Construction

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Construction is the process involved in delivering buildings, infrastructure, industrial facilities, and associated activities through to the end of their life. It typically starts with planning, financing, and design that continues until the asset is built and ready for use. Construction also covers repairs and maintenance work, any works to expand, extend and improve the asset, and its eventual demolition, dismantling or decommissioning.

The construction industry contributes significantly to many countries' gross domestic products (GDP). Global expenditure on construction activities was about $4 trillion in 2012. In 2022, expenditure on the construction industry exceeded $11 trillion a year, equivalent to about 13 percent of global GDP. This spending was forecasted to rise to around $14.8 trillion in 2030.

The construction industry promotes economic development and brings many non-monetary benefits to many countries, but it is one of the most hazardous industries. For example, about 20% (1,061) of US industry fatalities in 2019 happened in construction.

Grammatical construction

phrasal verbs. Grammatical constructions form the primary unit of study in construction grammar theories. In construction grammar, cognitive grammar,

In linguistics, a grammatical construction is any syntactic string of words ranging from sentences over phrasal structures to certain complex lexemes, such as phrasal verbs.

Grammatical constructions form the primary unit of study in construction grammar theories. In construction grammar, cognitive grammar, and cognitive linguistics, a grammatical construction is a syntactic template that is paired with conventionalized semantic and pragmatic content. In generative frameworks, constructions are generally treated as epiphenomenal, being derived by the general syntactic rules of the language in question.

Powerset construction

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In the theory of computation and automata theory, the powerset construction or subset construction is a standard method for converting a nondeterministic finite automaton (NFA) into a deterministic finite automaton (DFA) which recognizes the same formal language. It is important in theory because it establishes that NFAs, despite their additional flexibility, are unable to recognize any language that cannot be recognized by some DFA. It is also important in practice for converting easier-to-construct NFAs into more efficiently executable DFAs. However, if the NFA has n states, the resulting DFA may have up to 2n states, an exponentially larger number, which sometimes makes the construction impractical for large NFAs.

The construction, sometimes called the Rabin–Scott powerset construction (or subset construction) to distinguish it from similar constructions for other types of automata, was first published by Michael O. Rabin and Dana Scott in 1959.

Seabee

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United States Naval Construction Battalions, better known as the Navy Seabees, form the U.S. Naval Construction Forces (NCF). The Seabee nickname is a heterograph of the initial letters "CB" from the words "Construction Battalion". Depending upon context, "Seabee" can refer to all enlisted personnel in the USN's occupational field 7 (OF-7), all personnel in the Naval Construction Force (NCF), or Construction Battalion. Seabees serve both in and outside the NCF. During World War II they were plank-holders of both the Naval Combat Demolition Units and the Underwater Demolition Teams (UDTs). The men in the NCF considered these units to be "Seabee". In addition, Seabees served as elements of Cubs, Lions, Acorns and the United States Marine Corps. They also provided the manpower for the top secret CWS Flame Tank Group. Today the Seabees have many special task assignments starting with Camp David and the Naval Support Unit at the Department of State. Seabees serve under both Commanders of the Naval Surface Forces Atlantic/Pacific fleets as well as on many base Public Works and USN diving commands.

Naval Construction Battalions were conceived of as replacements for civilian construction companies in combat zones after the attack on Pearl Harbor. At the time civilian contractors had roughly 70,000 men working U.S.N. contracts overseas. International law made it illegal for civilian workers to resist an attack. Doing so would classify them as guerrillas and could lead to summary execution. The formation of the Seabees amidst the aftermath of the Battle of Wake Island inspired the backstory for the World War II movie The Fighting Seabees. They also feature prominently in the wartime musical drama (and subsequent film) South Pacific.

Adm. Moreell's concept model CB was a USMC trained military equivalent of those civilian companies: able to work anywhere, under any conditions or circumstances. They have a storied legacy of creative field ingenuity, stretching from Normandy and Okinawa to Iraq and Afghanistan. Adm. Ernest King wrote to the Seabees on their second anniversary, "Your ingenuity and fortitude have become a legend in the naval service." They were unique at conception and remain unchanged from Adm. Moreell's model today. In the October 1944 issue of Flying, the Seabees are described as "a phenomenon of WWII".

Plus construction

In mathematics, the plus construction is a method for simplifying the fundamental group of a space without changing its homology and cohomology groups

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Explicitly, if

X

{\displaystyle X}

is a based connected CW complex and

P

{\displaystyle P}

is a perfect normal subgroup of

?

1

(

X

)

{\displaystyle \pi _{1}(X)}

then a map

f

:

X

?

Y

{\displaystyle f\colon X\to Y}

is called a +-construction relative to

P

{\displaystyle P}

if

f

{\displaystyle f}

induces an isomorphism on homology, and

P

{\displaystyle P}

is the kernel of

?

1

(

X

)

?

?

1

(

Y

)

{\displaystyle \pi _{1}(X)\to \pi _{1}(Y)}

.

The plus construction was introduced by Michel Kervaire (1969), and was used by Daniel Quillen to define algebraic K-theory. Given a perfect normal subgroup of the fundamental group of a connected CW complex

X

{\displaystyle X}

, attach two-cells along loops in

X

{\displaystyle X}

whose images in the fundamental group generate the subgroup. This operation generally changes the homology of the space, but these changes can be reversed by the addition of three-cells.

