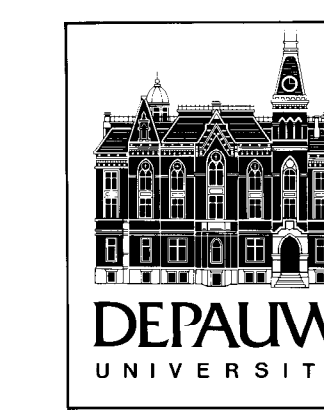


# Quick-Look Chart for Evaluating Cross Sections in Contractional Settings

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Full Text:  
Wilkerson, M. S., and Dicken, C. L., 2001. Quick-look techniques for evaluating two-dimensional cross sections in contractional settings. *American Association of Petroleum Geologists Bulletin*, v. 85, n. 10.

## Abstract (from Wilkerson & Dicken, 2001)

For over thirty years, geologists and geophysicists have used balancing techniques to constrain their cross-sectional interpretations in detached contractional settings. The quality of the resulting interpretations often directly correlates to the quality of the data, the balancing and interpretational experience of the interpreter, and the time allotted for the interpretation. We "de-mystify" the balancing process and present quick-look techniques for quickly and effectively detecting and preventing common cross-section balancing errors in detached contractional settings. Common balancing problems are highlighted through close scrutiny of hanging-wall and footwall ramps and flats; such analysis helps identify inconsistencies in the numbers of ramps and flats, in the strata and stratal thicknesses in corresponding ramps, and in displacement along the fault. These techniques possess the additional advantages of being useful at any stage of the interpretational process for time or depth sections and being easily comprehensible by students, geologists, geophysicists, and managers alike. The quick-look techniques, however, are not an all-encompassing panacea. They do not guarantee a unique and/or correct cross-sectional interpretation, but rather, they serve to focus the interpreter's attention on potentially problematic areas in the cross section that might require explanation and/or reinterpretation.

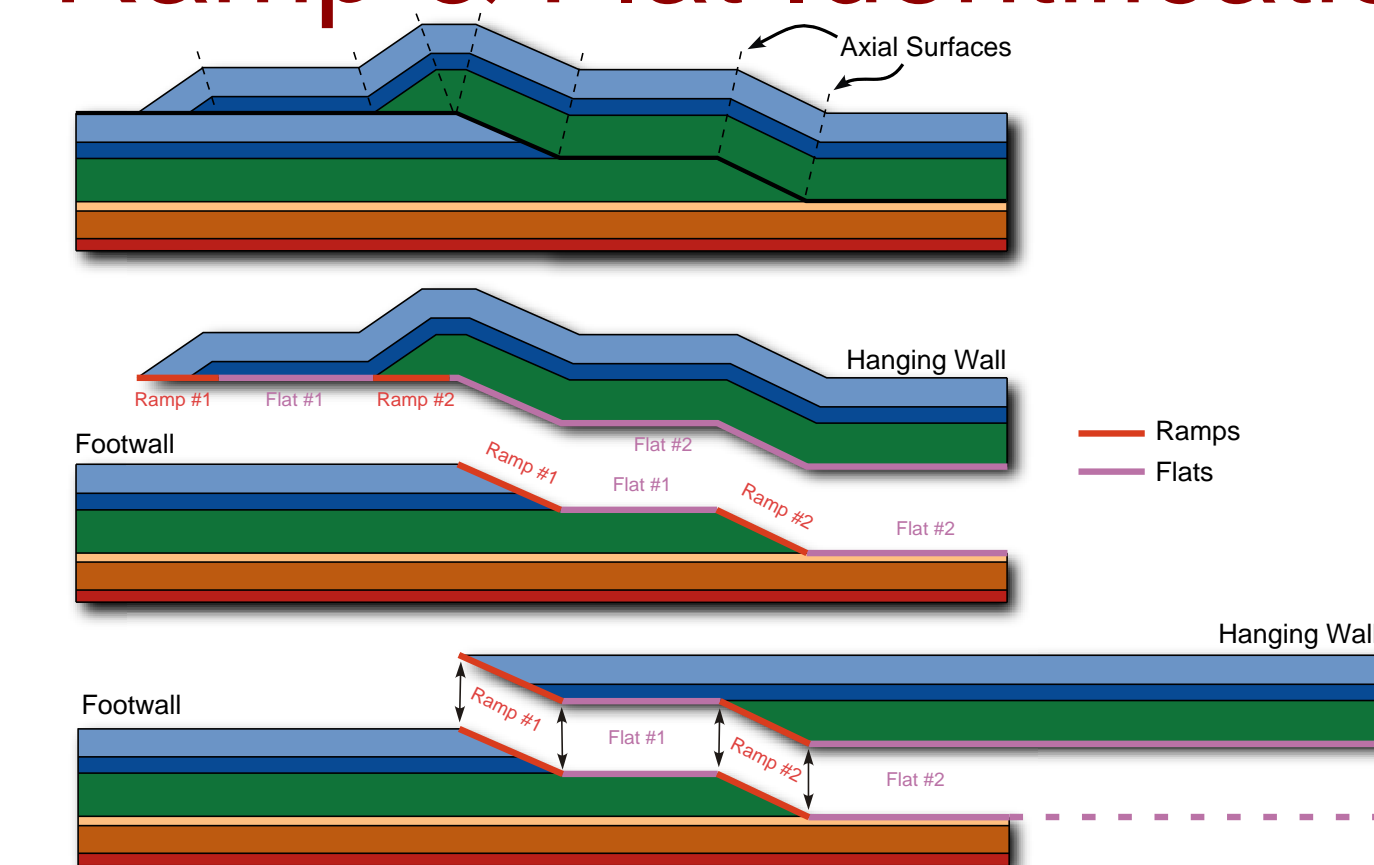
## Assumptions for Quick-Look Techniques

