INVENTIVE PRINCIPLES TO SOLVE THE TECHNICAL CONTRADICTIONS

STANDARDS

- Su-Field systems building and destroying
- Su-Field systems development
- Standards for measurement and revealing
- Techniques for introduction to Su-Field of the new elements without any elements: copies use, emptiness, substances modification
- Standards for transition to above-system and to micro-level

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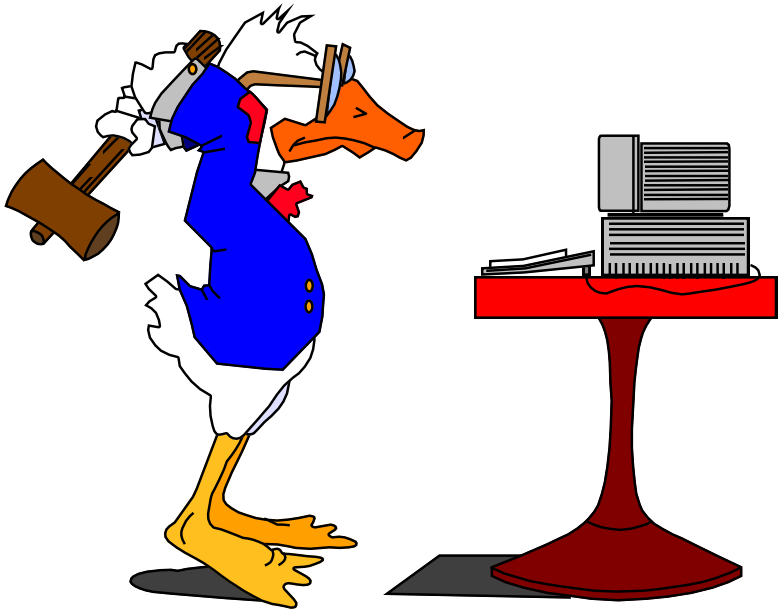
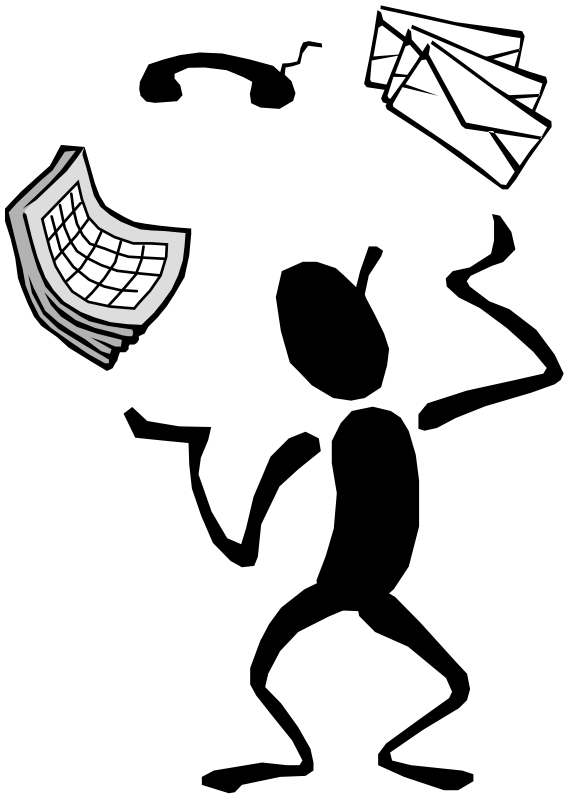
SEGMENTATION

- Divide an object into independent parts
- Make an object easy to disassemble
- Increase the fragmentation or segmentation degree



TAKING OUT

Separate an interfering part or property from an object, or single out the only necessary object part (or property)



MERGING

- Bring closer together (or merge) identical or similar objects, assemble identical or similar parts to perform parallel operations
- Make operations contiguous or parallel; bring them together in time

