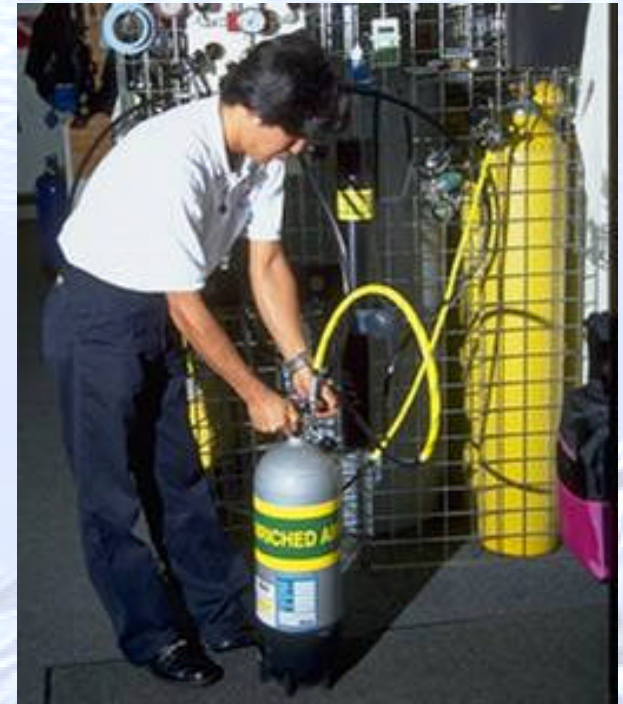


# Unit 4:

## *Choosing the Best Nitrox Mix*

- **Enriched Air Nitrox Mixtures**
- **Calculating MOD**
- **Choosing your “Best Mix”**

WORLDWIDE  
DIVE SAFETY THROUGH EDUCATION





# ***Student Performance:***

By the end of the lesson you will be able to:

- **Define Maximum Operating Depth and determine it for any nitrox mixture.**
- **Demonstrate the use of the OCEANx Calculator.**
- **Describe what “Best Mix” means and how to calculate it.**

# *Enriched Air Nitrox Mixtures*

- **Two Standard Nitrox Mixes**
  - EANx 32 or NOAA Nitrox I
  - EANx 36 or NOAA Nitrox II
- **Partial Pressure of Oxygen is the Limiting Factor**
  - Limit  $P_{O_2}$  to 1.4 ATA
    - 1.6 ATA as a contingency



# *Maximum Operating Depth*

---

- **The maximum operating depth (MOD) is the maximum depth that should be dived with a given nitrox mixture.**
  - **MOD should be derived from the recommended maximum oxygen partial pressure of 1.4 atmospheres**
  - **MOD should be written prominently on the cylinder's contents label**

# Maximum Operating Depth continued

- MOD by Table (imperial)

Maximum Operating Depth (in fsw) for Various Nitrox Mixes											
Percent O <sub>2</sub>	21%	22%	24%	26%	28%	30%	32%	34%	36%	38%	40%
PO <sub>2</sub>											
1.0 ata	124	117	104	93	84	77	70	64	58	53	49
1.1 ata	139	132	118	106	96	88	80	73	67	62	57
1.2 ata	155	147	132	119	108	99	90	83	77	71	66
1.3 ata	171	162	145	132	120	110	101	93	86	79	74
1.4 ata	187	177	159	144	132	121	111	102	95	88	82
1.5 ata	202	192	173	157	143	132	121	112	104	97	90
1.6 ata	218	207	187	170	155	143	132	122	113	105	99

# Maximum Operating Depth continued

- MOD by Table (metric)

Maximum Operating Depth (in msw) for Various Nitrox Mixes											
Percent O <sub>2</sub>	21%	22%	24%	26%	28%	30%	32%	34%	36%	38%	40%
P <sub>O<sub>2</sub></sub>											
1.0 ata	38	35	31	28	26	23	21	19	17	16	15
1.1 ata	42	40	36	32	29	26	24	22	20	18	17
1.2 ata	47	44	40	36	33	30	27	25	23	21	20
1.3 ata	52	49	44	40	36	33	30	28	26	24	22
1.4 ata	57	54	48	43	40	36	33	31	28	26	25
1.5 ata	61	58	52	47	43	40	36	34	31	29	27
1.6 ata	66	63	57	51	47	43	40	37	34	32	30

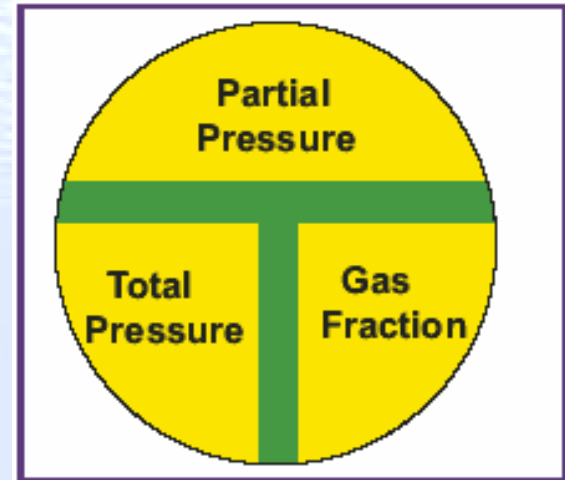
# Maximum Operating Depth continued

- **Calculating MOD**
  - Begin by finding the total pressure that it takes to produce the maximum acceptable oxygen partial pressure

