Idle Iron, Reuse and Scrap in the Gulf of Mexico

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What’s Wrong With This Statement?

“There are about 4,000 structures in the GOM producing oil and gas …”

Answer

30% of the 4,000 structures ~ 1,200 structures are “idle” (aka “dead steel”), meaning:

- once producing, not now producing
- unlikely to produce again in the future
- may or may not serve a useful economic function

Outline

Part 1 – Inventory

- Review of Federal Regulations
- What is Idle Iron?
- Why Does Idle Iron Exist?
- Idle Iron Statistics

Part 2 – Death Cycle

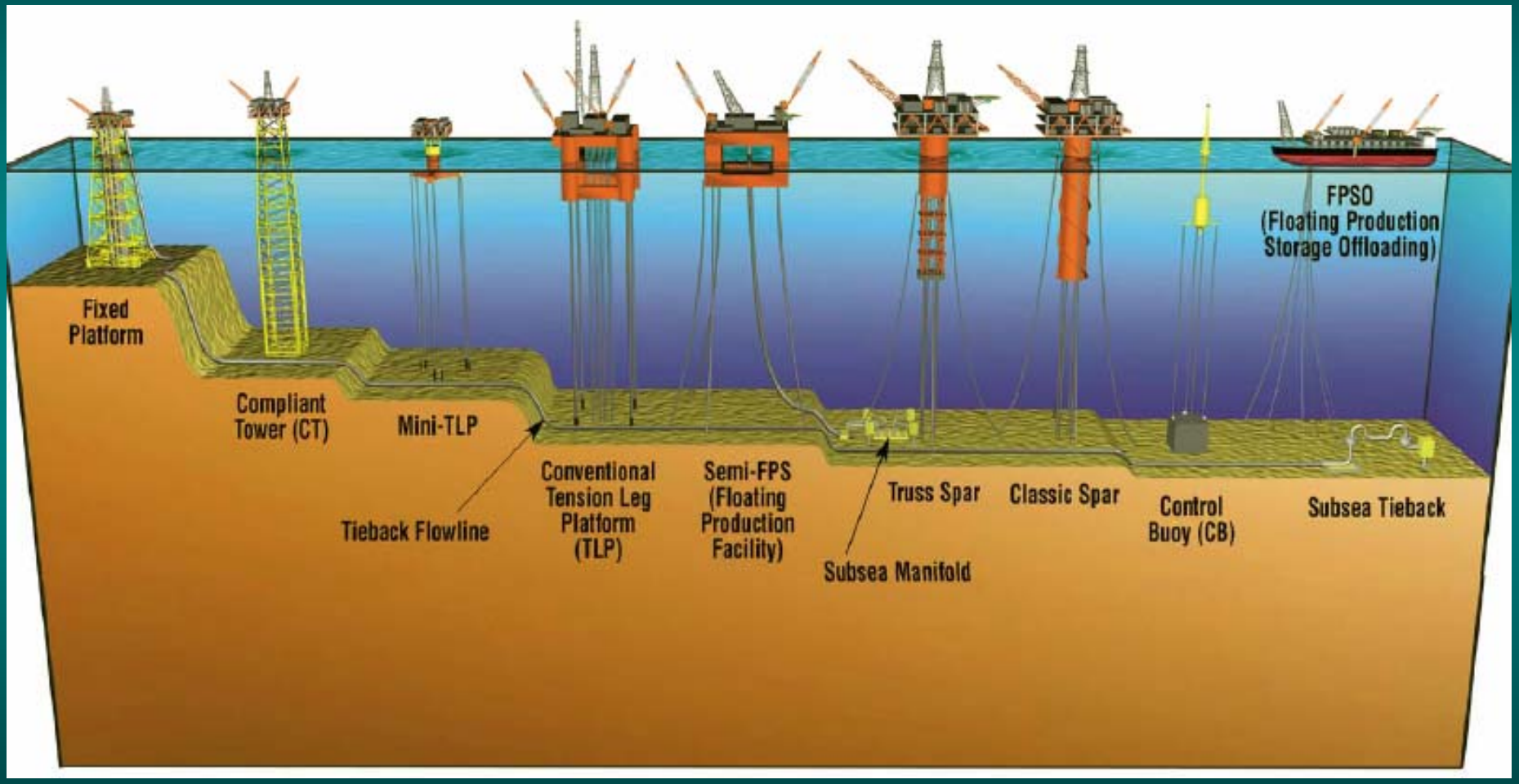
- Decommissioning Stages
- Reuse and Scrap Activities
- Decision Criteria

