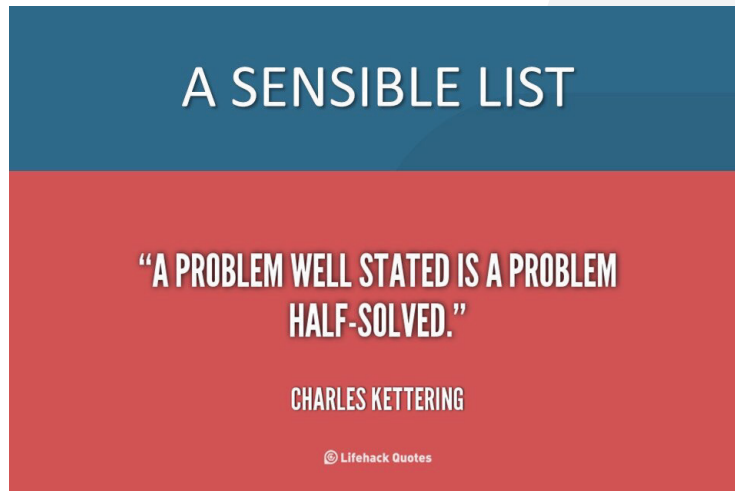


A Sensible List

Pete Fowler, October 20, 2017

The rumors are true. I am a crazy person. Anyone who knows our company knows that we are REALLY into training. And this training module, called "A Sensible List," has been included in more of our training programs than any other. BY FAR! And the reason is (as Charles Kettering said): "A problem well stated is a problem half-solved." And our job, above all else, is to solve problems.



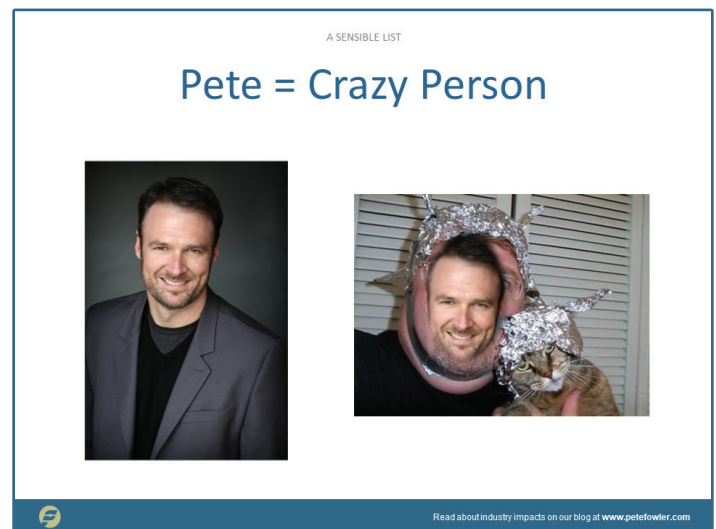
So yes; I am a crazy person. Any time someone brings me a collection of data that is not first organized into A Sensible List (or some sensible order), it makes me feel sad. So sad that people who won't stop bringing me "project piles" rather than sensible project files, are invited to work somewhere else, where they might better thrive.

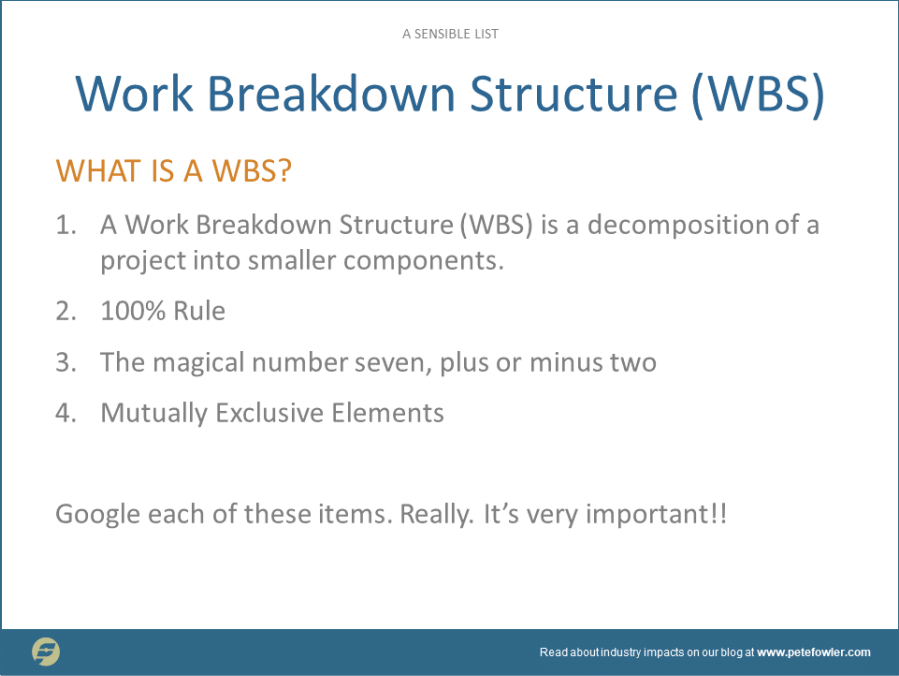
But people protest: "'Sensible' is SO subjective!"