- No movement in or out of the plane of the cross section.
- Constant cross-sectional area (i.e., no volume loss or differential compaction).
- Constant bed thicknesses (i.e., parallel folding).
- Folding is fault-related (not due to salt or shale flowage or ductile deformation).
- No regional shear distributed through section (i.e., all units have experienced the same amount of hinterland shortening).
- No "hidden" bedding-parallel detachments (i.e., no interbed slip from outside the section along a bedding-parallel detachment).
- No out-of-sequence faulting or reactivation of faults.
- Non-metamorphic rocks.
- Fault slip is post-depositional (i.e., no growth section).
- Continuous sequence of strata (i.e., no major unconformities).

## Quick-Look Checklist

1. Do the number of ramps and flats match in the hanging wall and footwall?
2. Does each hanging-wall ramp truncate the exact same strata as is truncated by the corresponding footwall ramp?
3. Assuming no synorogenic sedimentation, are strata in each hanging-wall ramp approximately the same thickness as strata in each corresponding foot wall ramp?
4. Assuming that each hanging-wall and footwall ramp rests on a similarly-dipping fault segment, are their cutoff angles dramatically different?
5. Assuming no underlying footwall ramps of related faults, do strata in the hanging wall return to their "regional level"?
6. Does each flat in the hanging wall have approximately the same length as each corresponding footwall flat?
7. Do faults cut upsection in the direction of transport and place older beds over younger beds?
8. Does displacement magnitude and sense of offset vary consistently along each fault?

## Ramp & Flat Identification



## Inconsistent Number of Ramps & Flats

	Suspect	Plausible
Number of Footwall Ramps > Number of Hanging-Wall Ramps		
Number of Footwall Ramps < Number of Hanging-Wall Ramps		

## Inconsistent Thicknesses in Hanging Wall and Footwall Ramps

	Suspect	Plausible
Hanging Wall Above "Regional"		
Hanging Wall Below "Regional"		
Hanging-Wall Cutoff Angles <<< Footwall Cutoff Angles		
Different Strata in Corresponding Hanging-Wall and Footwall Ramps		

## Inconsistent Displacement along Fault

	Suspect	Plausible
Hanging-Wall Flat Longer than Footwall Flat		
Abrupt Increases in Displacement		
Reversal of Offset along the Fault		
Fault Cuts Downsection in Transport Direction		