

Trail Construction Cost Realities

Advancing Trails



For those who build,
maintain, use,
and dream of trails...

**American
Trails**

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Reineke Construction
April 30, 2019

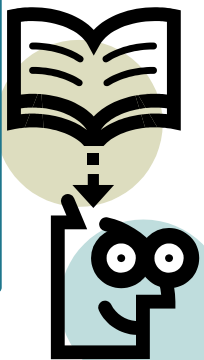


**Professional
TrailBuilders**
ASSOCIATION

What We Hope to Accomplish

- ▶ Increase knowledge of the factors that affect trail construction costs.
- ▶ Provide a framework for trail construction cost estimating.
- ▶ Identify the risks and uncertainties in trail construction cost estimating.

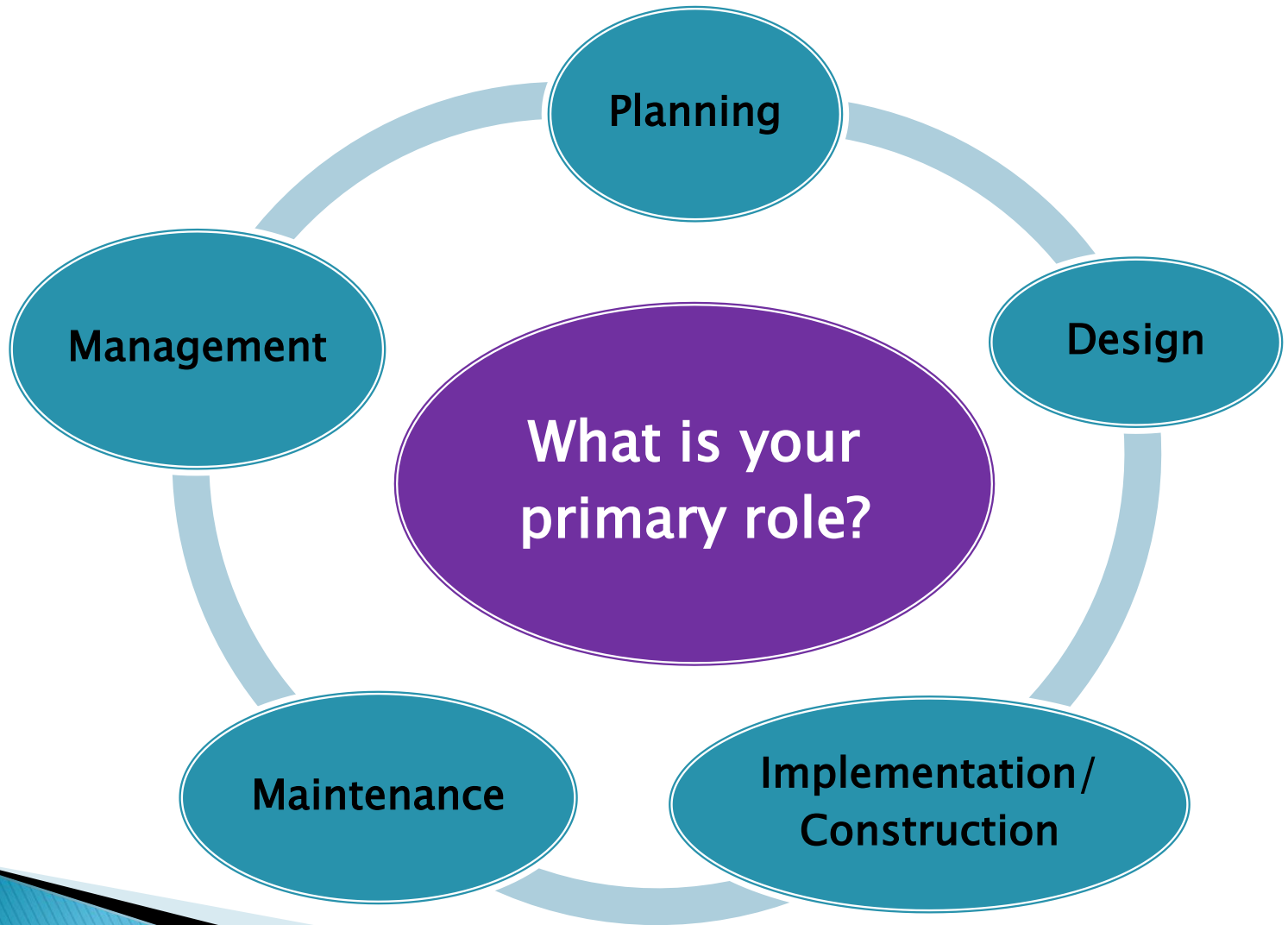
Outcome → increased insight regarding trail construction costs.



