

# *Pre-Construction Cost Control*

Pre-Construction Cost  
Control...the art and  
science of  
bringing certainty.

NWCCC

February 27, 2002

Bellingham, WA



Rider Hunt Levett & Bailey

# *Pre-Construction Cost Control*

Problem of cost control is not new!

Desire of British industrialists in the 18th Century to build factories and mansions that lead to establishment of professions of quantity surveying and cost engineering.



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## *Pre-Construction Cost Control*

When we mean to build,  
We first survey the plot, then draw the model,  
And when we see the figure of the house,  
Then must we rate the cost of erection,  
Which if we find outweighs ability  
What do we do then but draw anew the model  
If fewer office, or, at least, desist  
To build at all?  
Henry IV (Part III) Act 1, Scene III



# *Pre-Construction Cost Control*

Do alternative procurement methods  
obviate need for cost control?



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# *Pre-Construction Cost Control*

## THE SINKING OF THE LARGEST OFFSHORE OIL PLATFORM

March 2001



Rider Hunt Levett & Bailey



For those of you who may be involved in project cost control (at whatever level),



please read this quote from a Petrobras executive,



extolling the benefits of  
cutting quality assurance  
and inspection costs,



on the project that  
sunk into the Atlantic  
Ocean off the coast of  
Brazil in March 2001.





"Petrobras has established new global benchmarks for the generation of exceptional shareholder wealth



Conventional constraints have been successfully challenged



and replaced with new paradigms appropriate to the globalised corporate market place.





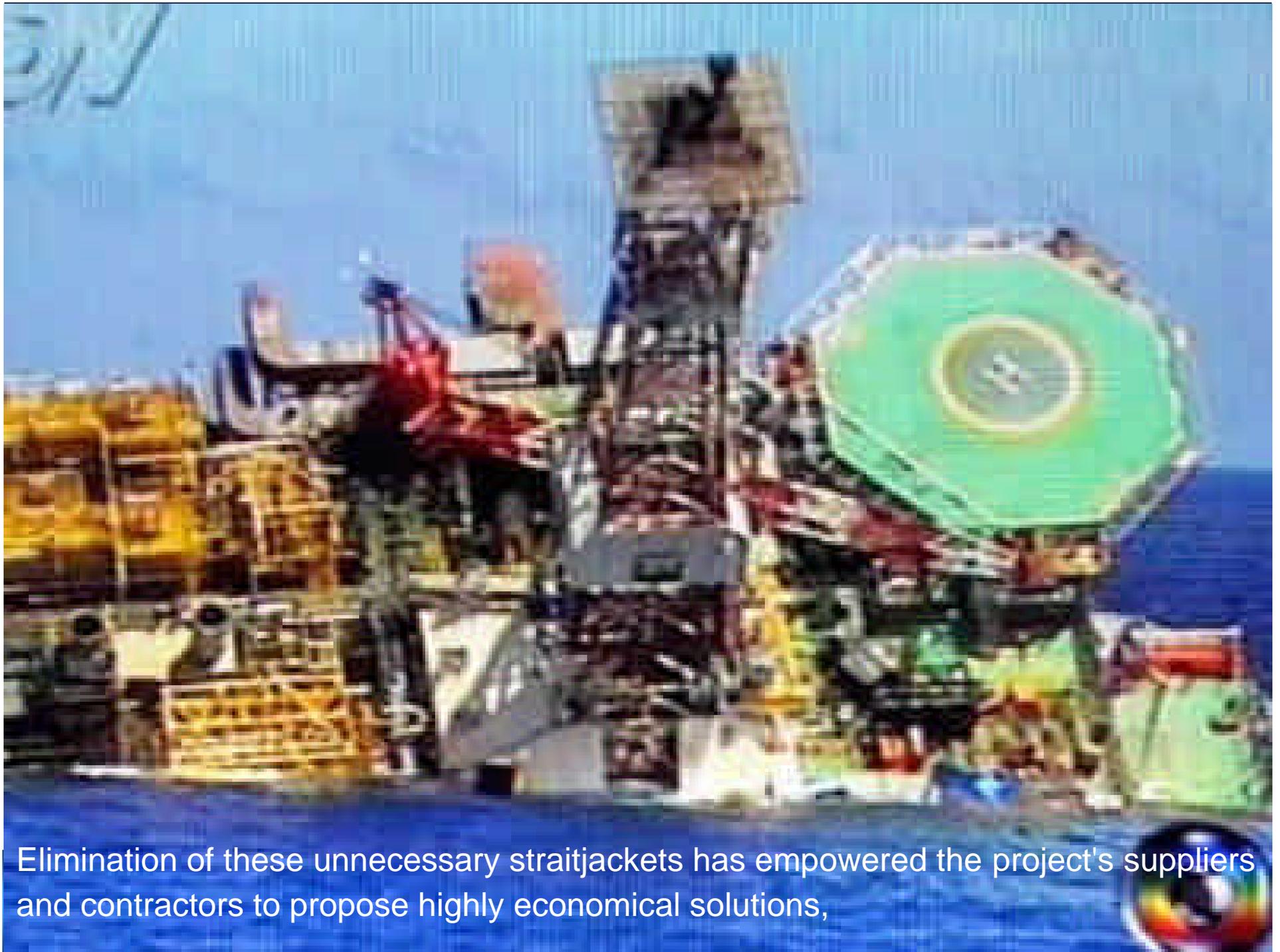
Through an integrated network of facilitated workshops,

the project successfully rejected the established constricting and negative influences of prescriptive engineering,



onerous quality requirements, and outdated concepts of inspection and client control.





