

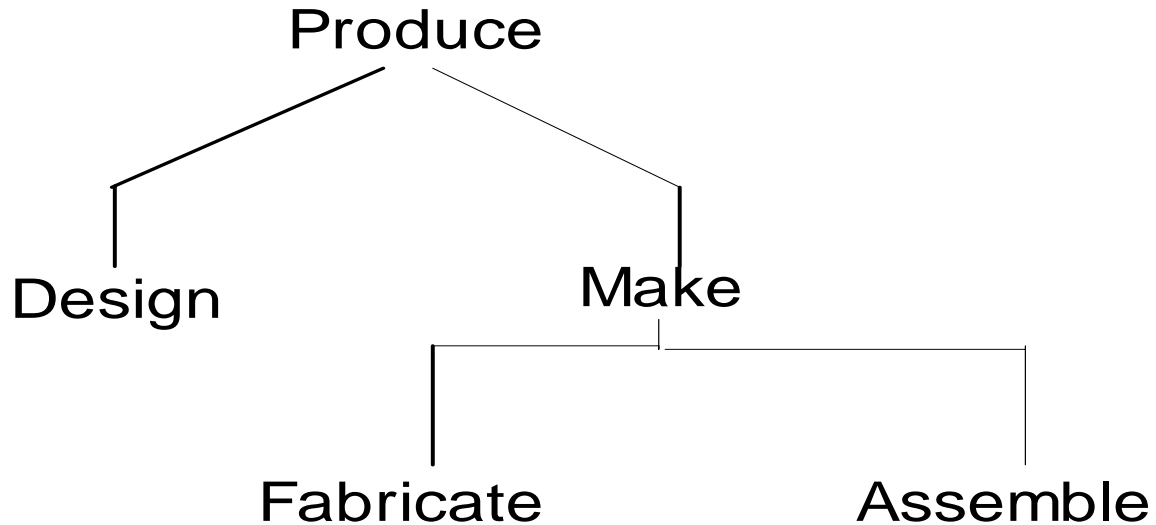
Making Prefabrication Lean

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Prefabricate: to fabricate (change the shape, density, etc. of materials) all or part of an object in some place other than its final position.

Preassemble: to assemble all or part of an object in some place other than its final position.

Prefabrication (premaking): making all or part of an object in some place other than its final position

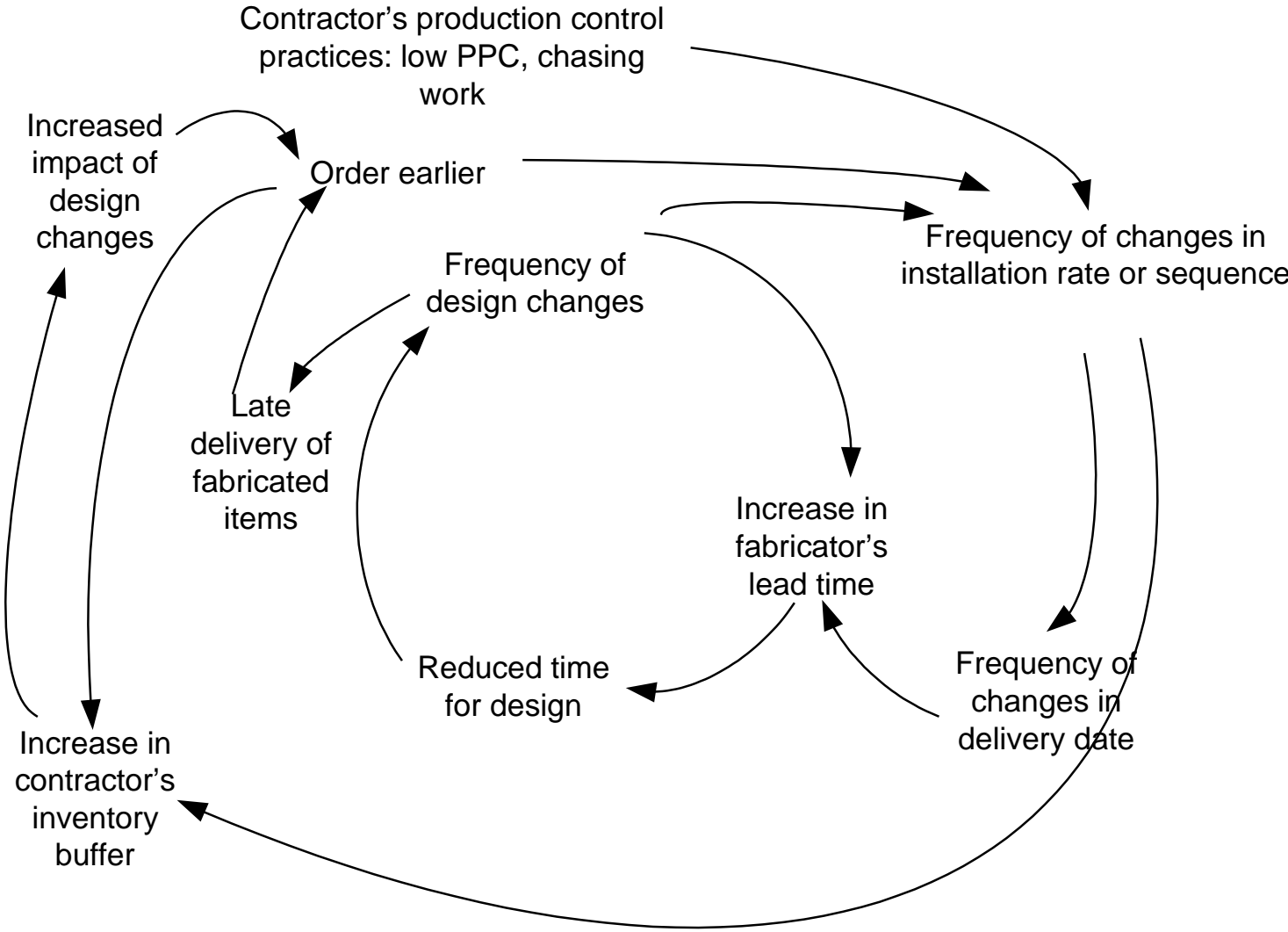
Drivers of Prefabrication Lead Time

$$\text{Equation: FLT} = \text{SDT} + \text{PT} + \text{FT} + \text{AT} + \text{DT} + \text{AC}$$