No it's not.

Organizing our world "sensibly" has been obvious since the dawn of civilization, and ultimately research psychologists figured out why. When you get bored or need a sleep aid, read "The Magical Number Seven, Plus or Minus Two." This is one of the most highly cited papers in psychology. It was published in 1956 and argues that the number of objects an average human can hold in working memory is 7 ± 2 . This is why SO many things are arranged in groups of 5-9. It's not a miracle. It's just how humans think.

So over time the folks who manage big, complex projects made some rules about making lists that conform with the way the human mind works, and they called their Sensible List a "Work Breakdown Structure." I highly recommend you study the subject, even further than I will go in this post.





A SENSIBLE LIST

Work Breakdown Structure (WBS)

WHAT IS A WBS?

1. A Work Breakdown Structure (WBS) is a decomposition of a project into smaller components.
2. 100% Rule
3. The magical number seven, plus or minus two
4. Mutually Exclusive Elements

Google each of these items. Really. It's very important!!

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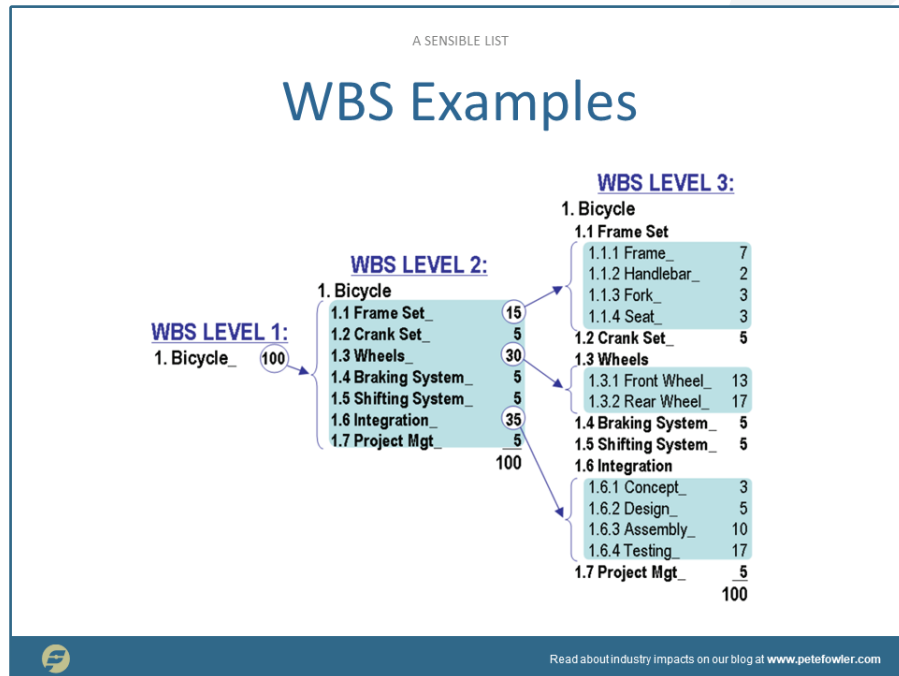
As it says on the slide above, I highly recommend you Google (search) each of these Work Breakdown Structure (WBS) terms. Until then, take my word for the following:

A Work Breakdown Structure (WBS) is a decomposition of a project into smaller components.

100% Rule: This means your list needs to add up to 100% of whatever it's summarizing. Not 99%. Not 101%.

