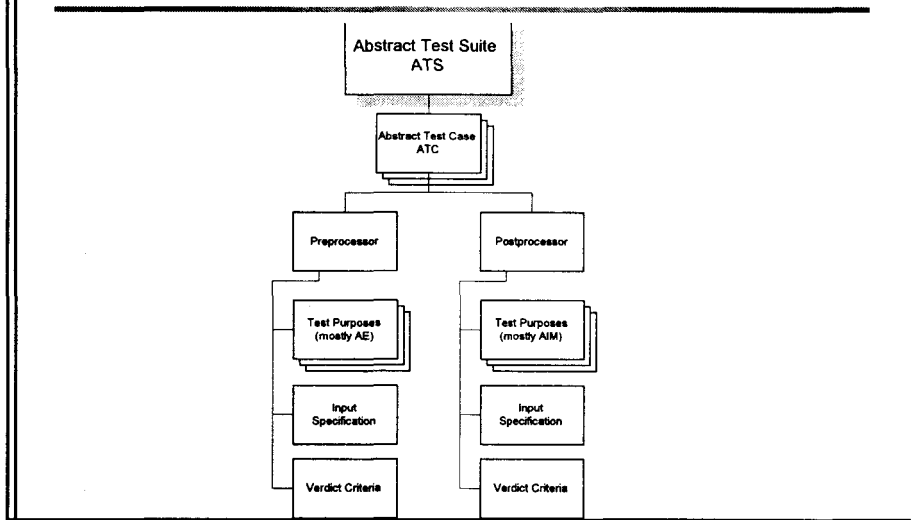
- Relation with AP
  - To make AP complete, consistent or perfect in the way developing ATS.
  - So AP can be completed only with accompanying ATS
- Conformance test
  - To insure any systems supporting ship STEP that they really work with defined test cases.

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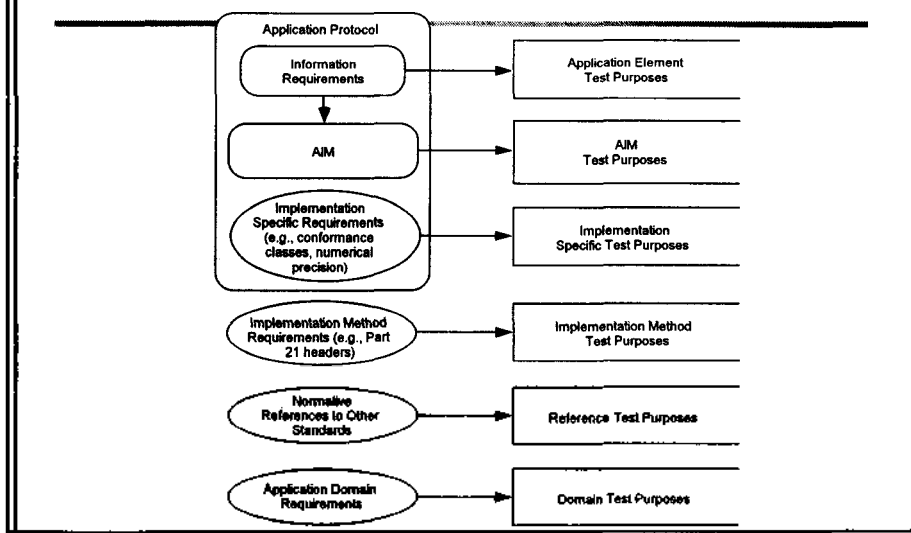
## The Structure of ATS



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## Test Purpose Sources



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## General test purpose & Verdict criteria

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- **General test purpose**
  - Statements of requirements that apply to all ATC
- **General verdict criteria for all ATC**
  - The semantics of the input model are preserved in the output of the IUT(implementation under test)
- **General verdict criteria for preprocessor ATC**
  - The output of a preprocessor conforms to the implementation method the IUT claims conformance to
- **General verdict criteria for postprocessor ATC**
  - The post processor accepts input data which is enclosed according to the implementation method the IUT claims conformance to

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## Abstract Test Cases (1)

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- **Title**
  - Test case summary
  - Other test purpose coverage
  - Execution sequence
  - Extra details
- **Preprocessor**
  - Input specification (Table)
  - Constraints on values
  - Specific verdict criteria
  - Execution sequence
  - Extra details

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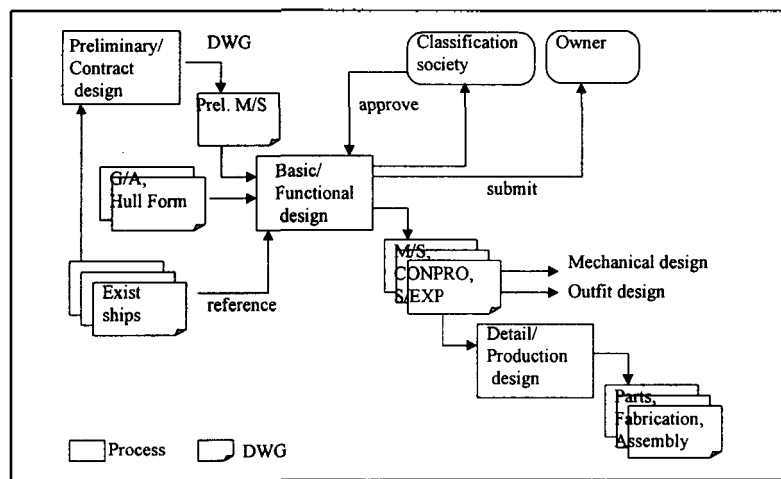
## Abstract Test Cases (2)

