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Bioprocessing technology startup companies and developers can overlook or significantly underestimate the "indirect cost" portion of total installed cost (TIC) project estimates. These indirect costs, if properly estimated, are typically between 30 to 45% of TIC and average approximately 40% of TIC.

The sizable percentage of indirect costs have surprised and disheartened many eager bioprocessing project leaders.

AACE International Guide 21R offers the following definitions for the two types of project costs (direct and indirect):

- "DIRECT COSTS are those that are readily or directly attributable to or become part of the final [project]". In simplest terms, they remain with the final project!
- "INDIRECT COSTS are all cost that cannot be attributed readily to the final [project]". In simplest terms, they do NOT remain with the final project!

 To further clarify the two types of costs, the following exercise is helpful. Review the two construction photos and attempt to name some examples of direct costs and indirect costs.

Direct Cost Examples (remain with project):

- Concrete
- Steel
- Pipe
- Skid/Module
- Equipment
- Conduit
- Wire
- Anchor bolts
- Craft labor (fruits of labor remain with facility)
- Permanent fencing
- Spare parts purchased with equipment (usually considered to be direct)

Indirect Cost Examples (do NOT remain with project):

- Construction equipment (crane)
- Vendor on-site support
- Construction tools (spreader bar)
- Temporary construction fencing
- Construction vehicles (pickup truck)
- Mobilization and demobilization cost
- Construction management
- Startup team and start up spares
- Construction management staff

- Temporary power, water
- Permit fees
- Contractor OHP, profit, contractor markups
- Scaffolding
- Contractor's home office support
- Construction temporary building & structures (trailers, portable bathroom, etc.)
- Insurances and performance bonds







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The following items appear to be in the "gray" area, but are almost always considered indirect cost:

- Sales taxes (rarely included in price of direct equipment)
- Per diem (unless built-in to wage rates)
- Overtime premium (unless built-in to wage rates)
- Consumables such as welding rods (99% of the time are indirect costs)
- Employee benefits unless part of all-in-wage, then considered direct
- Freight unless embedded in purchase price of equipment (most equipment quotes will be FOB jobsite) (easy to show as 3-4% if broken out as indirect)
- Engineering engineering is difficult to apply to specific plant area breakdowns; the figure 1 estimate summary example shows as indirect cost. Engineering is typically considered indirect cost

The bioprocessing project TIC estimate summary example in figure 1 shows how indirect and direct costs are segregated. A more detailed look at indirect cost is shown in Figure 2:

Many project aspects affect the range of overall indirect cost. Here are some aspects to consider:

- Project types affect the percentage of indirect cost, e.g., equipment intensive process projects with customized equipment or complex material requirements will increase the direct cost percentage and lower the indirect percentage.
- Contracting approaches affect indirect percentages, e.g., an EPCM not-at-risk contracting approach tends to reduce markup's and contract costs relative to full Design-Build, at-risk, approach.
- First of a kind or new technology projects tend to have higher engineering cost which could be considered indirect costs.

In summary, many early conceptual estimates can overlook the substantial indirect cost which can make or break the economics of a project. A good understanding of the difference between direct and indirect cost and how they apply to your project is an important success factor when evaluating or developing a project.

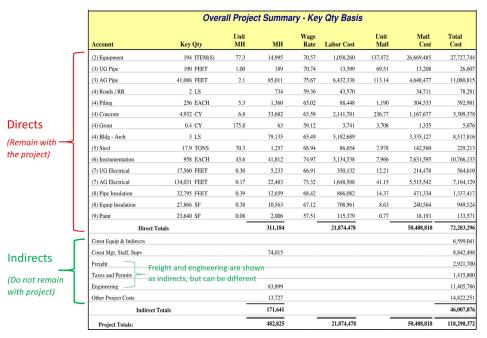


Figure 1 TIC Estimate Summary Example

direct Account Group	Acct No.	Account Name	МН	Indirect WageRate	Total
The state of the s	Acci No.	Account Name	MIL	wagercare	rota
(1) Const Equip & Indirects		CONSUMABLES, SMALL			
	13	TOOLS			656,200
		MISC. (INSURANCE,			8103555
	14	ETC)			437,500
	15	SCAFFOLDING, PLATFORMS			566,700
	16	EQUIPMENT RENTAL			2,068,700
	17	VENDOR REPRESENTATIVES			159,003
	18	FIELD SERVICES			656,200
	19	TEMP. CONST., UTILITIES			284,400
	19	MOBILIZATION,			204,400
	20	DEMOBILIZE			656,200
	22	TRAVEL			109,400
	24	PREFORMANCE BOND			1,004,738
				_	6,599,041
(2) Const Mgt, Staff, Supv					
	85	FIELD CONST. SUPERVISION	67,415	117.55	7,924,585
		START-UP,			
	86	COMMISSIONING	6,600	139.08	917.913
			74,015		8,842,498
(3) Freight					
(3) Freignt	51	DOMESTIC FREIGHT			2,921,700
	51	DOMESTIC PRESONT		_	
					2,921,700
(4) Taxes and Permits					
_	62	MATERIALS TAXES			1,415,800
				_	1,415,800
					1,120,000
(5) Engineering					
	71	BASIC ENGINEERING	22,000	136.36	2,999,995
	72	DETAIL ENGINEERING	52,000	134.62	7,000,346
	73	MATERIAL PROCUREMENT	9,899	141.98	1,405,445
		-	83,899	-	11,405,786
(6) Other Project Costs					
	81	HOME OFFICE CONST. SUPP.	13,727	112.97	1,550,800
	90	G AND A OVERHEADS	101101		4,020,861
	91	CONTRACT FEE			9,250,590