The magical number seven, plus or minus two: In general, each level of the WBS should be no more than 9 items long. In construction cost estimating, this rule gets broken. It's OK in this circumstance because most of the audience for construction cost estimates are people who deal with them often and can conceptualize these longer lists due to this familiarity. But any time we can't get the list on a single sheet of paper, we should usually "chunk" it down to size. At PFCS we usually arrange our WBSs using numbers at Level 1 (L1) and capital letters (A, B, C...) at Level 2 (L2). That way, if you get past Z at L2, you know you're in trouble and should consider re-thinking your list.

Mutually Exclusive Elements: In addition to the 100% rule, it's important that there is no overlap in scope definition between different elements of a work breakdown structure because this ambiguity could result in duplicated work. But sometimes an element of your list could fall naturally in two locations on the WBS, so from time to time we have a "zero value" item that refers to another element, just so everyone is clear. An example of this might be if we decided to sort documents first by "Who," then chronologically, where the name of the person or organization (Who) = L1 and the individual documents, that are listed in order by date, are each a L2 item (a common organizational scheme). If a document in this collection was authored by two parties we might list that document in both places (under both names), but refer from one of those items to the other so that we don't need to duplicate the document.



So the only thing I don't like about the diagram above is that they call the entire bike "WBS Level 1". Bit it's NOT broken down yet! So I call their "WBS Level 2," a Level-1 WBS because it's the first level of breakdown. It's a sensible 100% list. That is: A Sensible List.

The PFCS Standard WBS numbering-lettering scheme for this example would be:

1. Frame Set

- A. Frame
- B. Handlebar
- C. Fork
- D. Seat

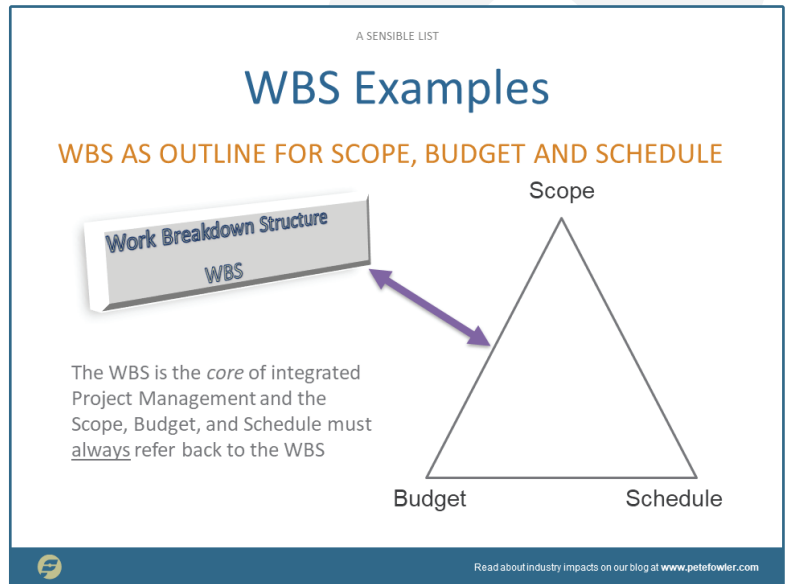
2. Crank Set

- A... Note: If there is only one sub-point, then there are NO sub-points.
- B... There MUST be a B. to have an A.!

The numbering scheme used in the slide above is appropriate for highly technical documents, like codes and standards. But our work at PFCS needs to be consumed and understood by smart but NOT technical people. Literally, our job is to help our clients make smart, informed decisions about buildings and property, and we know that if they don't understand our work, then we have not served them well. My experience is that some people get confused when you refer to section 1403.2.2.4. So we prefer an approach that is as simple as possible (but no simpler), conforming with the way humans best understand things.

If you've studied project management then you know "The Golden Triangle" includes the project "Scope, Budget, and Schedule." These are the big three aspects of getting a complex project planned and done.

In addition, if we layout our WBS just right, then we can manage all three aspects in lock-step, as depicted (in a simplified way) below.



A SENSIBLE LIST

WBS Examples

WBS AS OUTLINE FOR SCOPE, BUDGET AND SCHEDULE

Scope	Budget	Actual	Schedule
1. Item 1	\$ XXX	\$ XXX	Plan/Actual
2. Item 2	\$ XXX	\$ XXX	Plan/Actual
3. Item 3	\$ XXX	\$ XXX	Plan/Actual
4. Item 4	\$ XXX	\$ XXX	Plan/Actual
5. Item 5	\$ XXX	\$ XXX	Plan/Actual
6. TOTAL	\$ X,XXX	\$ X,XXX	

And compare performance to plan.