Elimination of these unnecessary straitjackets has empowered the project's suppliers and contractors to propose highly economical solutions,



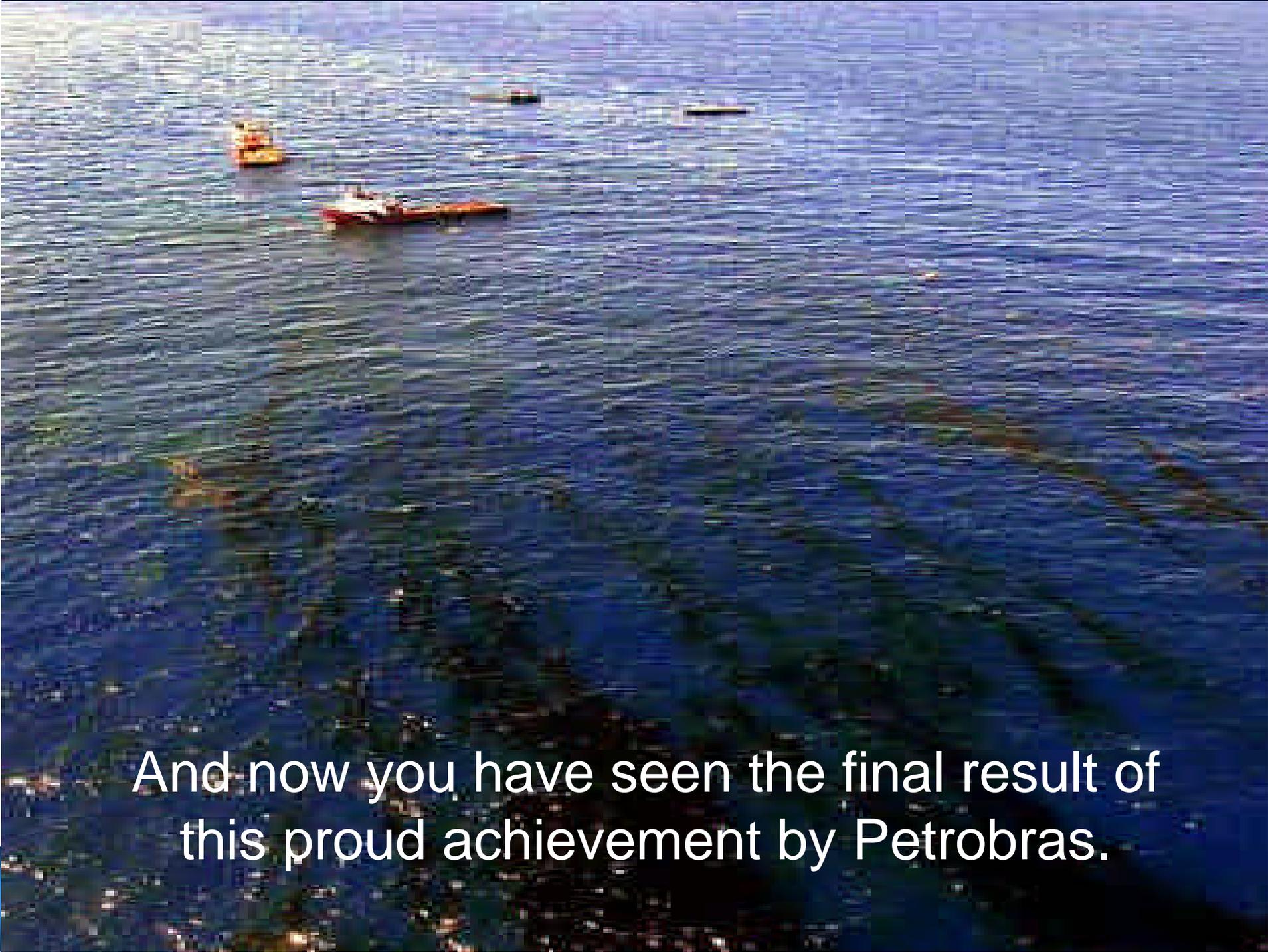
with the win-win bonus of enhanced profitability margins for themselves.



