Why should we collaborate?

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Why?

Growth of CO_2 concentration in the atmosphere

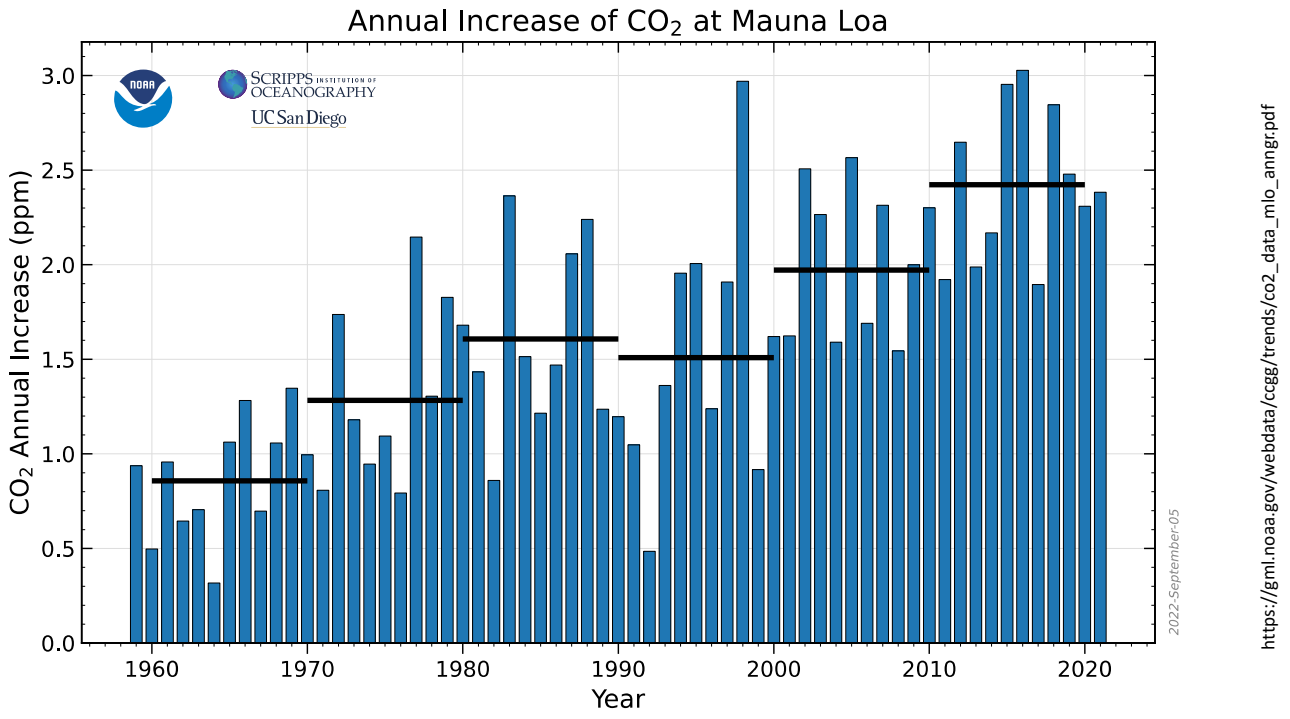
Pre-industrial average: 280 ppm

Weekly average CO_2 at Mauna Loa

Week beginning on September 11, 2022: 416.05 ppm
Weekly value from 1 year ago: 413.07 ppm
Weekly value from 10 years ago: 391.10 ppm
Last updated: September 19, 2022

https://gml.noaa.gov/ccgg/trends/weekly.html

Annual increase now: 3 ppm



Testimony from an energy entrepreneur

- Anttonen oli äskettäin puhumassa Helsingissä suurlähettiläspäivillä, jossa hän korosti sitä, että kansainvälistä yhteistyötä tarvitaan enemmän kuin koskaan.

- Anttonen was recently speaking at the ambassadors' day in Helsinki, where he emphasised that international collaboration is needed more than ever.

- Helsingin Sanomat, 18.9.2022

Short answer

- We are living in a dynamic mess, and requirements for buildings and other facilities are becoming much more stringent
- Clients realise that there is much slack, room for improvement in construction; they want slack away from the price, and improved performance.
- Collaboration is the way to realise these needs.