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"No plan can be considered complete - or satisfactory - until it produces measurable outcomes and incorporates mechanisms that allow mid-course corrections based on results."

— Judith Rodin

That is my favorite management quote (well... I have lots of favorite quotes :). It's so true! Most people's plans are more "hopes" than plans. I have worked on many projects in litigation, where the owners had no idea how far over budget they were until they had already paid MORE

than 100% of the original contract price, because the plan did not "incorporate mechanisms that allow mid-course corrections based on results." I had a mentor who used to say to me "Pete: Hope is not a strategy." I would always retort: Yes it is! It's just a terrible one!! I recommend you NOT use hope as a strategy in your planning.

As you can see from the slide above, with the right WBS (Sensible List) we can summarize the scope, budget and schedule, then we can compare actual performance compared to the plan throughout the life of the project, so that we can "incorporate mechanisms that allow mid-course corrections based on results." This is the promise of professional project management. And the foundation of project management is a well designed WBS. And a well designed WBS is the most Sensible List.

A SENSIBLE LIST

Why This Matters

DURING CONSTRUCTION

- Scope of Work
- Request for Proposal incl. Bid Forms and Schedule of Values
- Estimating
- Bid Analysis
- Contracting
- Scheduling
- Payment Processing
- Change Order Processing
- Quality Assurance Inspections
- Project Closeout

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In a construction project it's not only the scope, budget, and schedule that should be connected using A Sensible List (WBS). Most construction documents will either be organized or filed using the Sensible List (WBS). Often this is simply by Who, then When; that is, by party (name) and then chronologically (by date). That would be a 2-Level WBS (who-when). Other schemes go another level deep.

An example 3-Level WBS for Construction Document Organization:

1. Name 1

A. Contract Documents

1. YEAR-MO-DY Document 1
2. YEAR-MO-DY Document 2
3. YEAR-MO-DY Document 3

B. RFIs and Change Orders

C. All Other

D. Correspondence

1. YEAR-MO-DY Document 1
2. YEAR-MO-DY Document 2

2. Name 2

By the way: If we adhere to this scheme electronically, with individual electronic files organized with the date first and the format of the date YEAR-MO-DY, or 2017-10-20 for today's date, then we always know the most current version of any electronic file is the one at the bottom. Any other scheme adds complexity, which adds the likelihood of error. Even if the file has lots of different files, you can easily scan from the bottom to find the most recent version of a file (Ex. 2017-10-20 Change Order 17). So I highly recommend this scheme.

A SENSIBLE LIST

Why This Matters

IN LITIGATION

- Defect List
- Reports of All Experts
- Expert Responsibility Matrix: Who is testifying about what
- Scope of Repair
- Cost Estimates, Bids & Cost Comparisons
- Progress Schedule for Construction / Repairs
- Payment Schedule for Construction / Repairs
- Allocation of Responsibility
- Trade Contractor "Claim Packages"

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And the same goes for construction claim and litigation matters: A Sensible List often makes the difference between order and chaos.

A SENSIBLE LIST

Organizational Schemes

1. By Importance
2. Room-by-Room
3. SB800
4. Who Did the Work: Masterformat
5. Building Elements: Unifomat (PFCS Standard)

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I said above that people protest that "'Sensible' is SO subjective!" And that I totally disagree. This is not to say there is only one way to be "sensible." There are lots of ways to be sensible... And even more ways to be NOT sensible. So suffice it to say: Use one of the sensible ways. Think about how your Sensible List might get used before you begin, and work backward. Planning backward from a successful end is the essence of excellent planning.

A SENSIBLE LIST

Organizational Schemes

UNIFORMAT (PFCS STANDARD)

Level 1 Structure

- A. Substructure
- B. Superstructure
- C. Interiors
- D. Services
- E. Equipment & Furnishings
- F. Special Construction & Demolition
- G. Building Site work
- H. Other



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When PFCS is making lists of building elements, we use Uniformat, unless there is a compelling reason to use some other scheme *. "UniFormat is a standard for classifying building specifications, cost estimating, and cost analysis in the U.S. and Canada. The elements are major components common to most buildings. The system can be used to provide consistency in the economic evaluation of building projects. It was developed through an industry and government consensus and has been widely accepted as an ASTM standard."