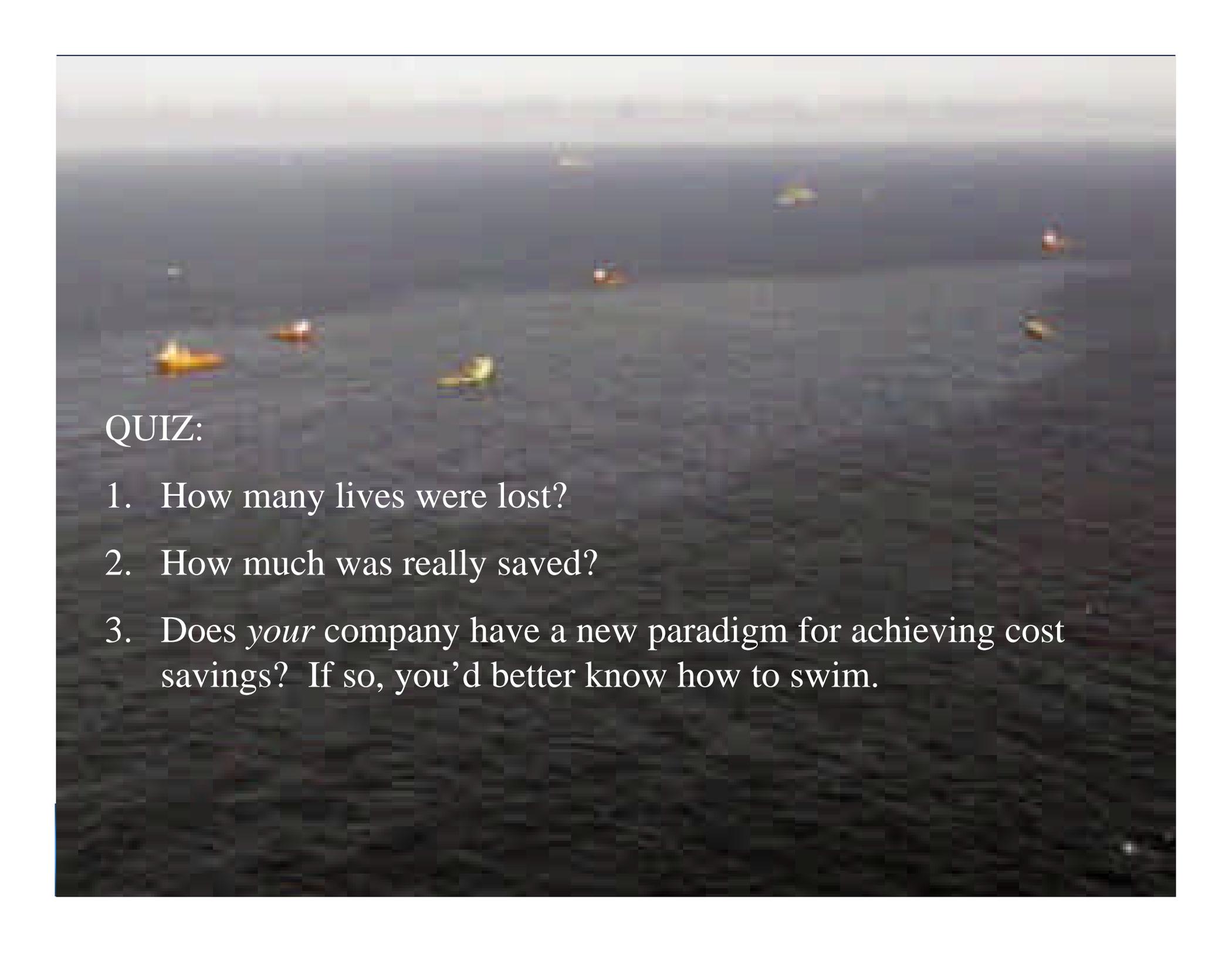
The P36 platform shows the shape of things to come

in unregulated global market economy of the 21st Century.“



An aerial photograph of a large offshore oil platform in the middle of a vast, deep blue ocean. The platform is a complex of structures, including a central tower and several horizontal sections. The water is a deep, dark blue with some lighter patches, possibly due to the sun's reflection or the platform's shadow. The overall scene is one of industrial activity in a remote, natural setting.

And now you have seen the final result of  
this proud achievement by Petrobras.

An aerial photograph of a vast, dark blue body of water, likely the ocean, under a hazy, overcast sky. Several small, brightly lit boats are scattered across the water's surface, appearing as small, glowing spots. The overall scene is somewhat desolate and expansive.

QUIZ:

1. How many lives were lost?
2. How much was really saved?
3. Does *your* company have a new paradigm for achieving cost savings? If so, you'd better know how to swim.

# *Pre-Construction Cost Control*

Design phase cost control requires design phase cost planning.

Delivery on budget = good practice



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# *Pre-Construction Cost Control*

For Owners to retain control of  
the cost of a project...

Instigate an 'Owner  
Oriented' Cost Control  
Philosophy...



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# *Pre-Construction Cost Control*

## *Cost Planning:*

*“facilitating the design process by systematic application of cost criteria so as to maintain a sensible and economic relationship between cost, quality, function and aesthetics to achieve the owner’s requirements within the agreed budget”*



# *Pre-Construction Cost Control*

Anderson's Maxim  
'Estimating  $\neq$  Cost Planning'