About the Presenters

- ▶ Reineke Construction
- ▶ Trail and Outdoor Design and Construction



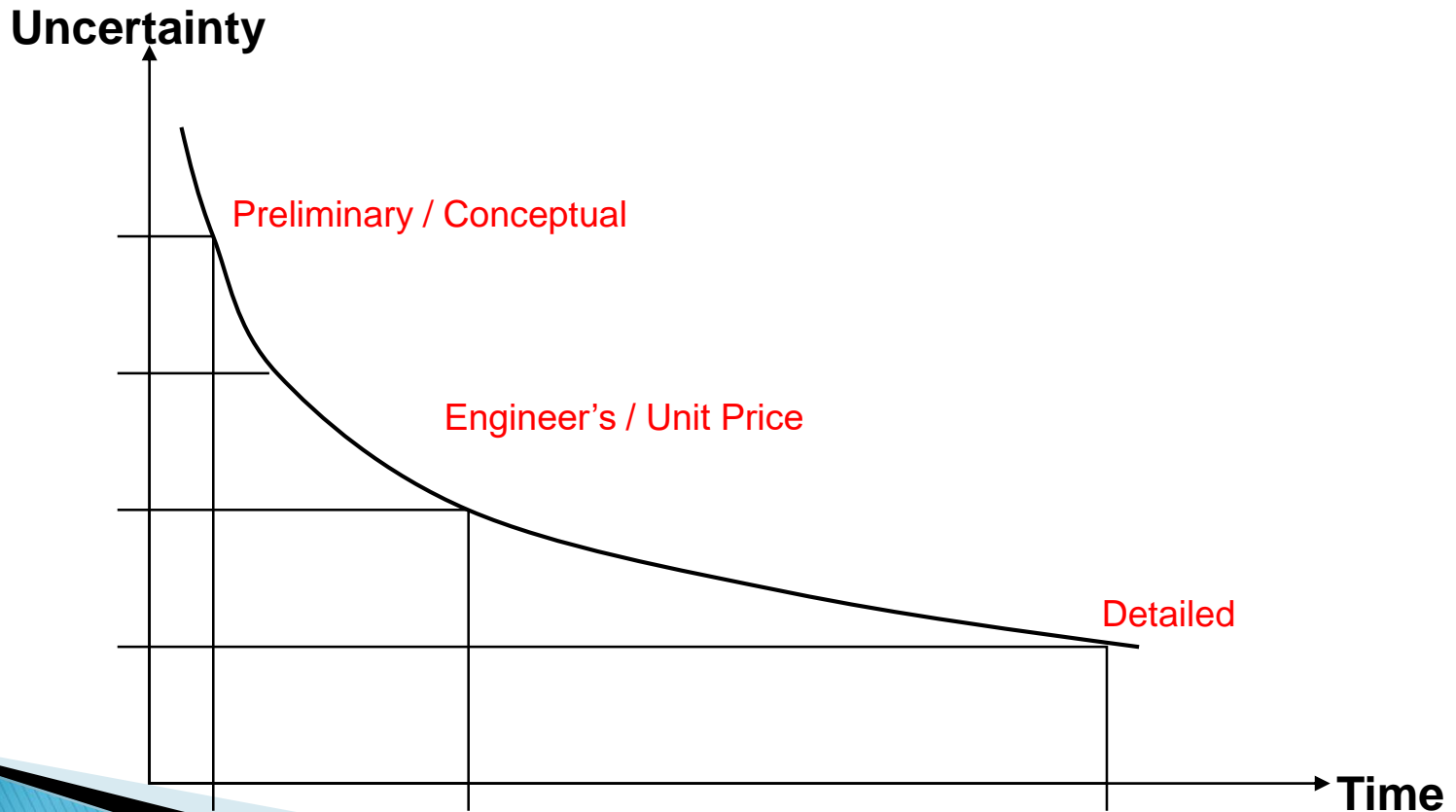


Graphic Credit: RecConnect and NOHVCC

Cost Estimating Foundation and Framework

Estimates Vary in Accuracy & Detail

1. Planning Phase – Preliminary / Conceptual Estimate
2. Design Phase – Design Estimate (Engineer's Estimate)
3. Bidding Phase – Detailed Construction Estimate