The most common application of the plus construction is in algebraic K-theory. If

R

{\displaystyle R}

is a unital ring, we denote by

GL

n

?

(

R

)

{\displaystyle \operatorname {GL} _{n}(R)}

the group of invertible

n

{\displaystyle n}

-by-

n

{\displaystyle n}

matrices with elements in

R

{\displaystyle R}

.

GL

n

?

(

R

)

{\displaystyle \operatorname {GL} _{n}(R)}

embeds in

GL

n

+

1

?

(

R

)

{\displaystyle \operatorname {GL} _{n+1}(R)}

by attaching a

1

{\displaystyle 1}

along the diagonal and

0

{\displaystyle 0}

s elsewhere. The direct limit of these groups via these maps is denoted

GL

?

(

R

)

{\displaystyle \operatorname {GL} (R)}

and its classifying space is denoted

B

GL

?

(

R

)

{\displaystyle B\operatorname {GL} (R)}

. The plus construction may then be applied to the perfect normal subgroup

E

(

R

)

{\displaystyle E(R)}

of

GL

?

(

R

)

=

?

1

(

B

GL

?

(

R

)

)

{\displaystyle \operatorname {GL} (R)=\pi _{1}(B\operatorname {GL} (R))}

, generated by matrices which only differ from the identity matrix in one off-diagonal entry. For

n

>

0

{\displaystyle n>0}

, the

n

{\displaystyle n}

-th homotopy group of the resulting space,

B

GL

?

(

R

)

+

{\displaystyle B\operatorname {GL} (R)^{+}}

, is isomorphic to the

n

{\displaystyle n}

-th

K

{\displaystyle K}

-group of

R

{\displaystyle R}

, that is,

?

n

(

B

GL

?

(

R

)

+

)

?

K

n

(

R

)

.

{\displaystyle \pi _{n}\left(B\operatorname {GL} (R)^{+}\right)\cong K_{n}(R).}

Blake construction

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Blake construction is a method of making shoes invented in 1856 by Lyman Reed Blake.

It is especially popular in Italy. In a Blake construction, the outer sole is directly stitched to the insole with a chain stitch. This allows more flexibility and lighter weight compared to the sturdier Goodyear construction, which is more common among British shoemakers such Crockett & Jones and Sanders.

Construction aggregate

Construction aggregate, or simply aggregate, is a broad category of coarse- to medium-grained particulate material used in construction. Traditionally

Construction aggregate, or simply aggregate, is a broad category of coarse- to medium-grained particulate material used in construction. Traditionally, it includes natural materials such as sand, gravel, and crushed stone. As with other types of aggregates, it is a component of composite materials, particularly concrete and asphalt.

Aggregates are the most mined materials in the world, being a significant part of 6 billion tons of concrete produced per year.

Aggregate serves as reinforcement to add strength to the resulting material.

Due to the relatively high hydraulic conductivity as compared to most soil types, aggregates are widely used in drainage applications such as foundation and French drains, septic drain fields, retaining wall drains, and roadside edge drains. Aggregates are also used as base material under building foundations, roads and railroads (aggregate base). It has predictable, uniform properties, preventing differential settling under the road or building.

Aggregates are also used as a low-cost extender that binds with more expensive bitumen to form asphalt concrete or with Portland cement to form concrete.

Self-binding aggregate refers to angular crushed material (quarrystone rubble) comprising a mixture of finer and coarser particles that interlock after being compacted.

More recently, recycled concrete, steel and carbon fibres as well as geosynthetic materials have also been used as aggregates.

Construction law

Construction law is a branch of law that deals with matters relating to building construction, engineering, and related fields. It is in essence an amalgam

Construction law is a branch of law that deals with matters relating to building construction, engineering, and related fields. It is in essence an amalgam of contract law, commercial law, planning law, employment law and tort. Construction law covers a wide range of legal issues including contract, negligence, bonds and bonding, guarantees and sureties, liens and other security interests, tendering, construction claims, and related consultancy contracts. Construction law affects many participants in the construction industry, including financial institutions, surveyors, quantity surveyors, architects, carpenters, engineers, construction workers, and planners.

Proj construction

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In algebraic geometry, Proj is a construction analogous to the spectrum-of-a-ring construction of affine schemes, which produces objects with the typical properties of projective spaces and projective varieties. The construction, while not functorial, is a fundamental tool in scheme theory.

In this article, all rings will be assumed to be commutative and with identity.

Lean construction

Lean construction is a combination of operational research and practical development in design and construction with an adoption of lean manufacturing

Lean construction is a combination of operational research and practical development in design and construction with an adoption of lean manufacturing principles and practices to the end-to-end design and construction process. Lean Construction required the application of a robust programmatic framework to all repair, renovation, maintenance, and or new build activities. While each project may be unique, the application of LEAN fundamental should be applied consistently. Lean Construction is concerned with the alignment and holistic pursuit of concurrent and continuous improvements in all dimensions of the built and natural environment: design, construction, activation, maintenance, salvaging, and recycling (Abdelhamid 2007, Abdelhamid et al. 2008). This approach tries to manage and improve construction processes with minimum cost and maximum value by considering customer needs. (Koskela et al. 2002)