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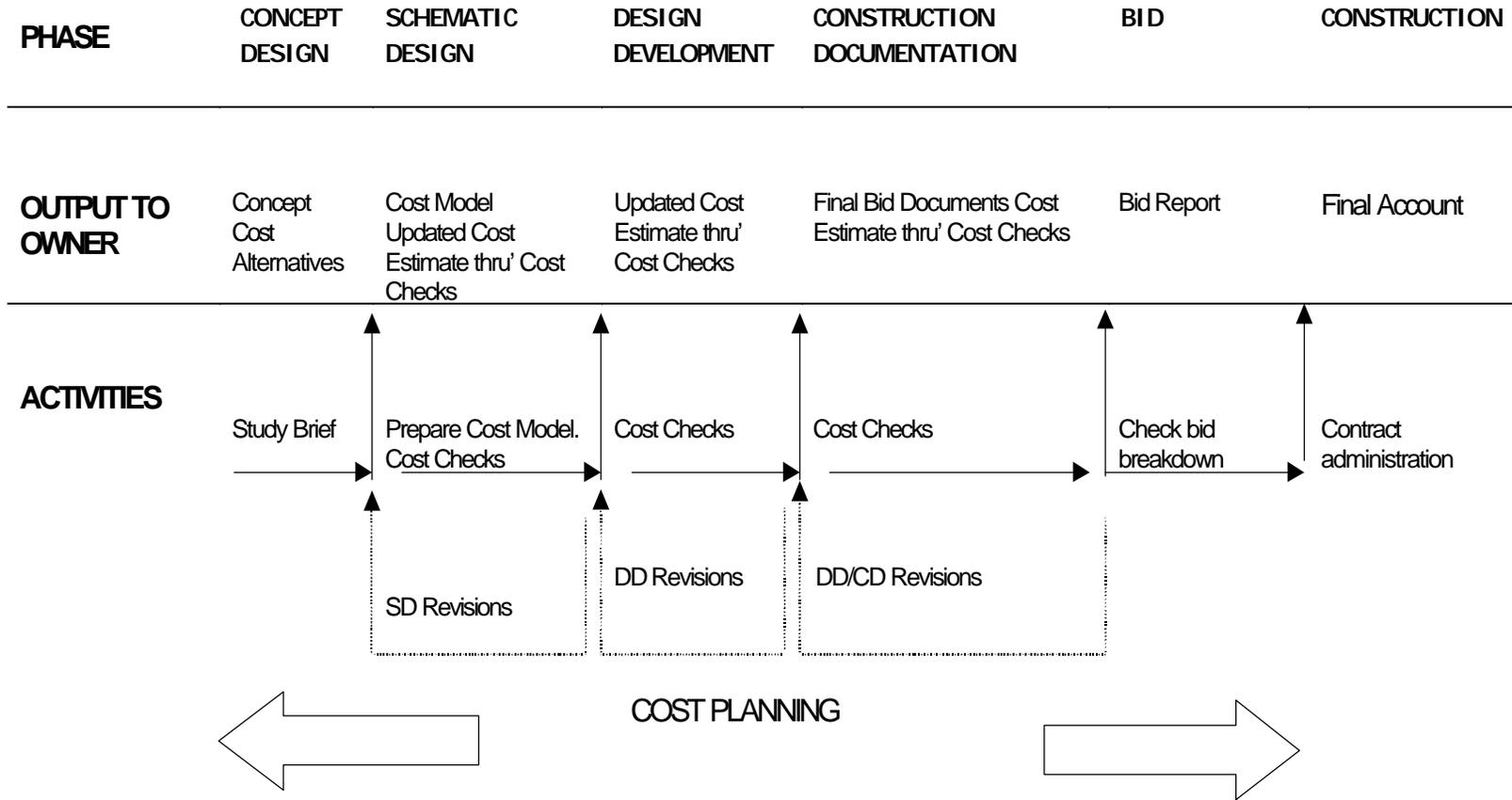
# *Pre-Construction Cost Control*

## Cost Planning:

- Preliminary Estimate
- Cost Plan / Cost Model
- Cost Checking
- Comparative Cost Studies
- Life-Cycle Cost Studies
- Value Management



# Pre-Construction Cost Control



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# Pre-Construction Cost Control

COST MODEL			
<b>project</b>	Boeing Commercial Airplane Group New Headquarters	<b>project no</b>	W20024-500
<b>project type</b>	Office Building	<b>project cost</b>	\$ 59,178,843
<b>location</b>	Renton, Washington	<b>project rate</b>	\$ 191.95
<b>contract period</b>		<b>estimate date</b>	5/23/97
<b>client</b>	Boeing Commercial Airplane Group Facilities Asset Mangement PO Box 3707, MS 20-30 SEATTLE, WA 98195	<b>architect</b>	Loschly Marquardt & Nesholm 801 Second Avenue, Suite 501 SEATTLE, WA 98104
ANALYSIS OF BUILDING		ANALYSIS OF COST	
<b>GFA</b>	308,310 sf	<b>ELEMENT GROUP</b>	<b>\$</b>
<b>No. of Stories</b>	5 story office building		<b>\$/GFA</b>
<b>Construction</b>	The building is set on pile concrete footings, with concrete frame to upper floors and roof. External walls include metal siding and concrete with feature glazed windows and curtain wall. The roof is clad with metal deck, concrete, and skylights. Interior finishes include terrazzo flooring, wood wall paneling to lobby, ceramic floor and tiles and wall tiles to toilet areas, carpet, vinyl tile, wall coverings and paint, interior glazing, curtain walls.	Foundations (1,2,3)	2,937,634 9.53
<b>Exclusions</b>	Washington State Sales Tax A/E, CM, and Professional Fees Owner furnished and installed furniture, furnishings and equipment Post contract contingency Architectural Contingency Owners administration Off-site work Haz-Mat removal Land and legal costs	Basement Construction	- -
		Superstructure (4,5)	7,639,165 38.81
		Exterior Closure (6,7)	9,302,468 47.26
		Roofing (8,9)	895,395 4.55
		Interior Construction (10-12)	4,124,268 20.95
		Staircases (13,14)	948,891 4.82
		Interior Finishes (15,16,17)	5,142,387 26.13
		Conveying Systems (18)	1,098,000 5.58
		Plumbing (19-23)	2,015,206 10.24
		HVAC (24)	7,100,650 36.07
		Fire Protection (25)	807,518 4.10
		Electrical (26, 27,28)	6,473,672 32.89
		Equipment (29)	746,945 3.79
		Furnishings (30)	3,172 0.02
		Special Construction (31)	402,482 2.04
		Selective Building Demolition	- -
		Site Preparation (32,33,34)	1,071,502 5.44
		Site Improvements (35-38)	1,702,645 8.65
		Site Civil/Mech. Utilities(39-42)	3,469,955 17.63
		Site Electrical Util. (43,44,46)	1,612,504 8.19
		Other Site Construction(45,47)	1,684,384 8.56
		General Requirements	- -
		<b>Net Project Cost</b>	<b>59,178,843 191.95</b>
		Sales Tax (Excluded)	- -
		<b>Total Project Cost</b>	<b>59,178,843 191.95</b>