Graphic Credit: Birch Outdoors

Construction – Basic Categories of Costs

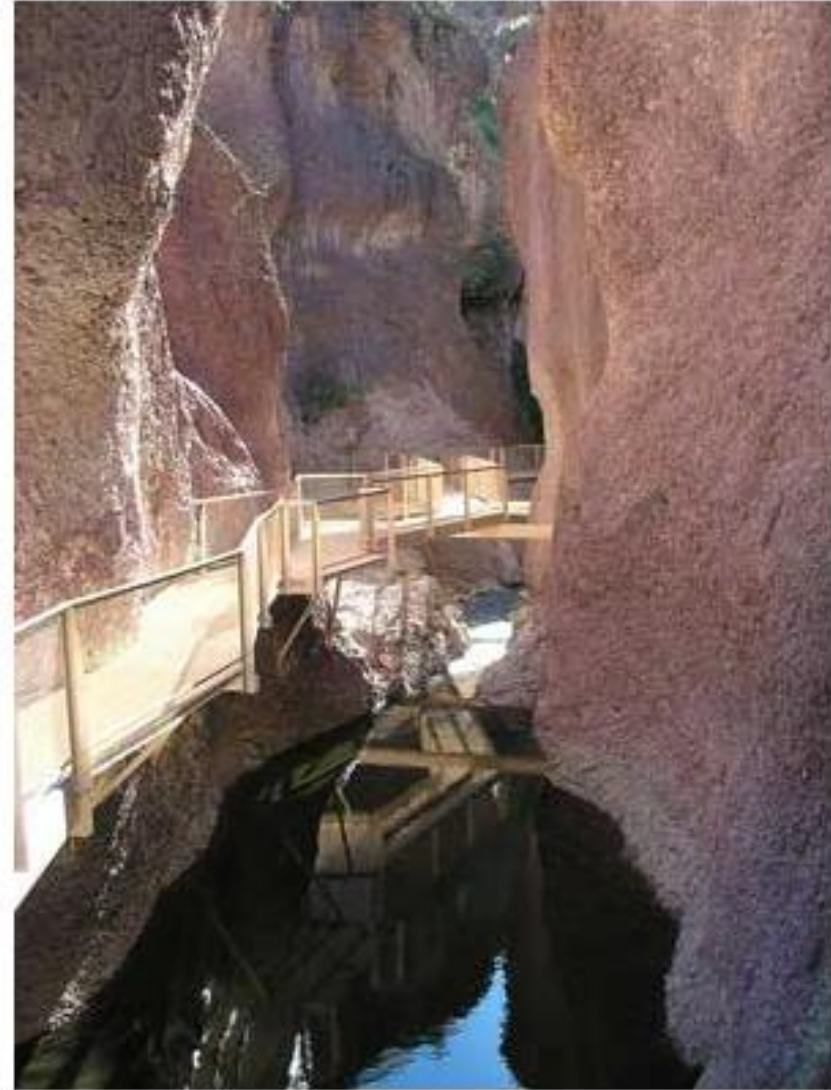
- ▶ Labor
- ▶ Equipment
- ▶ Materials
- ▶ Services
- ▶ Overhead

Project Cost = sum of these

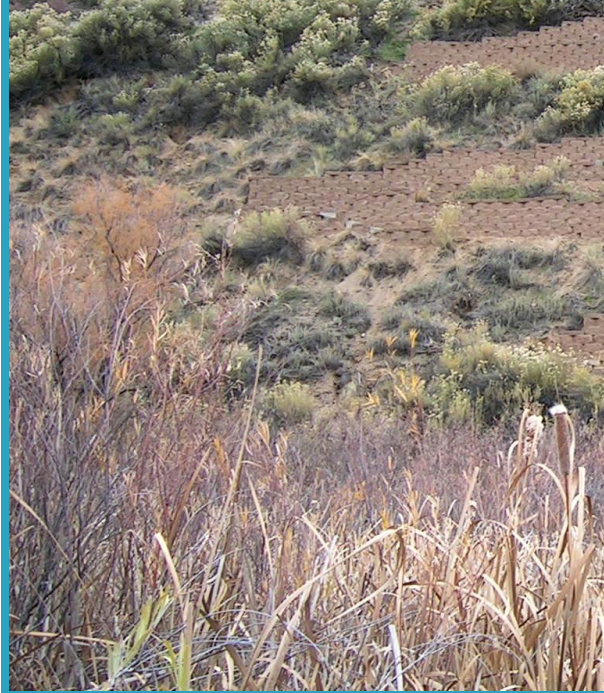
Costs in these categories are heavily influenced by terrain, soil, and trail design.