Inventory of Idle Iron

Structure Classification

Oil & Gas Complex

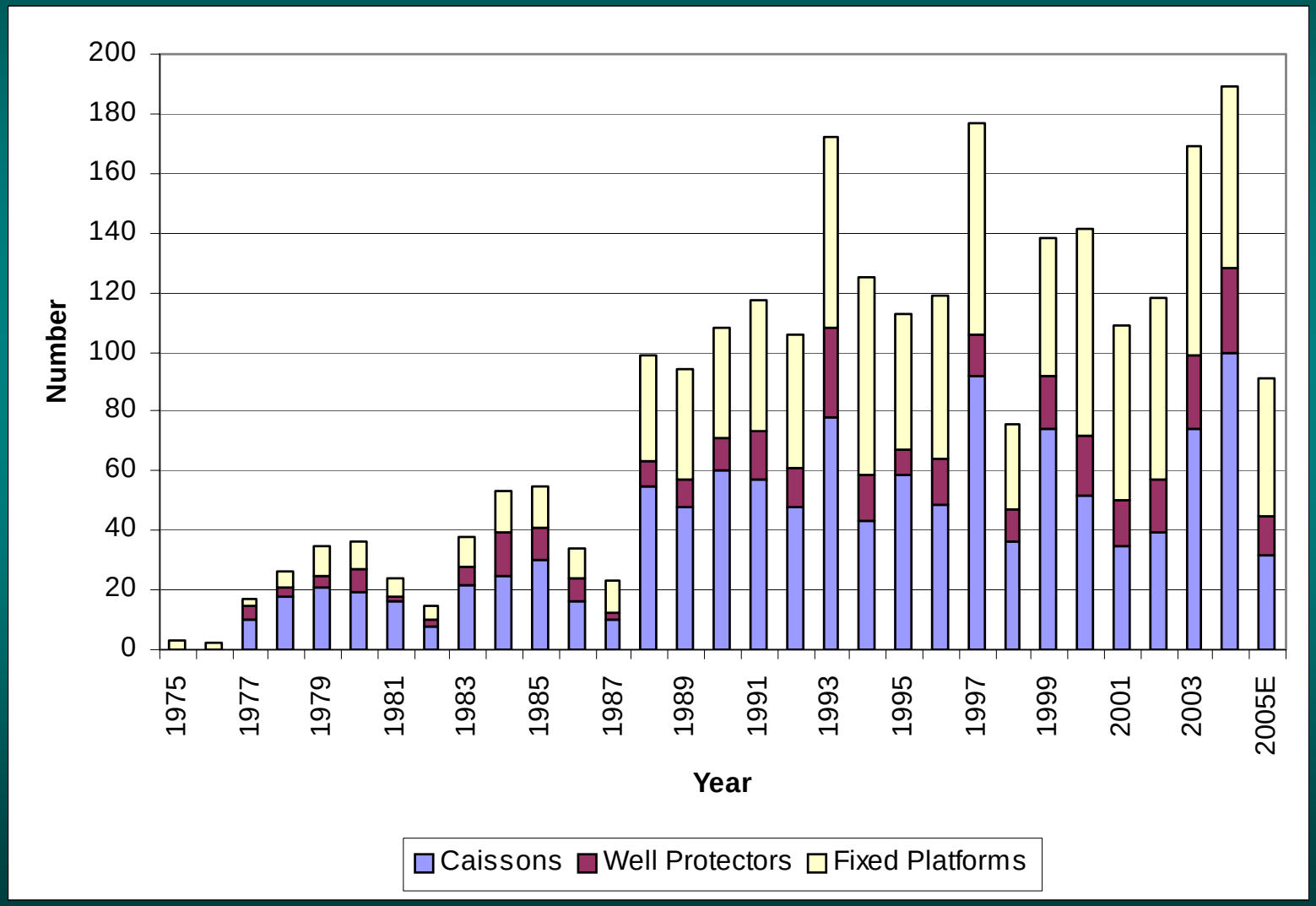
Deepwater Infrastructure



Shallow Water Structures (2003)