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# Pre-Construction Cost Control

project name		Boeing Commercial Airplane Group New Headquarters			GFA	308,310			
project #		W20024			Value	\$59,178,843		Estimate date	5/23/97
Ref	Code	Element	\$	\$/SF gfa	% of total cost	Specification	Element Unit Quantity		Element Unit Rate
1	FD	Standard Foundations	626,444	2.03	1.1%	Concrete pile caps and duct bank support beam	308,310	SF	2.03
2	SF	Special Foundations	1,461,348	4.74	2.5%	Concrete cassion, including drilling	308,310	SF	4.74
3	SG	Slab on Grade	849,842	2.76	1.4%	Concrete slab on grade, including grading, bedding, vapor barrier, joints & finish	70,420	SF	12.07
4	FL	Floor Construction	6,220,265	20.18	10.5%	Concrete shear walls, structural steel frame, concrete frame, metal deck and concrete slab	308,310	SF	20.18
5	RC	Roof Construction	1,418,900	4.60	2.4%	Concrete shear walls, concrete slab structural steel frame and metal deck	74,247	SF	19.11
6	EW	Exterior Walls	9,119,761	29.58	15.4%	Curtain wall, metal siding, sheathing metal stud framing, insulation, entry canopies, interior lining, guard rails	83,903	SF	108.69
7	ED	Exterior Doors	182,707	0.59	0.3%	Aluminum framed entrance doors, hollow metal doors, automatic roller doors	57	EA	3,205.39
		c/f	19,879,267	64.48	33.6%				



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		b/f	19,879,267	64.48	33.6%				
8	RF	Roof Coverings	782,749	2.54	1.3%	Single ply flat roof, metal standing seam pitched roof, flashings, gutters, roof hatch and louvers	76,394	SF	10.25
9	RO	Roof Openings	112,646	0.37	0.2%	Ladders, hatches, skylights	308,310	SF	0.37
10	PT	Partitions	1,721,722	8.75	4.7%	GWB metal stud partitions and furrings, interior curtain wall, masonry walls, shaftwall, insulation, glass wall & sealant	180,020	SF	9.56
11	ID	Interior Doors	725,599	3.69	2.0%	Wood and hollow metal doors including hardware & finish, overhead coiling grills, fire doors, sidelights	428	EA	1,695.32
12	SP	Specialties	1,676,947	8.52	4.6%	Casework, access doors, handrails, toilet accessories and blocking, display boards, signage, lockers, operative wall, wire mesh partitions, window blinds, window washing equip.	308,310	SF	5.44
13	SC	Stair Construction	619,608	3.15	1.7%	Steel pan concrete infill fire stair, steel open tread staircase, guardrails	222	FT/R	2,791.03
		c/f	25,518,538	190.74	43.1%				



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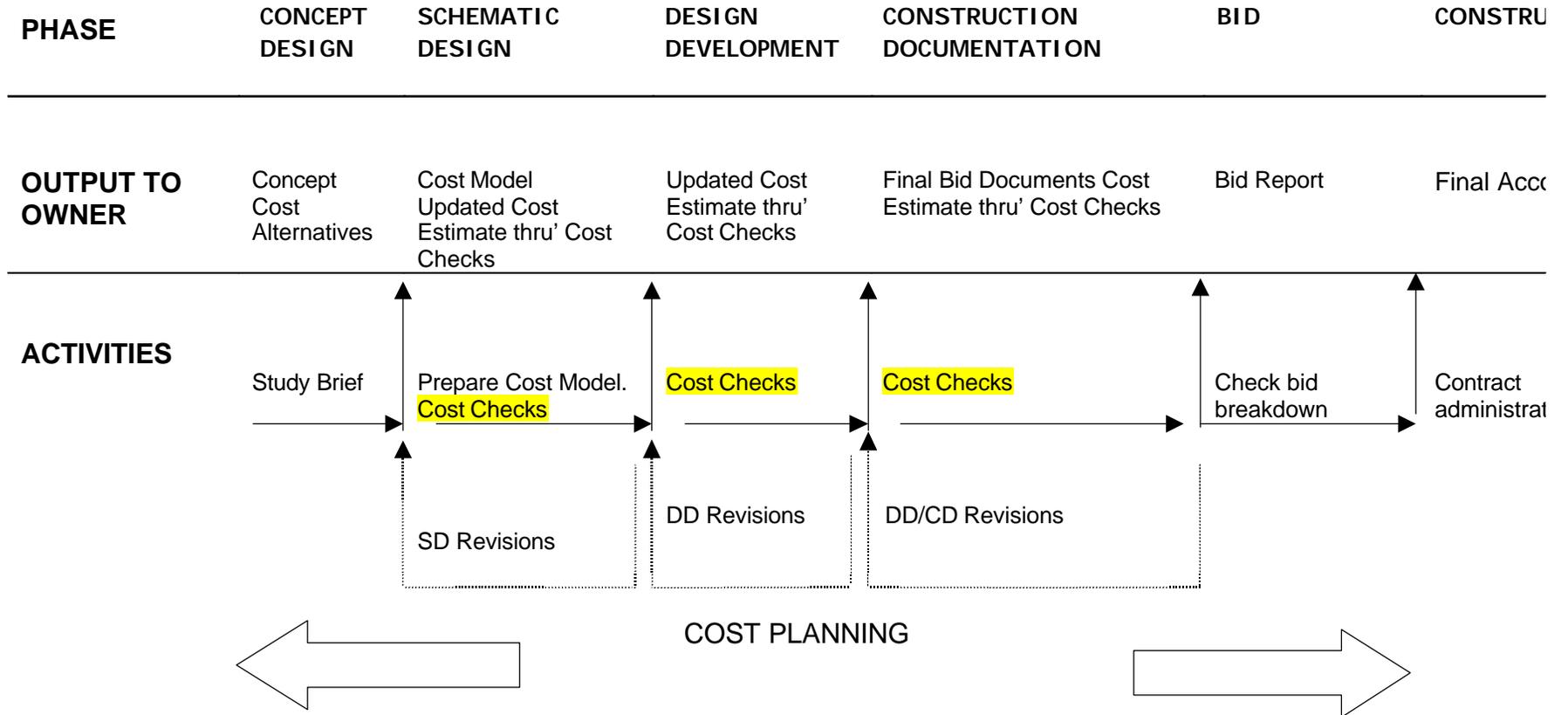
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# Pre-Construction Cost Control

