<table>
<thead>
<tr>
<th>Advice</th>
<th>Explanation</th>
<th>Example</th>
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<tbody>
<tr>
<td>Respond to your reader’s needs</td>
<td>Consider the factors that create your reader’s interest in your memo and address those factors in the way you organize your memo:</td>
<td>Rephrase the request as a statement to open your memo:</td>
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<tr>
<td></td>
<td>• Has the reader asked for specific information?</td>
<td>• Here are the data you requested from the thermal diffusion experiments. The results should be useful to the Composite Materials Group and should answer their questions regarding the degree of uncertainty in our measurements. The attached graph illustrates the time vs. temperature readings for three composite rods.</td>
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<td></td>
<td>• Is the reader aware of the subject and its importance?</td>
<td></td>
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<td></td>
<td>• Why does the reader need this information?</td>
<td></td>
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<td>• What level of detail or evidence will the reader require to accept the content of the memo?</td>
<td></td>
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<tr>
<td>Get to the point</td>
<td>Except for “bad news” situations, begin your memo with the most important point you wish to make.</td>
<td>Prefer a direct, specific opening:</td>
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<td></td>
<td></td>
<td>We believe the equations used in our procedures are valid for use in the design you propose <em>(followed by a list of reasons why along with any limitations or qualifiers to your statement).</em></td>
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### Advice Table for Technical Memos

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<td>Give structure to the information.</td>
<td>Make sure that headings, paragraphs, and lists reflect distinct groups of information arranged in an order that makes sense to your reader.</td>
<td>Prefer a structure that reveals the hierarchy of ideas.</td>
</tr>
</tbody>
</table>
|                                      |                                                                             | The equation we used would not suit your design for two reasons:  
|                                      |                                                                             |   o The 30 ft depth of your tanks will introduce stratification;                                                                    |
|                                      |                                                                             |   o The use of salt water in your tanks will create a variation in specific gravity.                                                |
|                                      |                                                                             | Avoid either mixing unrelated ideas in a single chunk of information or hiding structure within linear text:                         |
|                                      |                                                                             | The equations we used would not suit your design for two reasons. According to hydrostatic theory, the forces act on the center of pressure of the submerged are the 30 ft. depth of your tanks will introduce stratification. Another reason is that the use of salt water in your tanks will create a variation in specific gravity. |
Advice Table for Technical Memos

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| Use a direct, personal tone.    | Remember that memos are written by people for people (normally within the same organization). Address your reader directly in a level of formality that is appropriate to your working relationship and to the purpose of the memo. | Prefer a direct style:  

We remain available to answer any questions you have about these findings.

Avoid stiff, institutional prose:  

It is stated that investigators in the Engineering Applications Division will continue to remain available to render assistance in the understanding of the above listed findings.

| Use the subject line (Re:) to your advantage. | Let the subject line focus the reader’s attention by highlighting the critical ideas in your memo. | Prefer a subject line such as:  

Re: Serious Violations of Safety Regulations—Building A3  

Avoid overly broad, generic subject lines:  

Re: Safety Inspections |
To: Fluids Dept. Staff
From: Roger Wallace, Dept. Manager
Date: 11/4/2002
Re: Application of the hydrostatic equations

Request for information

Sarah Chen, from Contracts & Specifications, has received an RFP for a new line of ultra-light tanks. These tanks will be used in an experiment that determines how high a jet of buoyant fluid will rise through a static fluid that is stratified (fluid density increases with depth). She knows we have been running experiments at our hydraulic benches to determine the forces and pressures acting on the walls of smaller tanks using fresh water. She wants to know whether the equations we have used in our experiments would also be appropriate in determining the forces and pressures acting on the walls of these new tanks.

These tanks are to be 5ft (l) x 3ft (w) x 5ft (h). In this experiment the tank is filled with salt water. The water's specific gravity varies linearly over the 5ft depth from 1.025 at the bottom of the tank to 1.000 at the surface.

Your assignment

Please draft a memo to Sarah that addresses the following:

1. Would it be appropriate to use the equations for force and pressure employed in our current experiments in the new design as well? Explain why or why not. If not, can you suggest an alternative. In either case, determine whether this new situation presents conditions that violate assumptions made in development of the equations you have been using and explain the significance of any such violation.

2. Remember that Sarah is not an engineer and she likes her memos concise (1 page maximum) and in plain, correct English. Nonetheless, make sure your information is technically sound. She will have it checked. Remember the flak we took for those sloppy calculations we sent her last year; they caused a two-week delay in completing a proposal.

3. Use this company-standard memo format.
Memorandum

November 6, 2002

To: Sarah Chen
From: XXX, Laboratory Manager
Re: Application of the hydrostatic equations to your tank design

The equations we have used for predicting the forces and pressures on submerged planar surfaces might or might not satisfy your current testing requirements. The applicability of these equations depends upon the precise degree of differences between the system you propose and the setup we have used in the laboratory, as well as the degree of accuracy you require.

The problem is two-fold.

1. Our equations for predicting pressure ($p_c = pgH$) and force ($F = p_cA$) depend on the fluid having a constant density, which is the case in our freshwater system. Your system uses salt water, which introduces linearly varying density. This varying density (in your system from 1.025 to 1.000) might cause an error of ~2%.

2. The equations our laboratory has been working with are dependent on a static system. Your system may not be truly static since it involves a jet that may produce fluid movement and acceleration in the previously static layers of salt water. If such movement occurs, then your system could violate a key assumption used in our equations, and these equations may no longer be accurate predictors.

By using the maximum density of the salt water, we can calculate the force acting on each tank face. Please note that these numbers will be slightly larger than the actual forces felt on each face. However the precise effect of the jet remains unclear since we do not know its size or position in the tank. If the jet in your system is quite small, or is localized, then our equations might still yield a useful estimate of the pressures and forces your tanks will experience. The attached calculations support these conclusions.

Please contact me at extension 165 if you wish further information.
Estimated Values:

Assume: Static fluid / constant $\rho = 1.025 \text{kg/m}^3$

TANK

pressure on Top Face (4) is 0.

$F = F_{\text{Top Face}} = 0$

pressure on bottom face:

$\rho$ is uniformly distributed

$\rho = \frac{\rho_{\text{Saltwater}} (h)}{h} = \frac{1005.25 \text{kg/m}^3}{5\text{m}}$

$\rho = 502.7 \text{ kPa}$

$\rho = 50.28 \text{ kPa}$

$h = \text{depth to bottom plane} = 5\text{m}$

pressure on front face

$F = \rho (A)$

$F = (50.28 \times 3 \times 5)$

$F = 754.2 \text{ kN}$

pressure on back face = Pressure o-front $= 628.25 \text{ kN}$

Pressure on side face

$P_c = \rho_{\text{Saltwater}} (5)$

$P_c = \frac{1005.25 \text{kg/m}^3}{2.5}$

$P_c = 402.1 \text{ kPa}$

$F = \rho (A)$

$F = 402.1 \times 3 \times 5$

$F = 376.95 \text{ kN}$

Note: The other side face has the same force.