Water Depth	WGOM			CGOM			GOM
(ft)	CAIS	WP	FP	CAIS	WP	FP	Auxiliary
0-20	1	0	0	200	10	35	79
21-100	79	25	119	767	268	710	318
101-200	3	17	82	48	63	490	73
210-400	1	4	85	1	12	320	31
400+	0	0	13	0	3	43	4
TOTAL	84	46	299	1,016	356	1,598	505

Structure Removals



Installation & Removal Trends (1996–2005)

- Removals
  - 136 structures/yr
    - 10 structures/yr in water depth > 200 ft
- Installations
  - 127 structures/yr
    - 16 structures/yr in water depth > 200 ft

Federal Regulations

- MMS holds authority to “restore leases to original conditions”
  - 6 months after lease production ceases, operator loses lease instrument
  - 12 months to remove structures
- Lease with one producing well/structure can “hold” all other inactive wells/structures until lease production ceases

What Is Idle Iron?

- Structures that exist on a producing lease (active) that have **not produced in the last year** or **serve a useful economic function**
  - "Not produced in the last year": *observable*
  - "Serve a useful economic function": *unobservable*

- Structures that exist on non-producing (inactive) leases need to be removed in a timely manner unless serving a useful economic function.

Tradeoffs

Remove:

- To avoid environmental and operational hazard
- To avoid increased cost of decommissioning (e.g., if structure destroyed/damaged by hurricane)
- To reduce inspection and maintenance cost
- To reduce insurance premiums and liability
- To maintain good working relations with MMS

Hold:

- To defer cost of removal
- To increase opportunity for resale
- To reduce risk/expense of storing platforms in fabrication yards
- To reduce decommissioning cost through scale economies, scheduling, and shared mobilization
- Hedge against loss of future revenue associated with secondary/enhanced recovery

Why Does Idle Iron Exist?

- **Normal characteristic of field development**
  - Offshore fields require more than one well, and often, more than one structure
  - Well production begins and ends at different periods of time
  - Structure production begins and ends at different periods of time
- **Regulatory requirements**
  - Area/Block
  - Field
  - Lease
  - Structure
- **Operator preferences**
  - Good, bad and the ugly

Definitions

- **Active** lease = Lease that produces hydrocarbons in commercial quantities at given point in time

- **Inactive** lease = Lease that once produced hydrocarbons, but has not produced for one year or more

Definitions

- **Active** structure = Structure that produces hydrocarbon in the year of observation
- **Idle** structure = Structure that once produced, but no production over the past year
- **Auxiliary** structure = Structure that never produced, but serves in an auxiliary role (compression, processing, metering, etc.)

Statistics

- On ACTIVE leases
  - 2,175 active
  - 898 idle
  - 440 auxiliary
- On INACTIVE leases
  - 329 idle
  - 65 auxiliary
- 1,227 idle structures
  - 30% total number of all structures
  - 50% of all producing structures
  - 3/4^{ths} idle structures on active leases

Statistics

Lease Type	Parameter	Caisson	Well Protector	Fixed Platform	Total
Active					
	Active structures	503	225	1,447	2,175
	Idle structures	484	136	278	898
	Auxiliary structures				440
	Total age – active (yr)	6,848	5,151	29,578	41,577
	Total idle age (yr)	4,021	946	2,089	7,056
	Total age – idle (yr)	11,892	4,071	7,622	23,578
	Idle age/Total age (%)	21	10	6	11
Inactive					
	Idle structures	114	41	172	329
	Auxiliary structures				65
	Total idle age (yr)	558	180	565	1,303
	Total age (yr)	1,916	833	3,358	6,107
	Idle age/Total age (%)	29	22	17	21