PRELIMINARY ACTION

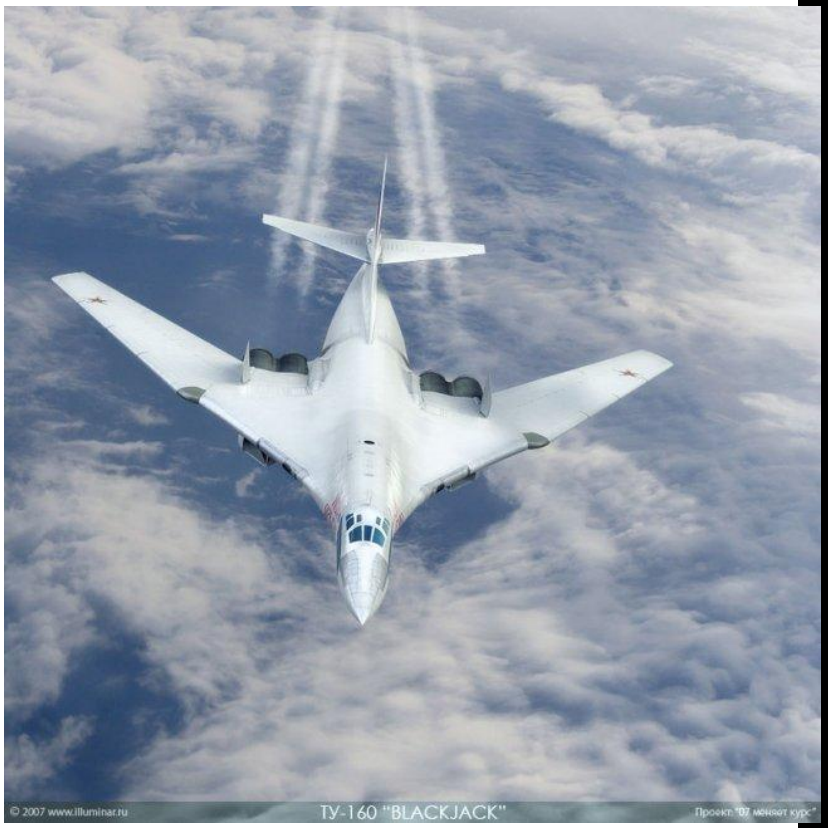
- Perform, before it is needed, the required object change (either fully or partially)
- Pre-arrange objects on such a way that they can come into an action from the most convenient place and without losing time for their delivery

THE OTHER WAY ROUND

- Invert the action(s) used to solve the problem (e.g. instead of cooling an object, heat it)
- Make movable parts (or the external environment) fixed, and fixed parts movable
- Turn the object (or process) 'upside down'