Lots of construction professionals use CSI Masterformat because most specifications manuals from architects are often written using this scheme, but since PFCS does so much building performance analysis, and we store building data (forever, for free) Uniformat is a better standard for us.

* In claims and litigation, we need to be very careful about making our Sensible List(s) because so much of the work is about comparing and contrasting. If we are on the plaintiff side, then all the other parties will likely use our list to respond to our claims. When we are on the defense side, and someone else has created a reasonably sensible list, then it's usually better to adopt their's, rather than re-inventing the wheel. Unfortunately, the work of others is sometimes so poor that we have to create our own organizational scheme. But we only do this as a last resort.

A SENSIBLE LIST

Organizational Schemes

UNIFORMAT (PFCS STANDARD)

A. Superstructure - B 2010 Siding - Leaks - Incorrect Nailing - B 2060 Exterior Paint - Deteriorated Trim - Delaminating - B 3001 Roof - Damage - Leaks - Missing Underlayment	B. Interiors - C 3011 Interior Paint - Inadequate Coverage - Wrong Color
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Unifromat's Level-1 structure is a simple, Sensible List that categorizes all aspects of any building project, using capitol letters at Level 1 (because there are WAY more than 26 Level 2 options, and they wisely switch from letters to numbers when going from L1 to L2):

A. Substructure

B. Superstructure

C. Interiors

D. Services

E. Equipment & Furnishings

F. Special Construction & Demolition

G. Building Site work

H. Other (This is added by PFCS because lots of our projects are in litigation and the issues don't always fit into Unifromat's building element codes.

The actual building elements nest comfortably at Level 2 under the respective L1 categories.

A SENSIBLE LIST

Organizational Schemes

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WBS Examples

ELEMENTS:

Buildings are composed of elements like foundations, walls and roofs.

A masonry wall is a building "Element."

The bricks and mortar are the individual "components" of masonry walls.

A SENSIBLE LIST

Roof Systems

Moisture and Thermal Protection

Mechanical and Electrical Systems

Doors and Windows

Wall Systems

Floor Systems

Special Construction

Finish Work

Foundation Systems

The Building Site

Notes on Materials



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In lots of what we do, we explain things by "working from large to small." I have explained this hundreds of times by asking people if they ever used Google Earth, where you start with an image of the entire Earth. You type in your address and the globe turns to orient toward your hemisphere, then it starts moving in toward your continent, then the your country, then your state, county, city, neighborhood, and ultimately your rooftop. And in going from large to small way we have been oriented perfectly to where in the world we are. First explain the forest we are in, then talk about trees.

So buildings are, for the sake of consistency in naming, composed of "Elements" like foundations, walls and roofs. A "masonry wall" is a particular type of building element (at Level 2 in Uniformat). The bricks and mortar are "Components" of that building element, that would be at Level 3 or deeper.

A SENSIBLE LIST

Case Study



ELEMENT LIST

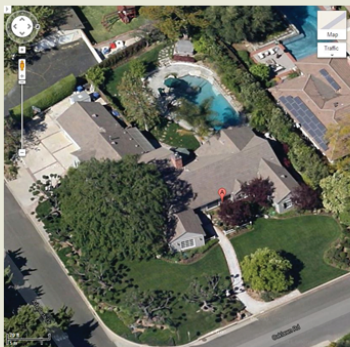
- Substructure
 - A1010 Foundations: Subterranean Concrete Walls and Columns
 - A2000 A Concrete Subterranean Parking Garage
 - A2000 B Parking Garage Insulation
 - A2000 C Garage Venting
- Superstructure
 - B1002 Masonry Panels
 - B2010 Exterior Enclosure: Exterior Gypsum Ceiling
 - B2013 Exterior Enclosure: Metal Cladding System
 - B2018 A Exterior Railings with Glass Railings at Decks
 - B2018 B Exterior Wall Accessories & Decorative Metal: Metal H
 - B2018 C Exterior Wall Accessories & Decorative Metal: Metal H
 - B2018 D Exterior Wall Accessories - Metal Louvers
 - B2020 Windows
 - B2030 Exterior Doors - Building Entry Doors
 - B2031 Exterior Doors: Garage Doors and Controls
- Interiors
 - C1020 Interior Doors
 - C2000 Stairs (Interior and Exterior): Metal Stairs
 - C3011 Interior Paint - Common Areas
 - C3021 Floor Finishes: Vinyl Flooring
 - C3024 Floor Finishes: Carpet at Common Areas
- Services
 - D1010 Elevators and Lifts
 - D2010 Plumbing Fixtures: Restroom Fixtures
 - D3000 A HVAC: Cooling Towers
 - D3000 B Elevator Cooling Unit
 - D3050 Natural Gas Fuel Distribution
 - D4000 A Fire Protection: Sprinkler System / Distribution
 - D4000 B Fire Protection: Fire Extinguishers / Defibrillator
 - D4050 A Fire Protection / Fire Alarm