Evolution of ideas on collaboration

Approaches to collaboration

Approaches/contexts ignoring or not stressing collaboration

- Western culture
- Military organization, since Roman times to 2000 or so
- Scientific management
- Economics
- Mainstream business organization in the 20th century
- Conventional project management

Approaches/contexts stressing collaboration

- Japanese culture (among others)
- Quality
- Lean
- Complexity science
- Concurrent engineering
- New military doctrine, stressing agility, networking and “power to the edge”

Industrial age command and control (organization)

- Decomposition
- Specialisation
- Optimisation
- Hierarchical organisation
- **Deconfliction**
- Centralised planning

Alberts, D. S., & Hayes, R. E. (2003). *Power to the edge: Command... control... in the information age*. Office of the Assistant Secretary of Defense Washington DC Command and Control Research Program (CCRP).

Lean, lean construction and collaboration

Umstot and Fauchier (2017): Lean project Delivery: Building Championship project teams

- Tools covered
  - **Collaboration**
  - 5S Last Planner System
  - Visual work place
  - Root cause analysis
  - A3
  - Value stream mapping
  - Target Value Design
  - Just-in Time.

Treatment of collaboration by Umstot and Fauchier through enablers of collaboration

- BIM
- Big Room
- Last Planner
- Aligning Commercial Terms with Desired Behaviours: Integrated project Delivery

Even more

- Target value design
- Takt planning

Lean cost management as cost reduction

- There are at least four methods to control and reduce costs in design and construction – typically, collaboration is used/needed in all of them:
  - Steering design and construction towards allowed costs.
  - Encouraging, in design and construction, more intense search of the best solutions.
  - Encouraging creativity for finding novel, less costly options.
  - Applying waste reduction for diminished costs

Koskela, L., & Ballard, G. (2021). Shifting the focus of discussion: from cost (under)estimation to cost reduction. In L. F. Alarcon, V. A. Gonzalez, D. Murgula, & X. Brioso (Eds.), *Proceedings of 29th Annual Conference of the International Group for Lean Construction (IGLC29: Lean Construction in Crisis Times: Responding to the Post-Pandemic AEC Industry Challenges* (pp. 43-52). https://doi.org/10.24928/2021/0177

Design collaboration

Needs for collaboration in design

- **Needs stemming from client expectations and requirements:** Defining and translating client (often aggregate client) needs into requirements requires interpretation, and prior solutions may not suffice.
- **Needs stemming from designers and engineers contributing to a common goal:** There is one associated set of design priorities (project, object, and client aspiration).
- **Needs derived from a single and collective design process:** There is a need for the timely delivery of outputs, requiring the coordination and integration of design work.
- **Needs derived from the designed construction system, the whole, and its parts:** Parts must fit, and performance (functioning and behavior) must be achieved at the whole system level.

Pikas, Pedo, Tezel, Koskela, &Versoo 2022. Digital Last Planner System Whiteboard for Enabling Remote Collaborative Design Process Planning and Control. Submitted manuscript.

Design collaboration

- Knowledge creation and integration
- Communication
- Creation of shared understanding

- Kleinsmann

What is shared understanding?

- Common ground
  - Generally
  - In the project
- Common situation picture

Examples

- Common ground
  - Generally: In IPD projects, the selection of project participants according to the compatibility of candidates with the targeted project culture, and with existing project partners
  - In the project: Starting meetings where all essential aspects of the project are dealt with
- Common situation picture: Daily huddles; visual information in a Big Room; Digital White Board

Levels of collaboration?

Levels of collaboration

- Communication
- Coordination
- Cooperation
- Collaboration

(From several sources)

Levels of collaboration

- *Communication*
  - Sharing of information
- *Coordination*
  - Coordination of participant organisations by a central unit
- *Cooperation*
  - Working alongside each other
  - Mutual support through informal relationships
  - Resources and rewards separate
- *Collaboration*
  - A common mission
  - Joint problem solving
  - Sharing of risks, resources and rewards

Joint problem solving?

- In creativity research, there is initial support for the role of spoken and written language, verbalization, and debate as important enablers of creativity

Conclusions

- “Collaboration” covers a wide variety of phenomena, not yet well understood
- Collaboration takes time, and is thus costly and perhaps brings unpredictability
- It is advantageous to structure collaboration (in time, physically, standardized procedures, etc.)
- Be clear which parts of the project especially require collaboration
- Be clear with the purpose(s) of collaboration, and set up collaboration accordingly
- Collaboration: an excellent topic for academia-industry collaborative research