COST CHECK STATEMENT					
<b>project</b>		Boeing Commercial Airplane Group New HQ		<b>project no</b>	
				W20024-500	
<b>project type</b>		Office Building		<b>project cost</b>	
				\$ 59,178,843	
<b>location</b>		Renton, Washington		<b>project rate</b>	
				\$ 191.95	
<b>contract period</b>				<b>estimate date</b>	
				5/23/97	
				<b>cost check date</b>	
				7/20/97	
ELEMENT GROUP	Cost Model 5/23/97	Cost Check 7/20/97	Cost Check 9/15/97	Cost Check	Cost Check
Foundations (1,2,3)	2,937,634	3,200,000	3,100,000		
Basement Construction	-	-	-		
Superstructure (4,5)	7,639,165	7,450,000	7,455,000		
Exterior Closure (6,7)	9,302,468	9,420,000	9,400,000		
Roofing (8,9)	895,395	950,000	936,000		
Interior Construction (10-12)	4,124,268	4,250,000	4,235,000		
Staircases (13,14)	948,891	920,000	925,000		
Interior Finishes (15,16,17)	5,142,387	5,350,000	5,250,000		
Conveying Systems (18)	1,098,000	1,100,000	1,100,000		
Plumbing (19-23)	2,015,206	2,150,000	2,120,000		
HVAC (24)	7,100,650	6,900,000	6,950,000		
Fire Protection (25)	807,518	815,000	812,000		
Electrical (26, 27,28)	6,473,672	6,500,000	6,550,000		
Equipment (29)	746,945	725,000	720,000		
Furnishings (30)	3,172	5,000	4,000		
Special Construction (31)	402,482	395,000	395,000		
Selective Building Demolition	-	-	-		
Site Preparation (32,33,34)	1,071,502	1,100,000	950,000		
Site Improvements (35-38)	1,702,645	1,750,000	1,687,000		
Site Civil/Mech. Utilities(39-42)	3,469,955	3,550,000	3,256,000		
Site Electrical Util. (43,44,46)	1,612,504	1,635,000	1,625,000		
Other Site Construction(45,47)	1,684,384	1,720,000	1,700,000		
General Requirements	-	-	-		
<b>Net Project Cost</b>	<b>59,178,843</b>	<b>59,885,000</b>	<b>59,170,000</b>		
Sales Tax (Excluded)					
<b>Total Project Cost</b>	<b>59,178,843</b>	<b>59,885,000</b>	<b>59,170,000</b>		