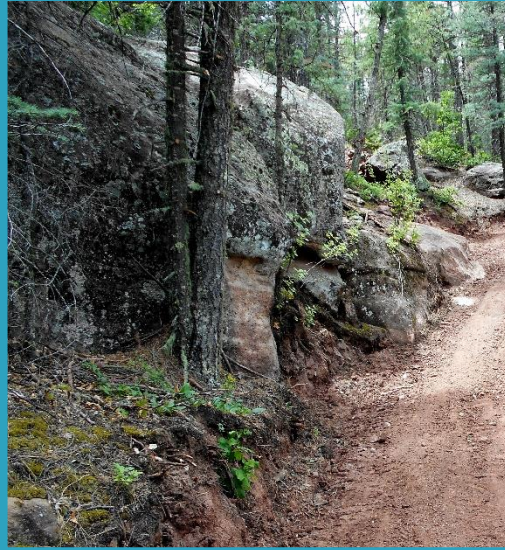
Keep Lifecycle Costs in Mind



\$s per Linear Foot Can be Misleading



Terrain Matters





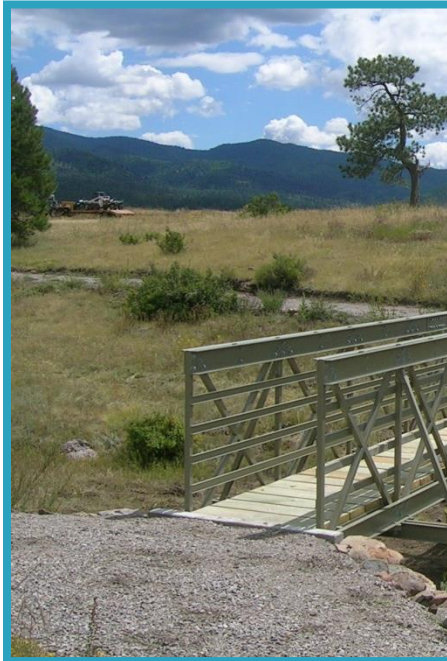
Tradeoffs Between Hand and Machine Building

- ▶ Hand build
 - more labor intensive, particularly where drainage structures are needed
- ▶ Machine build
 - may be access or terrain limited
 - operator experience key

Note: trail corridor is determined by user type and desired user experience, not by construction technique.

Amenities and Structures Add Cost

**Communication and/or Signage
is THE MOST IMPORTANT
amenity in a trail system.**



Dangers, Pitfalls and Warnings

- Every trail construction job is unique, so beware of generic “\$ per linear foot (or meter)” quotes
- “Free” Labor
- Safety Experience
- Equipment Logistics
- Access
- Unknown Field Conditions
- Provider Qualifications
- Weather



Determine Who Owns the Risk

Risk – the possibility of harm or damage, or unforeseen construction obstacles

- ▶ Trail service provider
- ▶ Client/customer (land manager or representative)
- ▶ Sponsor (funds provider)
- ▶ Shared

Risk ownership = responsibility = \$\$

Considerations for Labor Costs

- ▶ Davis Bacon wages or special wage determinations
- ▶ Pre defined construction or design/build
- ▶ Local or imported labor
- ▶ Hand or Machine build and finish
- ▶ Personnel Transport – mobilization
- ▶ Personnel Support (food, water, lodging)



Factors in Selecting Resources

Who Owns Risks?