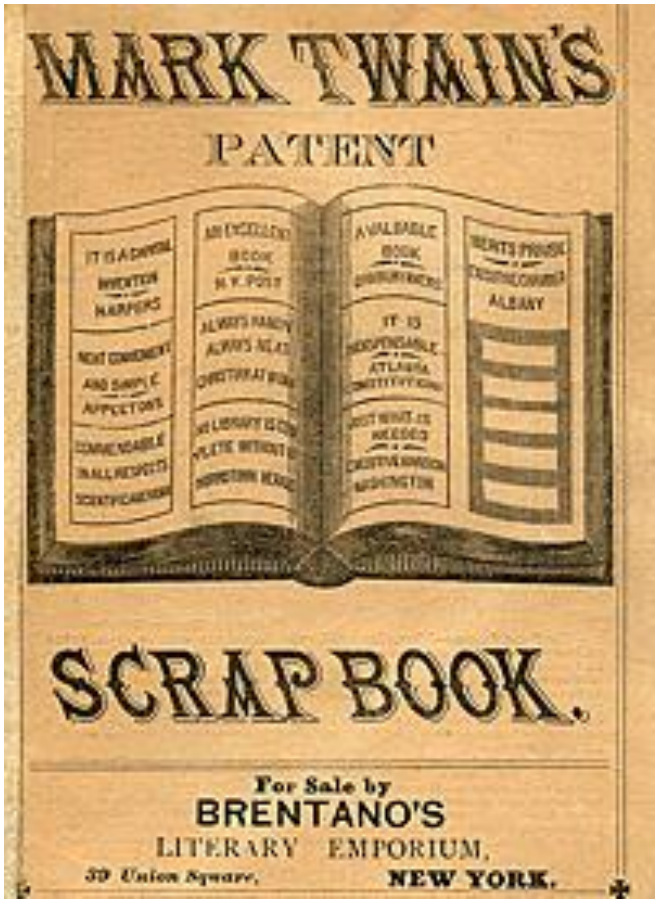
DYNAMICS

- Allow (or design) the object characteristics, external environment, or process to optimal change or to find an optimal operating condition
- Divide an object into parts capable of movement relative to each other
- If an object (or process) is rigid or inflexible, make it movable or adaptive



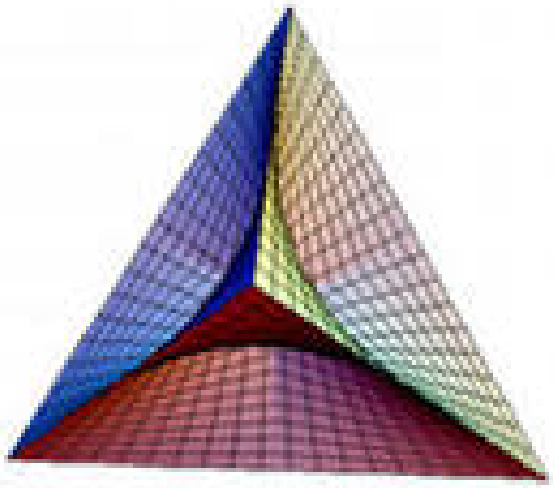
PARTIAL OR EXCESSIVE ACTIONS

If 100 percent of an object is hard to achieve using a given solution method then, by using 'slightly less' or 'slightly more' of the same method, the problem may be considerably easier to solve



ANOTHER DIMENSION

- To move an object in two- or three-dimensional space
- Use a multi-story objects arrangement instead of a single-story one
- Tilt or re-orient the object, lay it on its side
- Use 'another side' of a given area



“BLESSING IN DISGUISE” OR “TURN LEMONS INTO LEMONADE”

- Use harmful factors (particularly, harmful effects of the environment or surroundings) to achieve a positive effect
- Eliminate the primary harmful action by adding it to another harmful action to resolve the problem
- Amplify a harmful factor to such a degree that it is no longer harmful:

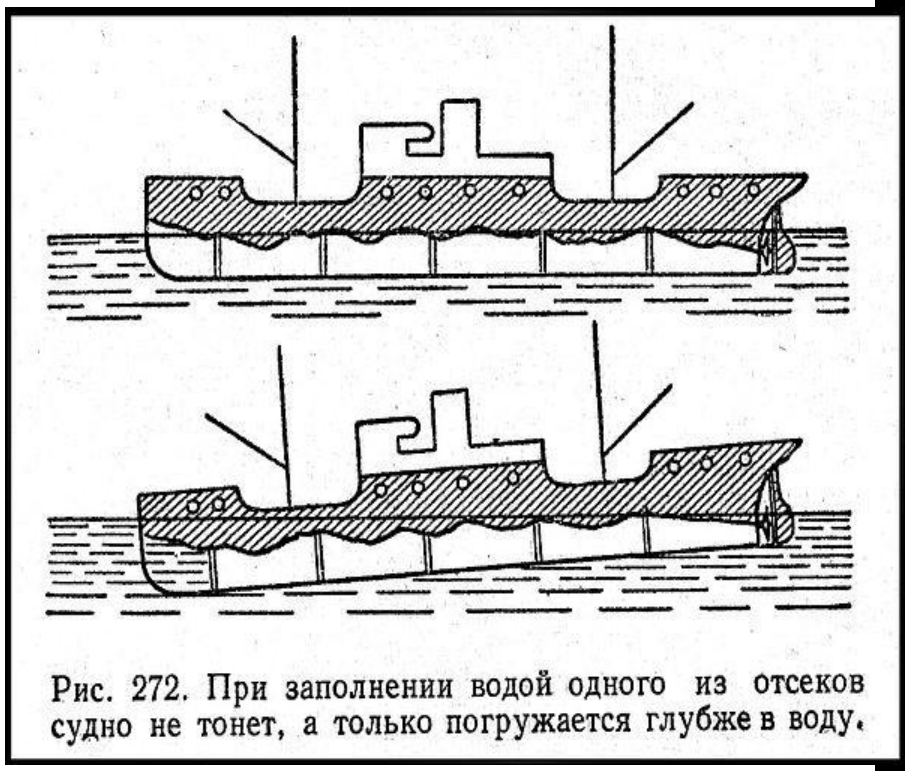


Рис. 272. При заполнении водой одного из отсеков судно не тонет, а только погружается глубже в воду.

COPYING

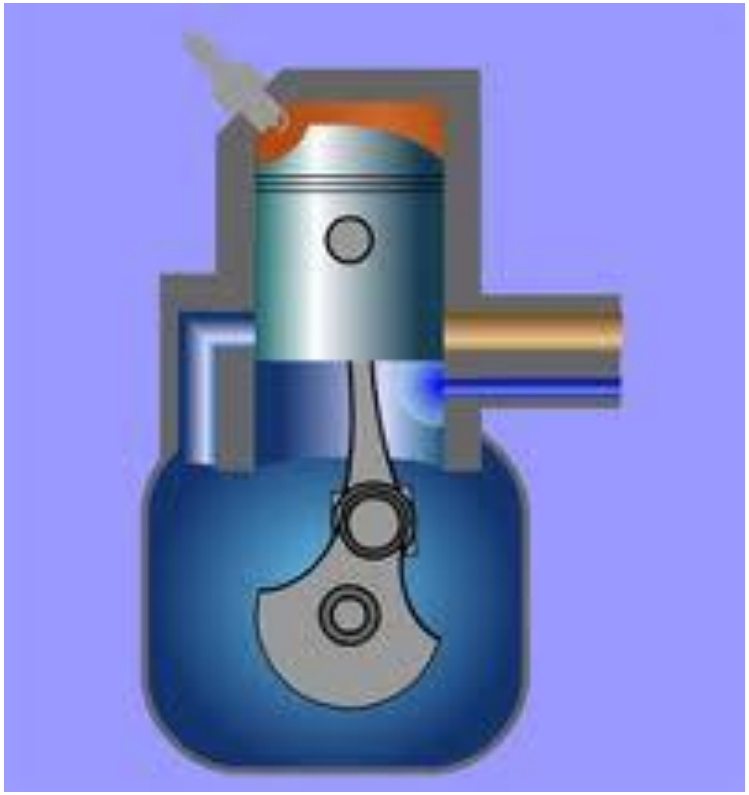
- Instead of an unavailable, expensive, fragile object, use simpler and inexpensive copies
- Replace an object, or process with optical copies
- If visible optical copies are already used, move to infrared or ultraviolet copies

MECHANICS SUBSTITUTION

- Replace a mechanical means with a sensory (optical, acoustic, taste or smell) ones
- Use electric, magnetic and electromagnetic fields to interact with the object
- Change from static to movable fields, from unstructured fields to those having structure
- Use fields in conjunction with field-activated (e.g. ferromagnetic) particles

POROUS MATERIALS

- Make an object porous or add porous elements (inserts, coatings, etc.)
- If an object is already porous, use the pores to introduce a useful substance or function

PHASE TRANSITIONS

- Use phenomena occurring during phase transitions (e.g. volume changes, loss or absorption of heat, etc.)