Distribution of Idle Structures on Active Leases

k	Number of active leases with k active structures	Number of k active leases with l idle structures										
		$l = 0$	1	2	3	4	5	6	7	8	9	10
1	944	773	118	29	8	6	3	3	2	0	0	2
2	245	171	40	20	7	1	2	3	0	1	0	0
3	84	36	26	12	5	1	0	1	3	0	0	0
4	35	12	9	4	5	0	1	1	0	0	0	0[a]
≥ 5	48	12	4	6	7	2	4	5	0	1	0	1[b]
Total	1,356			71	32	10	10	13	5	2	0	3

Footnote: a) One lease exists with 13 idle structures, 2 leases exist with 14 idle structures.
b) Six leases exist with 14, 17, 19, 23, 44, 55 idle structures.

Active, Idle, and Auxiliary Structures on Active Leases

k	Number of active leases with k active structures	Number of active structures	Number of idle structures	Number of auxiliary structures
1	944	944	291	129
2	245	490	141	79
3	84	252	96	66
4	35	140	84	43
≥ 5	48	348	286	123
Total	1,356	2,175	898	440

Distribution of Idle Structures on Inactive Leases

l	Number of inactive leases with l inactive structures	Total number of idle structures	Average idle age (yr)
1	197	113	5.1
2	21	40	4.3
3	9	26	4.9
4	7	27	5.1
≥ 5	14	123	5.3
Total	248	329	5.1

Inactive Lease Inventory

- Inactive lease inventory is dynamic
  - Best viewed as a “pool”
- Average idle age
  - Caisson: 4.9 years
  - Well protector: 4.4 years
  - Fixed platform: 3.3 years

Company Ownership (2003)

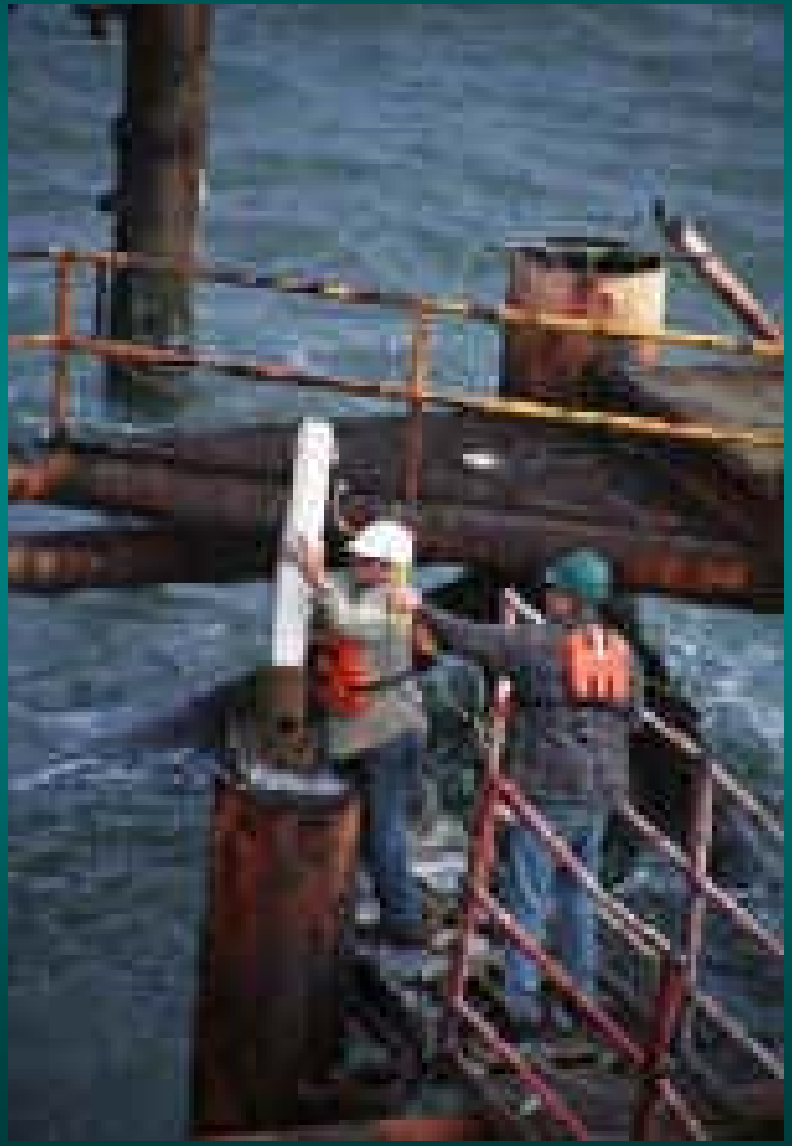
Company	Active	Auxiliary	Idle	Total
ChevronTexaco	311	95	157	562
Apache	160	30	43	234
Union Oil	72	37	39	149
Forest Oil	81	18	36	136
Devon Louisiana	55	22	34	111
Samedan Oil	72	11	29	111
J.M. Huber	24	9	63	95
Energy Partners	41	8	45	94
Newfield Exploration	67	9	16	92
Stone Energy	58	8	21	87
Anadarko Petroleum	47	14	25	86
ExxonMobil	63	9	10	81
BP Exploration & Production	48	7	24	79
Devon Energy Production	42	8	23	73
Comstock Offshore	22	10	40	72
Kerr-McGee Oil & Gas	34	7	26	68
BP America	43	6	17	66
Murphy E&P	26	8	28	62
W&T Offshore	39	4	17	60
Energy Resource Technology	44	4	7	55
Nexen Petroleum Offshore	35	7	10	52