- ▶ **Volunteers**
 - Tools, training, coordination, management, quality assurance
- ▶ **Youth Services**
 - Coordination, management, quality assurance
 - Level of effort vs. job completion
- ▶ **Contractor**
 - Pre-qualifications advised
 - Clear project definition
- ▶ **In-House Personnel**
 - Availability, tools, skill sets



Equipment Considerations

- ▶ Rented or owned
- ▶ Transport – mobilization
- ▶ Insurance
- ▶ Easy access or remote
- ▶ Fuel
- ▶ Maintenance
- ▶ Secure storage



Material Costs are Typically Straightforward

- ▶ Quantity
- ▶ Source
- ▶ Delivery/Transport/Offloading/Secure Storage
- ▶ Disposal of excess or removed material

Single supplier materials
Transport of heavy materials

RISKS

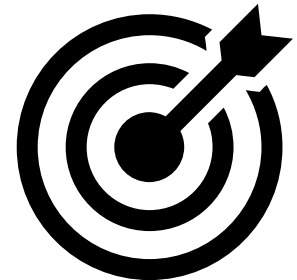
Services Can Be Significant

- ▶ Compaction and concrete testing (bridge foundations)
- ▶ Surveys
- ▶ Sanitation (Porta potty rental, dumpsters)
- ▶ Traffic Control
- ▶ Blasting
- ▶ Archeological and Species Clearances
- ▶ Environmental Permits
- ▶ Storm Water Pollution Prevention Plans



Overhead Costs Vary Considerably

- ▶ Can include:
 - Documentation
 - Management
 - Bonding and insurance
 - Payroll and accounting
 - Training
 - ▶ Profit
 - ▶ Contingency



Cost Model – Excel Spreadsheet

- ▶ Cost summary
 - By major element of the job
 - Labor, Equipment, Materials, Service, Overhead
- ▶ Detailed cost of owning and operating equipment worksheet included
- ▶ Site inspection check list included

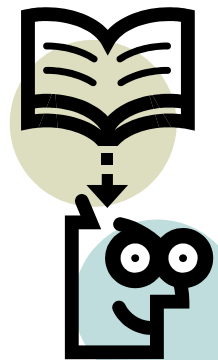
- ▶ Send Margie an email if you would like a copy, mltatro@earthlink.net



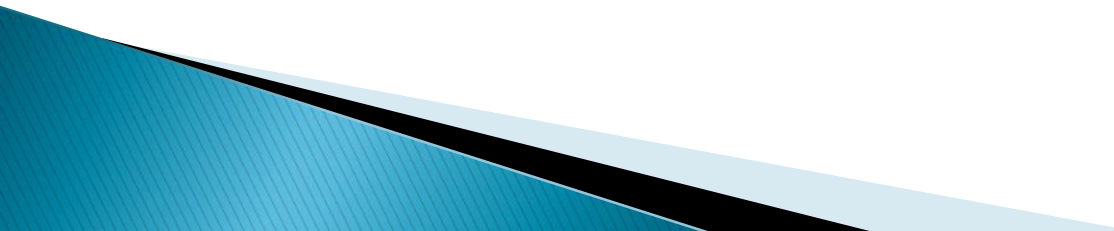
Summary

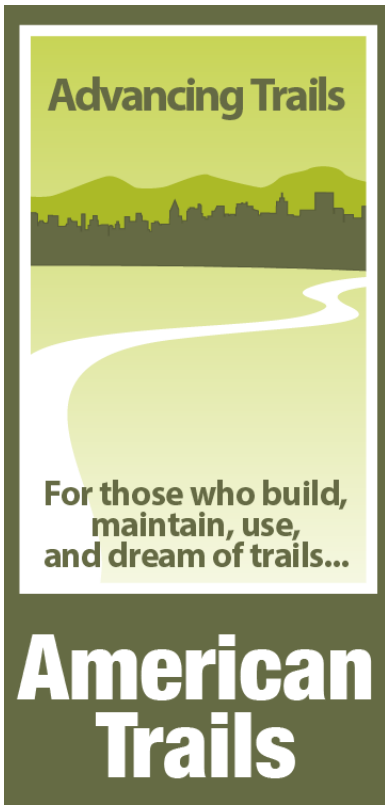
Key Points to Remember

- ▶ **Cost = labor + equipment + materials + services + overhead**
 - influenced by terrain, soil, and trail design
- ▶ Estimates vary in accuracy
- ▶ Consider trail life cycle
- ▶ Cost estimates involve assumption of risks
- ▶ Be clear on who owns risks
- ▶ Overhead costs vary significantly



Some Resources to Enlist

- ▶ www.trailbuilders.org for a professional trail builder near you
 - ▶ Great Trails Book (essential for motorized, applicable to all)...<http://gt.nohvcc.org/>
 - ▶ USFS accessibility standards
<http://www.fs.fed.us/recreation/programs/accessibility/>
 - ▶ Caterpillar Performance Handbook, Edition 40
 - ▶ American Trails webinars and resources
 - ▶ Your experiences and those of your colleagues
- 



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