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This project was a Property Condition Assessment for twin high-rise condominiums, so virtually all of the building elements were addressed in our report.

A SENSIBLE LIST

Case Study



ISSUES LIST

- B1000 Structural Frame (incl. Floor, Wall and Roof)
 - B1000 A: Floor sheathing, floor joists, rim joist and rim blocking damaged by water intrusion from tub/shower.
 - B1000 B: Lack of adequate framing below walls and floor joists in bathroom #2.
- B2012 Exterior Enclosure: Masonry Veneer
 - B2012 A: Lack of a drainage plane behind the brick veneer on the chimney to direct water out of the assembly.
- B2013 Exterior Enclosure: Siding & Trim
 - B2013 A: Exterior siding buried by the concrete flatwork and brick.
- B2040 Exterior Wall Flashing & Sheet metal
 - B2040 A: Exterior trim flashing at roof to wall did not direct water out of the building envelope.
 - B2040 B: Exterior sheet metal on chimney not properly installed into full bed of sealant.
- B3001 Sloped Roofs
 - B3001 A: Valley sheet metal on sloped roof has the roof tiles butted too close together which causes debris to clog the valleys.
- B3004 Roof Flashing & Trim
 - B3004 A: Sheet metal tile pan on the downhill side of the chimney, east and north, was covered by roof tiles and did not provide an area for debris and water to flow around the chimney.
- C3015 Tile & Stone Assemblies (Incl. Showers)
 - C3015 A: Water intrusion at the horizontal tile surfaces to the horizontal cast iron surfaces.
- D2040 Rain Water Drainage
 - D2040 A: Rain water overflowed the rain gutter above the laundry room exterior wall and entered the building envelope at the roof to wall.

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This project was a construction defect litigation matter with discrete problems and repairs for all of those issues.

A SENSIBLE LIST

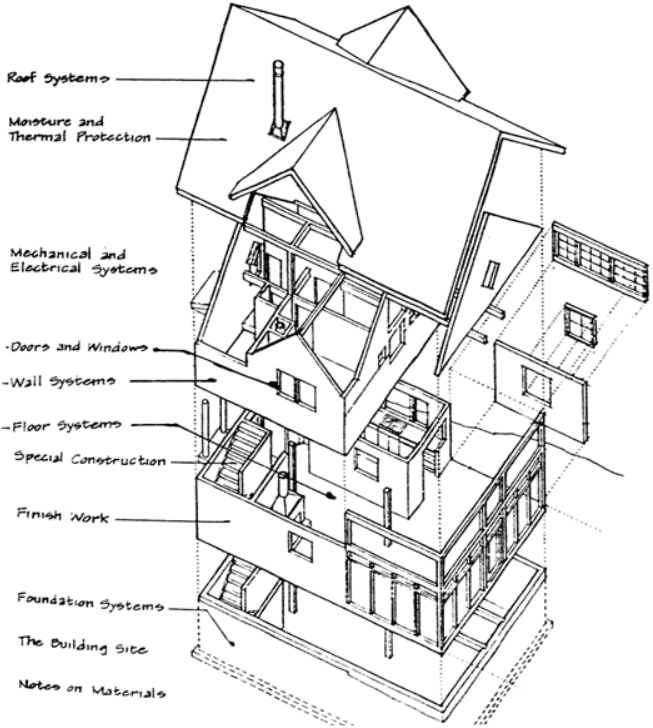
WBS Examples

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Even our Core Values are laid out in a 2-Level Work Breakdown structure!

And from there, so, so many of the things we do have to be arranged in a sensible list:

- One Minute Summary
- Project Plan
- File Management
- Timeline of Events
- Project Players List
- Locations
- Issues / Complaints / Problems / Defects
- Estimates
- Meeting Management
- Quarterly Plans
- Key Performance Indicators (KPIs)
- There are a LOT more ;)