Drivers of Demand Variability

- Design/engineering durations shortened by requests for early deliveries---which drives changes in the design of the product to be fabricated.
- Traditional methods of project planning and control, including the earned value method, which reduce the percentage of planned activities that are completed---which drives changes in the date when specific fabricated products are needed on site.

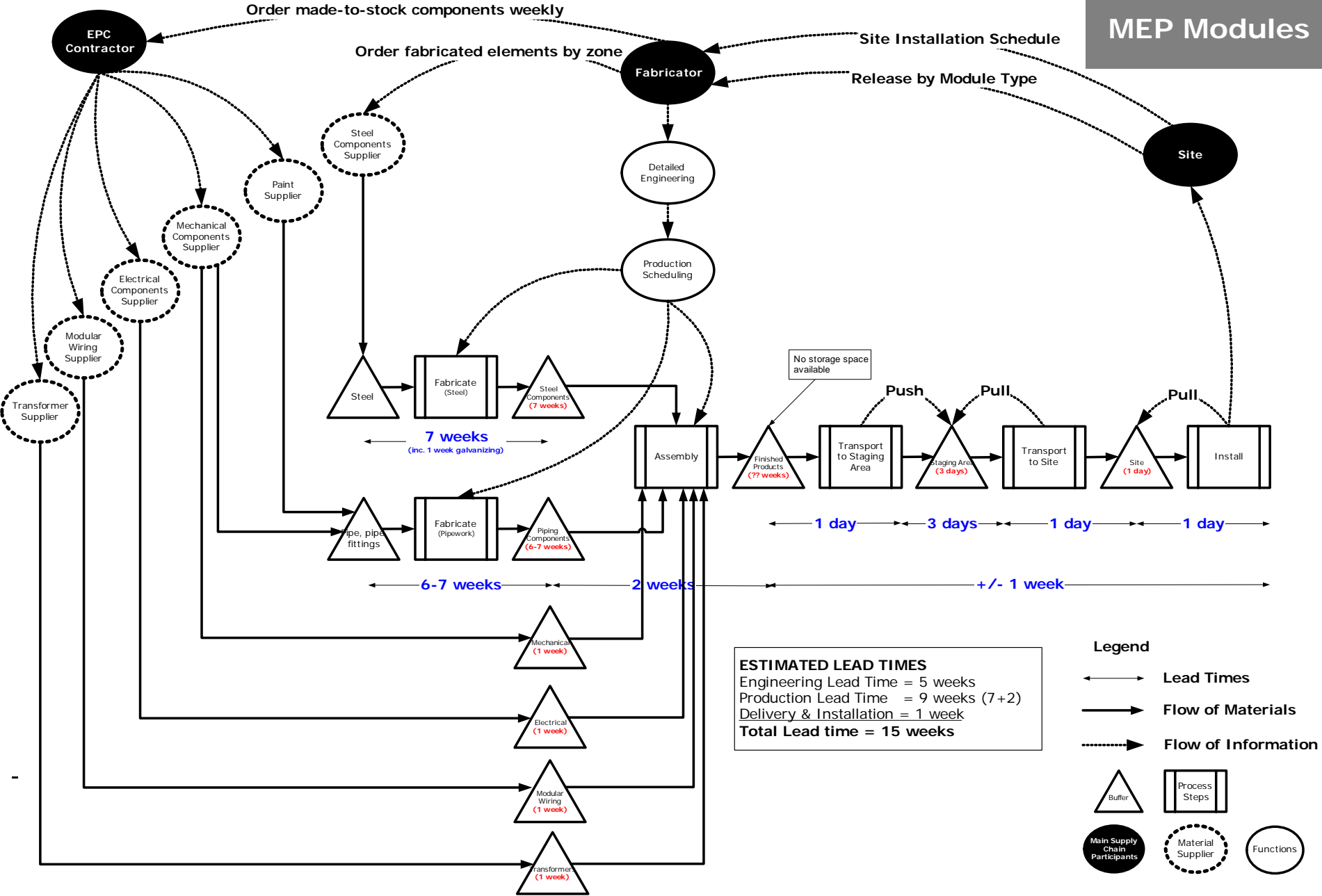
Interdependence of demand variability and fabrication lead time



Mechanical-Electrical modules (Pasquire and Connolly, 2002)



MEP Modules



Research Questions

- Have competent users of the Last Planner system of production control reduced their demand variability? If so, have their fabricators reduced their lead times accordingly, or, if not, could fabricators safely reduce their lead times? Has increasing the contractor's window of reliability enabled them to pull more products to installation dates? What can be done to further reduce work flow variability, and hence demand variability?
- What are the lead times for various fabricated products; e.g., switchgear, HVAC ductwork, rebar preassemblies, precast concrete, pipe spools, pipe supports, cladding, air handling units, chillers, pumps? What can be done to reduce those lead times without reducing demand variability; i.e., unilaterally by the fabricators?
- What allowance for change should fabricators include in their lead times for a given level of demand variability on the part of their customers?
- What competitive advantage is provided to client, contractor and fabricator by the combined effect of reducing demand variability and reducing fabricator lead times?