Death Cycle

P&A Wells, Cut and Pull Conductors

Cut and Remove Deck

Cut and Pull Piles



Remove Jacket

Site Clearance & Verification

Storage

DVN·BA·552 A

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After a Structure Is Removed

- Title to structure may be
  - Retained by owner
  - Transferred to contractor
- In either case, several options exist:
  - Hold/store
  - Refurbish
  - Sell to broker
  - Sell to scrap yard

Reuse, Hold or Scrap?

- Fabrication price ($/ton)
- Price of scrap steel ($/ton)
- Cutting cost ($/ton)
- Holding cost ($/acre)
- Refurbishment cost
- Interest expense

Scrap Steel Is a Commodity

- Supply and demand
- Scrap class
  - Over 100 classes
  - Size, thickness, material preparation, source
- Steel price
- Delivery method and quantity
- Location

No. 1
Busheling

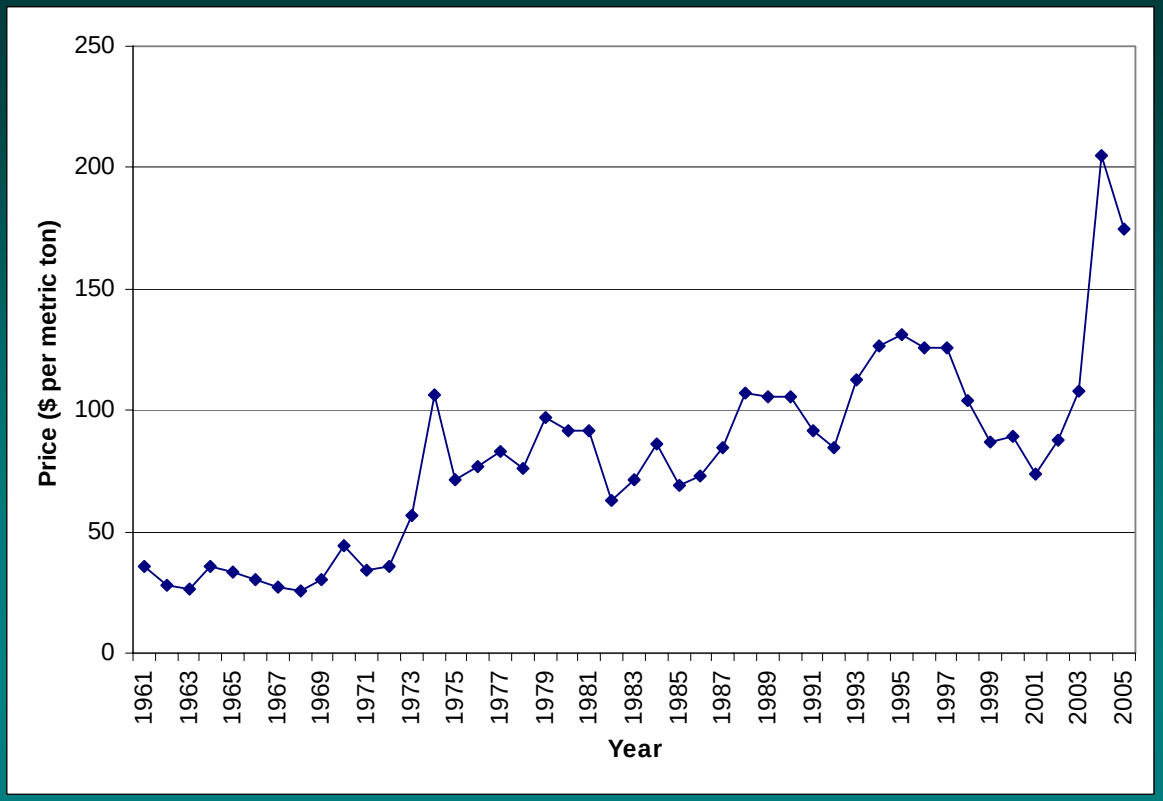
Cast Iron
Pipe

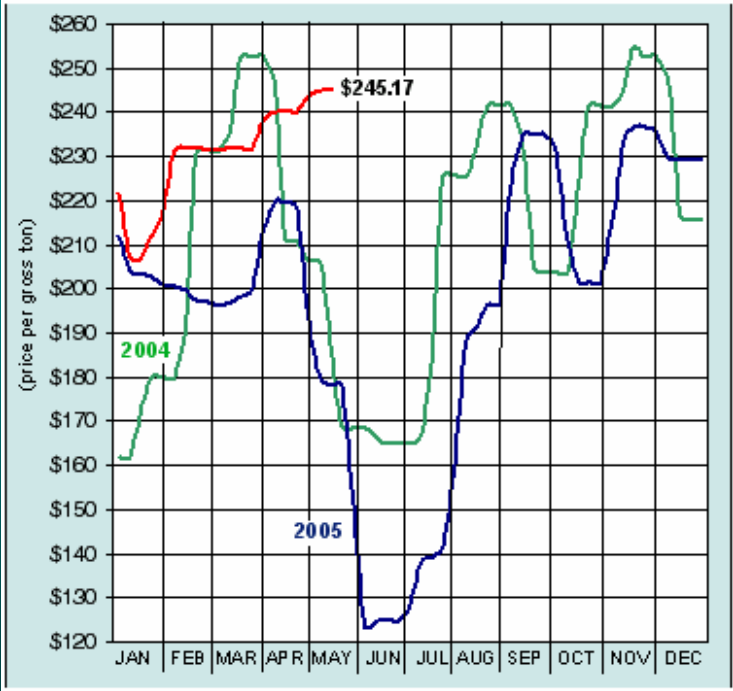
Steel
Clipping

No. 1
Bundle

Plate and
Structural
Steel 2 ft
and Under

Sheet
Iron


Price ($ per metric ton)
250
200
150
100
50
0
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Year


(price per gross ton)
$260
$250
$240
$230
$220
$210
$200
$190
$180
$170
$160
$150
$140
$130
$120
$245.17
2004
2005
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

“Typical” Platform

- 50–70% plate and structural steel
- 20–40% No. 1, No. 2 heavy metal scrap
- 5–10% nonferrous metal
- 5% piping