- Postprocessor
  - AIM test purpose coverage
  - Input specification (STEP file or EXPRESS-I documentation)
  - Specific verdict criteria
  - Execution sequence
  - Extra details

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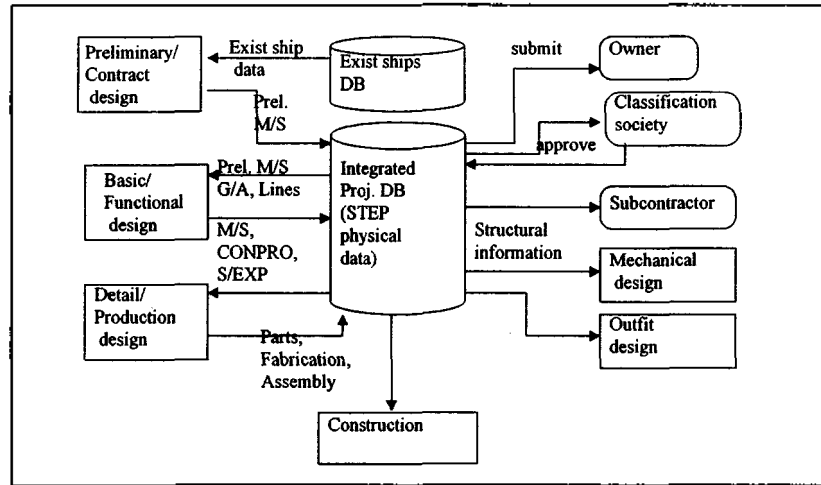
## As-Is Process of ship structural Design



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## To-Be Process of ship structural Design



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## Consideration to ATS 318

- Ship STEP is composed of several AP's
  - AP 215, 216, 217, 218, 226 and still more...
  - Sharing information with other AP's
    - Some test case may include test case of other ATS as a part of it
- Should reflect the growing information as to the phase of life-cycle stage
  - Preliminary, functional, detail and production design phase
    - Diverse test cases to fit the design phase
- Should reflect the processes of the top-level shipbuilding industries
  - Korean industries

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## 1st B/C : Exchange of Midship structure data

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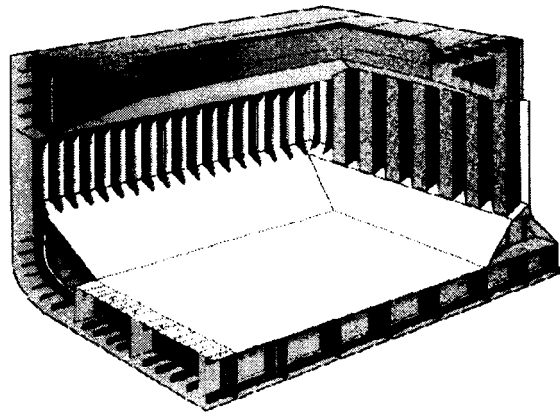
- **Midship structure**
  - covers more than half part of the whole ship structure
  - included in contract design as preliminary design status
  - key plan for the approval of classification society
- **Information to be defined**
  - materials
  - configuration(geometry)
  - structural parts arrangement (functional view)
  - assembly (weld connection)
  - environments (design loads,..)

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## Typical Midship Structure

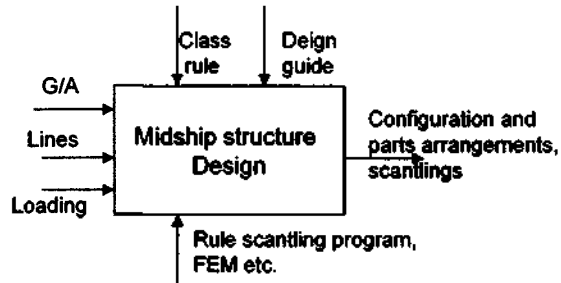
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## Midship structure design



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## Information requirements

- **G/A, Lines :**
  - 3-D surface model
  - to be imported as digital format
- **Loading and analysis :**
  - automatic generation analysis model
- **Definition of structural configuration**
  - at preliminary stage : parametric configuration
  - at functional design stage :
    - bounded connection relation
    - parts level configuration with the room of detail design

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## Conclusion

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- Using STEP
  - Streamlining the ship design process
  - Reduction of time and manpower
- Development of ATS
  - Can reflect the domestic design process to the international standard
    - enhancement of competitive power of domestic industry
  - Contribute to the international standardization efforts for ship product model
- Implementation of STEP ATS
  - Core technology for the shipbuilding CALS system