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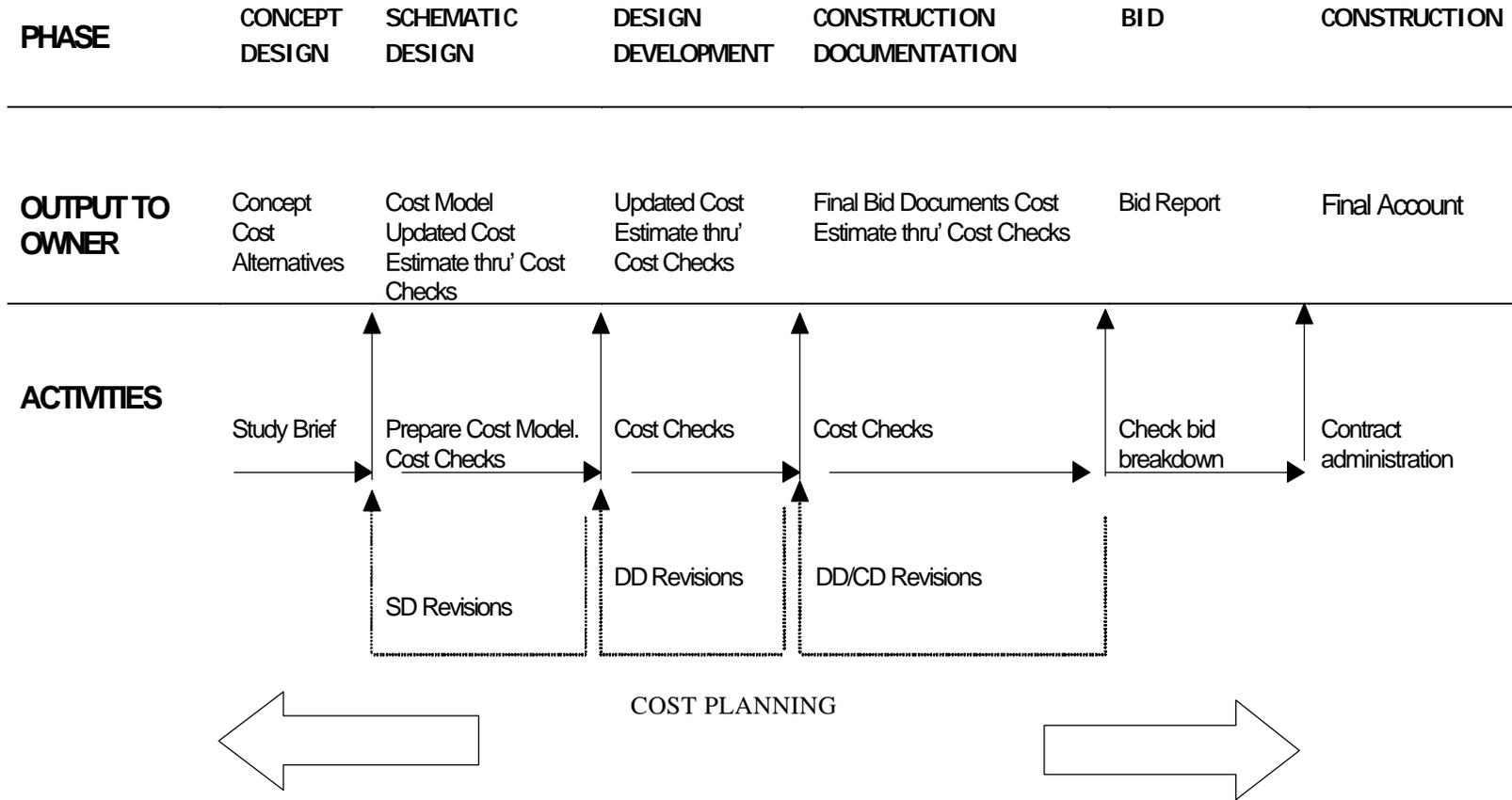
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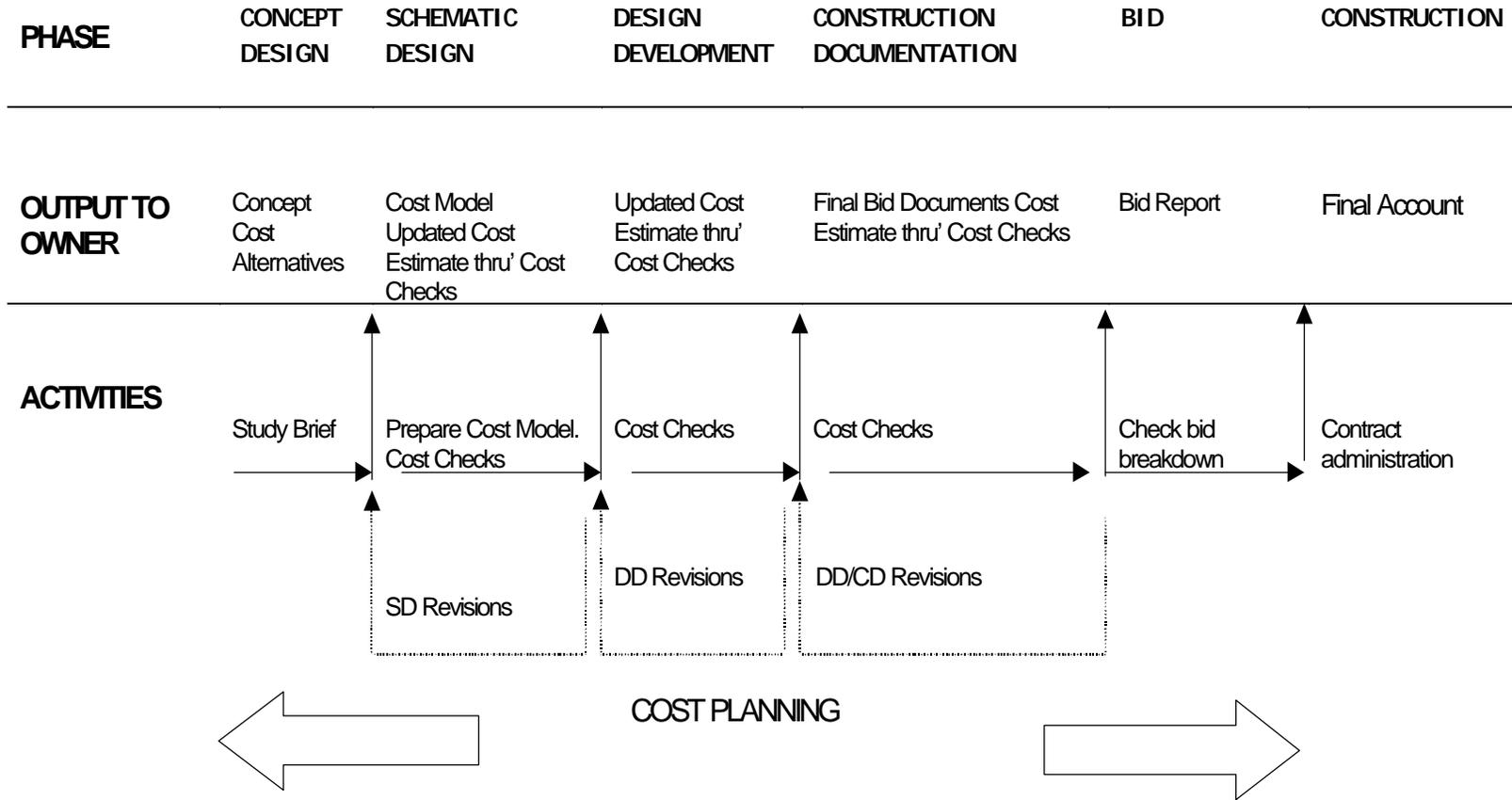
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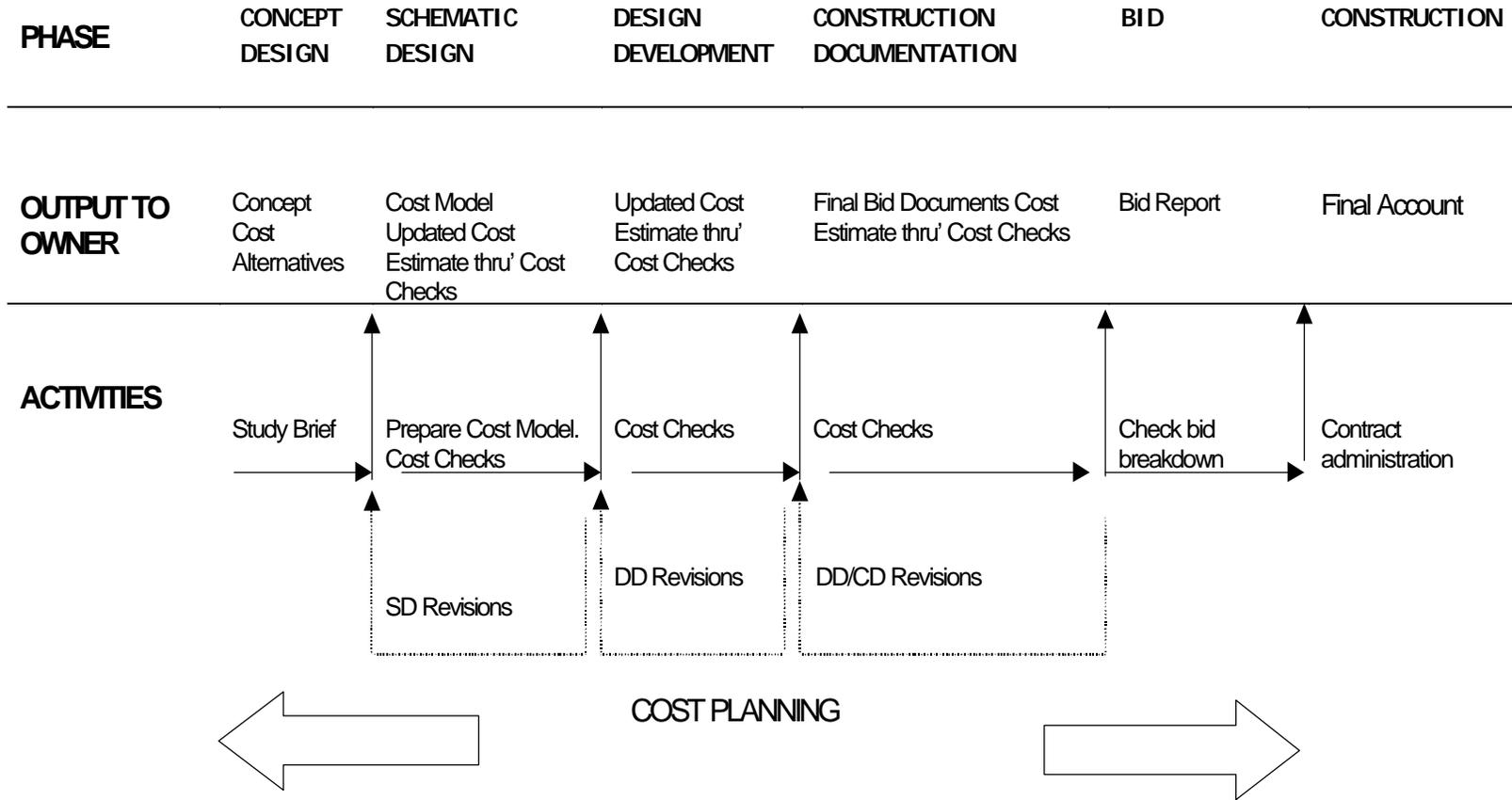
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# Pre-Construction Cost Control



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# *Pre-Construction Cost Control*

Finally...

Through the technique of *Cost Planning* an Owner can retain control of the cost of their construction project.



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# *Pre-Construction Cost Control*

## Cost Planning will...

- Confirm the project is feasible
- Establish a Cost Plan setting targets for quality and cost
- Undertake Comparative Cost Studies
- Consider Life-Cycle Issues and Value Management
- Ensure, through Cost Checking, what is being designed meets budget



# *Pre-Construction Cost Control*

Thank you...



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