$$P_g = F_g \times P_{total}$$

- Then convert to a depth

$$D_{fsw} = (P_{ata} - 1 \text{ atm}) \times 33 \text{ fsw/atm}$$



# *Maximum Operating Depth* continued

- **Combining the two steps**

$$D_{\text{fsw}} = \left( \frac{PO_{2 \text{ limit}}}{FO_2} - 1 \text{ atm} \right) \times 33 \text{ fsw/atm}$$

$$D_{\text{fsw}} = \left( \frac{PO_{2 \text{ limit}}}{FO_2} \times 33 \text{ fsw /atm} \right) - 33 \text{ fsw}$$



# Maximum Operating Depth continued

- Using the OCEANx to Establish MOD



# *Best Mix*

- **“Best mix” is the nitrox mixture with highest fraction or percentage of oxygen that can be used at the target depth.**

**WORLDWIDE**  
DIVE SAFETY THROUGH EDUCATION



# *Choosing Best Mix*

- **Using the Best Mix Table**
- **Calculating the Best Mix**
- **Using the OCEANx to establish best mix**

# Choosing Best Mix continued

- The Best Mix Table

P02		1.2	1.3	1.4	1.5	1.6
fsw	msw					
40	12	40%	40%	40%	40%	40%
45	14	40%	40%	40%	40%	40%
50	15	40%	40%	40%	40%	40%
55	17	40%	40%	40%	40%	40%
60	18	40%	40%	40%	40%	40%
65	20	40%	40%	40%	40%	40%
70	21	40%	40%	40%	40%	40%
75	23	37%	40%	40%	40%	40%
80	24	35%	38%	40%	40%	40%
85	26	34%	36%	39%	40%	40%
90	27	32%	35%	38%	40%	40%
95	29	31%	34%	36%	39%	40%
100	30	30%	32%	35%	37%	40%
105	32	29%	31%	33%	36%	38%
110	33	28%	30%	32%	35%	37%
115	35	27%	29%	31%	33%	36%
120	36	26%	28%	30%	32%	35%
125	38	25%	27%	29%	31%	33%
130	40	24%	26%	28%	30%	32%



# Choosing Best Mix continued

- Calculating best mix is similar to the calculation for maximum operating depth in reverse.
- **Step 1: Determine the absolute pressure at the target depth**

$$P_{ata} = \frac{D_{fsw}}{33 \text{ fsw} / \text{atm}} + 1 \text{ atm}$$

or

$$P_{ata} = \frac{D_{fsw} + 33 \text{ fsw}}{33 \text{ fsw} / \text{ata}}$$

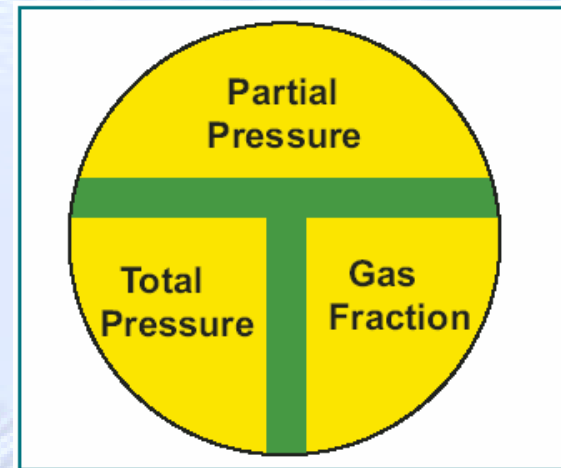
# Choosing Best Mix continued

- **Step 2: Determine what fraction will produce the target partial pressure at that absolute pressure**

$$F_g = P_g / P \text{ total}$$

or

$$F_{O_2} = P_{O_2} / P \text{ total}$$



# Choosing Best Mix continued

- The two steps can be combined into a single formula.

$$FO_2 = PO_{2 \text{ limit}} / \left( \frac{D \text{ fsw}}{33 \text{ fsw / atm}} + 1 \right) = \frac{PO_{2 \text{ limit}} \times 33 \text{ fsw / atm}}{D \text{ fsw} + 33 \text{ fsw}}$$

WORLDWIDE  
DIVE SAFETY THROUGH EDUCATION

# Choosing Best Mix continued

- Using the OCEANx Calculator for Best Mix





## End of Unit 4

# *Choosing the Best Nitrox Mix*

- **Enriched Air Nitrox Mixtures**
- **Calculating MOD**
- **Choosing your “Best Mix”**

WORLDWIDE  
DIVE SAFETY THROUGH EDUCATION





# ***Student Performance:***

By the end of the lesson you will be able to:

- **Define Maximum Operating Depth and determine it for any nitrox mixture.**
- **Demonstrate the use of the OCEANx Calculator.**
- **Describe what “Best Mix” means and how to calculate it.**