Cutting and Fabrication Cost

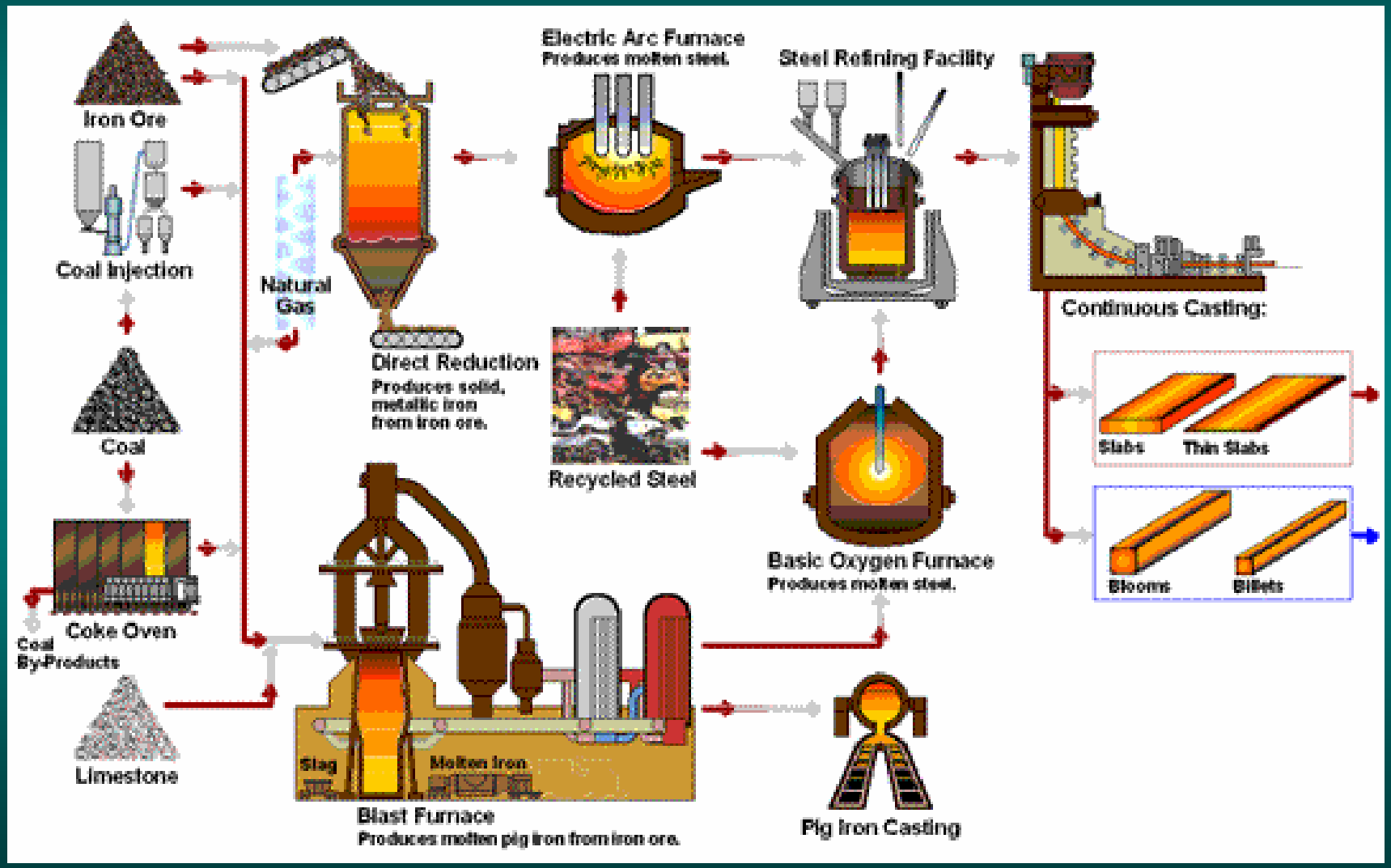
- Deck: $10–20/ton
- Jacket: $50–60/ton
- Empty Ship Hull: $40–50/ton
- Semi: $60–200/ton
- Bulk Carrier (India): $400–450/ton
- Tanker (India): $425–500/ton

- Deck: $1,500–2,000/ton
- Jacket: $2,000–4,000/ton

Decision Criteria

$$P_{scrap} \leq C_{cut} + C_{hold}$$

Recycled Steel Flowline



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